

## **The International Commission on Snow and Ice (ICSI) and its precursors, 1894–1994**

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### **THE INTERNATIONAL GLACIER COMMISSION (CIG, 1894–1927)**

On 31 August 1894, in Zurich, Switzerland, the Council of the sixth International Geological Congress decided to create an International Glacier Commission (Commission Internationale des Glaciers, CIG) with the task of "inciting and spreading the studies of changes in the sizes of glaciers (provoquer et généraliser les études sur les variations en grandeur des glaciers)".

The CIG came into existence through the efforts of three men. Two of them were well known personalities of their day. François Alphonse Forel, Professor for Anatomy and Physiology in the Academy of Lausanne, had created the science of limnology and since 1881 had issued annual reports on the periodic variations of Swiss glaciers; he provided the theoretical and conceptual framework for the Commission. Prince Roland Bonaparte, a grand-nephew of Napoleon I, had explored and described glaciers in the French Alps and in the Pyrenees in the 1870s and 1880s; he had married the heiress to the Monte Carlo Casino fortune and provided the funds for the work of the Commission. But it was the third man who formally proposed the creation of the CIG to the 1894 Congress (in a letter reproduced in the Appendix as a translation from the Proceedings of the 1897 St. Petersburg Congress). Captain Marshall Hall, of the Wiltshire Militia was a Fellow of the Geological Society of London, and the son of a prominent physiologist who had invented artificial respiration and formulated the first theory of reflexes. Captain Marshall Hall in 1876 had founded the *Journal of Mineralogy* and in the 1880s worked with Forel in the Swiss Alps. He died in 1896 when CIG results were just beginning to take shape<sup>1</sup>.

Following the 1894 Geological Congress, each of the next six congresses received a report for the intervening period from the outgoing CIG President. These reports differed widely in content and style, reflecting the interests and personalities of the CIG Presidents. F. A. Forel, the first President, in his St. Petersburg (1897) address summarized the basic concepts and methods used in recording glacier variations. At Paris in 1900 the next President, Eduard Richter, Professor of Geography at Graz University, put forward the view that such variations occur with the 35-year "Brueckner" periodicity; at the same time he emphasized the need for studying features

<sup>1</sup> Hall's obituary appeared in the Geological Society Proceedings for May 1897 (Vol. 53, pp. 58-59)

such as moraines, seasonal speed variations, and mass budgets (discussed at an 1899 meeting of the Commission, *cf.* Historical note (1951). He expressed the hope that the Commission would live through three Brueckner cycles until the year 2000!

The next President was Sebastian Finsterwalder, Professor of Analytical Geometry and Calculus at the Munich Technische Hochschule (TH), and a pioneer in terrestrial and aerial photogrammetry. In his address to the Vienna Congress (1903) he outlined a mathematical formulation for Forel's and Richter's conceptual model of how glacier sizes and shapes vary in response to mass balance changes; a fuller version of that theory (Finsterwalder, 1907) anticipated the "kinematic waves" much discussed in the late 1950s and early 1960s. At Mexico City (1906), the next President, Harry Fielding Reid, Professor of Geology at The Johns Hopkins University, Baltimore, reported the arrival of the first data from Antarctica and compared different national ways in which data for the CIG were being formulated. He had earlier shown how the flux through the firm line of glaciers responds with time lags to accumulation changes (Reid, 1905), and after the 1906 San Francisco earthquake became widely known for his elastic reponse theory of earthquakes.

At Stockholm (1910) the next CIG President, Eduard Brueckner, Professor of Geography at Vienna University, described the worldwide glacier shrinkage since the middle of the 19th century as a cyclic phenomenon. Three years later at Toronto (1913) President Charles Rabot was able to report the first of the glacier re-advances which became general in the following decade. As it turned out, his successor became the last CIG President: Axel Hamberg, Professor of Geography at Uppsala University and best known for his multi-year studies of the Sarek Mountains in north Sweden, was elected by mail after only one CIG member had been able to attend the 1913 Toronto Congress. He kept the CIG alive through the First World War and presided over its post-war transformation (Hamberg, 1930).

In addition to the Presidential statements, a series of annual CIG reports entitled "Les variations periodiques des glaciers" recorded the results of glacier surveys and historical data in different parts of the world. The first eleven of these reports were published during the years 1895 to 1905 in *Archives des Sciences Physiques et Naturelles*, the remaining nine in Brueckner's *Zeitschrift für Gletscherkunde* (volumes 1-9, 1906-1913). This series started with a memorandum by Forel (1895) which established technical concepts and terms for a long term programme on glacier variations. Glacier states were to be specified as advance/retreat (*crue/decrue*), together with estimated dates of maximum and minimum extents. The initial annual report for 1895, by Forel and Léon du Pasquier, provided this information for the Central Alps, together with less specific reports from six other regions (the Pyrenees, the Caucasus, Central Asia, the Himalayas, the USA and New Zealand). A similar data mixture became a mark of the annual report series. While the reports from the Alps followed the Forel pattern, the Scandinavian reports provided instead annual tongue displacement, and many reports from other regions such as Greenland, Spitsbergen and Africa were largely confined to new glacier discoveries. In this way the annual reports of the International Glacier Commission came to define the range of information to be covered by a future glacier monitoring service.

## **THE GLACIOLOGICAL COMMISSIONS OF THE INTERNATIONAL ASSOCIATION OF SCIENTIFIC HYDROLOGY (IASH, 1927-1939)**

International scientific contacts in the early 1920s (as described by the Secretary of the 13th International Geological Congress in Brussels, 1922) were "totally disorganized". Hamberg's appeal to the Geological Congress Bureau for a reconstitution of the CIG remained without response. This directed his attention to a new post-war development: the Rome (1924) Congress of the International Union of Geodesy and Geophysics (IUGG) had created an "International Section of Hydrology"<sup>2</sup>. At its inaugural meeting in Rome (1924) the Section had discussed, but not decided, the formation of a Glacier Commission. Hamberg came to regard IASH as a possible alternative home for the CIG, especially since unlike the Geological Congress, the International Scientific Unions were able and willing to support their commissions financially.

A political difficulty, the exclusion of representatives from the defeated "Central Powers" of World War I, was in due course removed on the suggestion of the Royal Swedish Academy of Science. The surviving fourteen full members of the CIG then agreed to seek incorporation in IASH which, at its 1927 Prague Assembly, created its Glacier Commission, with Hamberg as first President and Paul Louis Mercanton as Secretary (Hamberg, 1930).

The next Assembly took place at Stockholm in 1930 and received the first report of the Glacier Commission (IUGG-IASH Publ. no. 14). President Hamberg, C. Rabot (Vice President), and P. L. Mercanton reviewed the move from the International Geological Congress to IASH and listed the changes which the lengths of glaciers in the Alps and Scandinavia had undergone between 1914 and 1928, together with the names of scientists who had collected the observations. This report series was later continued and extended by Mercanton with IASH Publ. no. 20 for the years 1928-31, no. 22 (1931-35), no. 30 (1935-46) and no. 32 (1947-50).

At the next IASH Assembly, in Lisbon, September 1933, Mercanton reported the "regretted disappearance" of Hamberg, who had died three months earlier (June 1928). His place as President was taken by Adolf Hoel, Dozent for Geology at Oslo University and veteran of many expeditions to Greenland and the Arctic islands. Mercanton's report to the Lisbon Assembly mentioned among other advances, Somigliani's viscous glacier model (also used by Lagally and others at that time, after having been first suggested by Hopkins (1845)), which enabled a maximum glacier depth estimate to be derived from the surface velocity. Proposals for seismic depth soundings were also mentioned.

Mercanton's views were sought by the Association on an American proposal for the creation of a Commission on Snow, along the lines developed by J. E. Church in the American Geophysical Union. Some questioned whether the different snow conditions in America and Europe provided snow hydrology with sufficient international interest, but such doubts were quickly put to rest. With the consent of the

<sup>2</sup> Soon to become the International Association of Scientific Hydrology (IASH), and later (1972), of Hydrological Sciences (IAHS).

meteorologists consulted, Church was invited to head a new International Commission on Snow and to submit a programme of work to the next Assembly which took place in 1936 at Edinburgh. There a joint symposium of the Commissions of Snow and Glaciers received 80 papers on all aspects of glaciology filling an 800 page IASH "red book" (Publ. no. 23). In one paper A. B. Dobrowolsky, Vice President of the Glacier Commission and author of the first modern glaciological textbook (Dobrowolsky, 1923) proposed the creation of a separate "Association of Cryology", an idea that has resurfaced repeatedly since then without being accepted. But as a significant development the two glaciological commissions decided later (1939) to form a single Commission on Glaciers and Snow, with J. E. Church as President and F. E. Matthes as Secretary. Then World War II halted everything once more.

### **THE INTERNATIONAL COMMISSION OF SNOW AND ICE (ICSI, 1948-1994)**

At the first post-war Assembly of the IASH in 1948 in Oslo the IASH Commission on Glaciers and Snow reappeared under its new name, International Commission on Snow and Ice (ICSI), or Commission Internationale de Neige et de Glace (CING). In a Presidential address, J. E. Church (Nevada University) described how the original CIG purpose had broadened to encompass all aspects of the modern science of snow and ice "with its multiple relationships and human services" – anticipating a theme of the 1980s. He mentioned a Russian idea for a "world snow year" which, he thought, might be combined with the explorations beginning in both the Arctic and Antarctic at that time.

One of those explorations, the Norwegian-Swedish-British Expedition to Queen Maud Land, was the brainchild of the next ICSI President, Hans W.-son Ahlmann (1948-1951, Stockholm University), Sweden's Ambassador to Norway and explorer of the glaciers surrounding the North Atlantic. The Maudheim expedition together with French and Australian expeditions to Antarctica became a prelude to the International Geophysical Year (IGY), which dominated the thoughts and discussions of ICSI at its Rome (1954), Toronto (1957), and Helsinki (1960) Assemblies.

Ahlmann's successor as ICSI President was Gerald Seligman (1951-1954), founder of the British (now International) Glaciological Society (IGS), first editor of the *Journal of Glaciology*, and pioneer of snow structure studies on the Jungfrauoch. His Presidential address to the Rome (1954) Assembly described the new discoveries in ice rheology and mathematical glacier modelling which became the theme of a special ICSI Symposium on the Dynamics of Glacier Movement held at Chamonix (1958). This was the first of a series of specialized symposia which the Commission had decided at Brussels (1951) to stage between IASH Assemblies, in order to gain more time for presentations and discussions.

Seligman's successor as ICSI President, Robert Haefeli (1954-1957, ETH Zurich) had extended the Jungfrauoch studies downstream along the Aletsch Glacier and combined the presidency of the International Glaciological Expedition to Greenland (EGIG) with his ICSI role. In the latter he was succeeded by Richard Finsterwalder

(1957-1960, TH Munich), the son of the 3rd CIG President and, like his father, a pioneer in glacier cartography and photogrammetry, which he had applied to the exploration of the Pamirs and the Nanga Parbat region. Although ill health prevented both Haefeli and Finsterwalder from giving Presidential addresses, their explorations and research helped to revive the idea of worldwide glacier monitoring.

At the Helsinki Assembly of IASH in 1960 a Symposium on Antarctic Glaciology (IASH Publ. no. 54) reviewed results of the IGY, to which the new ICSI President, Petr A. Shumskiy (1960-1963, Obruchev Permafrost Institute, Moscow) had himself contributed while wintering at Mirny, Antarctica. He later provided the first comprehensive description of the Antarctic ice sheet in physical terms (Shumskiy, 1967). The Commission's first Secretary, Pat D. Baird, Senior Research Fellow for Geography at the University of Aberdeen, handed over this vital office to a comrade of several expeditions to the ice caps of Baffin Island: W. H. (Bill) Ward, Head of the Geotechnical Division of the British Building Research Station at Watford, who had organized and led several expeditions to Norway's Austerdal Glacier (Austerdalbreen).

Bill Ward came to play a key role in designing a new structure for the Commission. The expanding special fields of glaciology were placed in the care of four Divisions, concerned with seasonal snow cover and avalanches (Marcel de Quervain); sea, lake and river ice (Elton Pounder); and ground ice (J. A. Bender)<sup>3</sup>. Responsibility for the fourth Division, concerned with glaciers and ice sheets, was taken initially by the entire ICSI team.

With this structure ICSI was able to respond to the new international demands for snow and ice research that had resulted from the successes of the IGY. Several large programmes for UNESCO's International Hydrological Decade (IHD, 1965-1974) were created by ICSI officers, led initially by ICSI President Herfried Hoinkes (1963-1967, Innsbruck University) in annual meetings with UNESCO officials.

A Symposium on Variations of the Regime of Existing Glaciers, staged in 1962 at Obergurgl (IASH Publ. no. 58), had received a report from the ICSI sub-committee on glacier variations. As formulated by John Nye, this report created the basis for a renewed monitoring of world-wide changes of glaciers as well as polar ice sheets. Now a Permanent Service for the Fluctuations of Glaciers (PSFG) was set up under the direction of Peter Kasser, and a World Glacier Inventory was started under the direction of Fritz Mueller. A latitudinal and longitudinal network of glacier stations for the measurement of heat, ice, and water balances in representative glacier basins was started under the direction of the next ICSI President, Mark Meier (1967-1971, US Geological Survey). The observations of glacier variations, the goal of the original CIG, were coordinated with other international data collection services, and nine Technical Reports were published jointly by UNESCO/ICSI-IASH, between 1967 and 1973.

These achievements were reviewed and placed into perspective in Presidential addresses by Herfried Hoinkes (Bern, 1967) and Mark Meier (Moscow, 1971). In the

<sup>3</sup> The growth of permafrost research later led to the establishment of the International Permafrost Association (IPA) and replacement of ICSI's Ground Ice Division by a Division on Ice as a Material.

same period the Division of Seasonal Snow Cover and Avalanches, under the leadership of Marcel de Quervain, organized a Symposium on Scientific Aspects of Snow and Ice Avalanches which took place at Davos in 1965. Furthermore a start was made on the creation of an avalanche classification and of a pictorial atlas of avalanches.

Up to the 1971 Moscow Assembly the work of ICSI had been recorded in summaries only, first in the *Journal of Glaciology* and later in the IGS news magazine *Ice*. From then on most of the original minutes of ICSI Bureau meetings have been preserved. Many of these minutes contain detailed discussions which make it possible to identify contributions from individual ICSI officers, to whom, however, this "occasional" history cannot hope to do full justice.

At the 1971 Moscow Assembly of IUGG the IASH proposed to nominate future ICSI officers in line with the Association's procedure for its other Commissions. However, the glaciologists had always nominated their own officers and felt they knew the field better than other hydrologists. They succeeded in preserving that right as part of new ICSI Statutes, formulated by Bill Ward and John Nye.

The new ICSI formed at the Moscow Assembly had a new Secretary, Fritz Mueller (ETH, Zurich). The new President, John Nye (1971-1975, Bristol University), was able to report at Grenoble in 1975 that, in addition to planning for the International Hydrological Programme (IHP, successor to the IHD), the Commission had organized Symposia on Snow Mechanics (Grindelwald, 1974) and on Isotopes and Impurities (Grenoble, 1975). The latter topic had acquired special interest from the successful extraction of long cores from ice sheets and glaciers, providing new climatic information. This coincided with the appearance of the first computer simulations of real glaciers (including surging glaciers) and ice sheets. A steady state computer model of the Antarctic ice sheet, which yielded an approximate but quantitative description of its main physical features, took a step towards answering the questions raised in the IHD about the Antarctic mass balance and its effect on sea level.

The detailed minutes of ICSI meetings reveal that some special questions had also received attention. One of these was a proposal for letting masses of radioactive nuclear waste melt their way down into the Antarctic ice sheet as a permanent storage site. In view of an as yet inadequate understanding of ice sheet dynamics and the possibility of surges the Commission took a strong stand against this proposal.

The next ICSI President, Uwe Radok, (1975-1979, Melbourne University) and a new ICSI Secretary, Malcolm Mellor (US Army Cold Regions Research and Engineering Laboratory) decided that the dominant theme for the following four years would be the roles played by ice in climate. This led in due course to a Symposium on Sea Level, Ice and Climate Change at the Canberra (1979) Assembly, where the first detailed computer history of the Wisconsin ice sheet, as driven by orbital changes, was presented. A regional training seminar on snow, ice, and avalanches was organized by Bruno Salm, Chairman of the Division of Seasonal Snow Cover and Avalanches, at Manali, India in 1977. Norbert Untersteiner, the new Chairman of the ICSI Division on Sea, Lake and River Ice, arranged for a Symposium on Sea Ice Processes and Models (Seattle, 1977). Workshops were held on the computation and prediction of runoff (Tbilisi, 1978), on the World Glacier Inventory (Rieder Alp, 1978) and on mechanical

properties of ice (Boulder, 1979); and UNESCO published ICSI reports on the climatic roles of ice and on the remote sensing of ice.

The next Commission under President Fred Roots (1979-1983, Environment Canada) and Secretary Malcolm Mellor, helped to start Phase II of the IHP and assisted major atlas projects on world snow and ice resources (V. M. Kotlyakov, Soviet Academy of Sciences) and satellite images of glaciers (Ritchie Williams and Jane Ferrigno, US Geological Survey). The Working Group on Glacier Mass Balances and Runoff, established in 1974 under the leadership of Gordon Young, presented its Final Report and a *Manual on Runoff Prediction* still in use by UNESCO and IHP hydrologists. New Working Groups were created on Large-Scale Effects of Seasonal Snow Cover, on Problems of the Snow and Ice Hydrology in Glacierized Regions, and on Remote Sensing of Ice and Snow including that of the large polar ice sheets. A further Himalayan training seminar was organized in Nepal, and preparations were made for a 1985 seminar in the Andes.

The Permanent Service for the Fluctuations of Glaciers (PSFG) published a *Report on World-Wide Glacier Variations during 1975-1980*, and preliminary results of the *World Glacier Inventory* (delayed by the untimely death in 1980 of its founder, Fritz Mueller) were reported. In discussions with the ICSU Panel on World Data Centres (WDCs) and the Federation of Astronomical and Geophysical Services (FAGS) the categories for data in WDCs (Glaciology) were revised to reflect priorities of current research and international glaciological programmes, to include information on sea ice, and to add PSFG data to those reported regularly by FAGS.

Symposia staged or co-sponsored by ICSI dealt with technical problems of floating ice (discussed in cooperation with the International Association of Hydraulic Research, IAHR, at Quebec in 1981), and with large-scale snow studies and problems of the marginal sea ice zone (Hamburg 1983). In his Presidential address to the 1983 IAHS Assembly, Fred Roots reviewed existing problems of snow and ice and showed their study to have become an international responsibility.

The next ICSI was led by President Louis Lliboutry (1983-1987, Grenoble University) and Secretary Gorow Wakahama (Hokkaido University) who later received help from an executive secretary in the person of Vice President Bruno Salm (who also continued as chairman of the Division of Seasonal Snow Cover and Avalanches). A Symposium on the Modelling of Snowmelt-Induced Processes was staged in 1986 at Budapest, and Working Groups were created on Snow Classification and on Snow Chemistry. A major event was the fusion in 1985 of the PSFG with the World Glacier Inventory's "Temporary Technical Secretariat" (TTS – so called to assuage UNESCO's aversion to new permanent scientific organizations) into a single World Glacier Monitoring Service (WGMS) under Wilfried Haeberli.

Concurrently the appropriate tasks for such elements of ICSI and for the Commission itself came under scrutiny. The outgoing Secretary Malcolm Mellor had established closer links with snow and ice engineering, while President Lliboutry pursued contacts with IUGG meteorologists and oceanographers. He proclaimed ICSI's rightful role as covering all branches of glaciology, with an emphasis on physical aspects, demanding in particular the monitoring of mass balances in addition to the traditional records of glacier size fluctuations.

A new ICSI Bureau with President Vladimir Kotlyakov (1987-1991, Soviet Academy of Sciences) and Secretary General (a title later questioned by IAHS) Bruno Salm (Davos Snow and Avalanche Research Institute) then took over. Four years later, at the 1991 Vienna Assembly, Kotlyakov looked back at his five years as President, and at 15 years previously spent in other ICSI positions. He noted the emergence of global change as an overriding international concern, with new projects such as the World Climate Research Program (WCRP) and the International Geosphere Biosphere Program (IGBP), both turning to snow and ice for information on the past; the Decade of Natural Hazard Reduction, requiring inputs from the ICSI Avalanche Division; and the fourth phase of the IHP, with ICSI contributions on the impact of global snow and ice upon global and regional precipitation systems, and on the hydrology of snow and ice in mountain regions (with special attention to long period fluctuations of water reserves).

Working groups on Snow Chemistry and Snow Classification had reported their conclusions. The World Glacier Inventory had received long withheld coordinates of Soviet glaciers, and the WGMS had published volume 5 on the fluctuations of glaciers during 1981-1985 and was preparing the sixth volume on the next five years. Other publications included a *Snow and Ice Glossary* and a report on *Variations of Snow and Ice in the Past and Present on Global and Regional Scales*. Several volumes of the *Satellite Atlas of Glaciers* had appeared in print, and the *Atlas of World Snow and Ice Resources* was reported to be ready for publication but facing difficult domestic circumstances.

In addition to dealing with this plethora of projects (and acronyms), the ICSI Bureau discussed coordination of symposia with the International Glaciological Society, and somewhat unwieldy new rules proposed by IAHS for the election of Commission officers. New Working Groups were created for Extraterrestrial Ice, Snow Ecology, and Snow-Atmosphere Exchange, while consideration of snow biochemistry was postponed. Symposia were staged or co-sponsored on Snow Cover and Glacier Variations (Baltimore, 1989), Glacier-Ocean-Atmosphere Interaction (Leningrad 1990), Snow and Ice Chemistry (Sapporo, 1991), and Snow Hydrology and Forests in High Alpine Areas (Vienna, 1991).

## FIN DE SIÈCLE

The next ICSI Bureau with President Michael Kuhn (1991-1995, Innsbruck University) and Secretary General Bruno Salm staged symposia and workshops at Kathmandu, Copenhagen, Tashkent and Yokohama. The World Glacier Monitoring Service (WGMS) issued *Fluctuations of Glaciers 1985-1990*, completed the second and third of a new series of *Glacier Mass Balance Bulletins*, and prepared a report on *Glacier Monitoring into the 21st Century*. As a welcome return to the pages of the International Glaciological Society newsletter *Ice*, a report on ICSI activities was published by Gordon Young (1993). President Kuhn's ICSI had the privilege of celebrating the centenary of the International Glacier Commission and rose to the occasion at Innsbruck in September 1994 with a Symposium on Glacier Mass Balances: Measurements and Reconstructions.

Discussions at Innsbruck again addressed the basic question of ICSI's mission. President Kuhn emphasized that the Commission should define focal points for glaciological research and promote exciting new projects. Conforming with the new Association rules for electing Commission members, a slate of nominations was adopted. These were confirmed at the 1995 Boulder General Assembly of IUGG and are taking ICSI under President Elizabeth (Liz) Morris (1995-1999, British Antarctic Survey) and Secretary Andrew Fountain (US Geological Survey) to the end of the third Brueckner cycle, as hoped by CIG President Eduard Richter 100 years earlier.

## SOURCES

Ten years after the International Commission on Snow and Ice had acquired its present name, the Commission's first secretary, Pat Baird, traced its history back to its 1894 beginnings at the 6th International Geological Congress (Baird, 1958). A briefer history with a useful list of ICSI reports was published by another ICSI Secretary, Malcolm Mellor, in 1981. Other sources used include Axel Hamberg's (1930) account of the CIG's final days; Peter Kasser's (1993) history of the Swiss Glacier Commission; the reports of the CIG Presidents to six International Geological Congresses; twenty annual CIG reports entitled *Variations Periodiques des Glaciers*; and published and unpublished minutes of ICSI meetings. All this material is being formed into a continuing ICSI archive at the British Antarctic Survey (High Cross, Madingley Road, Cambridge CB3 0ET, UK).

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## APPENDIX

Captain Marshall Hall's letter to the President of the 6th International Geological Congress in Zurich, proposing the creation of an International Glacier Commission (CIG); translated from pp. CXCVI - CXVIII of *Comptes Rendu* of the 7th session of the 1907 St.Petersburg Congress (St. Petersburg, 1899); some original terms in brackets:

*Parkstone, Dorset, England,  
1 August 1894*

*Dear Mr. President,*

*During recent years there have been studies of glacier variations, and careful and qualified observers have published the glacier history of several European countries ("contrees"). Switzerland, France, Austria, Bavaria, and Italy have made available (donne jour a) reports thanks to which we can create a beginning of what, for lack of a better expression, I will be permitted to call comparative glaciology. The growing attention devoted to meteorological data opens for us a research field on the subject of the influence of climates on the history, as much ancient as modern, of variations in the size of glaciers.*

*On the other hand, our knowledge of Arctic and Antarctic glaciers, and of those of Scandinavia, Iceland, Greenland, the Himalayas, America, New Zealand, etc.etc. as yet is little complete, despite interesting contributions from numerous expert and devoted explorers.*

*It will facilitate considerably the study of the combined material on the changes in glacier sizes if the results obtained in each country were combined (reunis) in a single annual report (which could encompass also meteorological data). We would soon arrive at comparisons which would without doubt throw light on numerous problems of natural history, problems of interest for geologists as much as for glaciologists (glaciairistes).*

*I have the honour of proposing to the Congress the creation of a commission, composed of one or several members from each country, charged to choose between them a recorder (redacteur) for each country; the recorder each year will make his report to the President of the Commission who will publish it in entirety or in part.*

*While leaving each country full freedom for the study of its glaciers, the Commission would indicate certain general rules for the manner in which the work would lead to combined results which would be comparable with (entre) one another.*

*It would be useful to have the general report edited in a single language; this would simplify the research and the correspondences. I propose the use of French. All measurements must be given in the metric system.*

*(At the request of the undersigned, the English Alpine Club has already taken a first step along this road, by addressing to the governments of the English colonies a circular, asking that the informations and observations on the changes of the magnitudes of glaciers be brought together).*

*It is likely (a croire) that the interest of these investigations will expand with each year. By following up the project which I have sketched, the Congress, I am convinced, will enter a useful and fertile road; I dare hope that my proposal will be judged worth the attention of the experts assembled at Zurich, in sight of the eternal snows of the Swiss Alps.*

*With expressions of my highest sentiments*

Captain Marshall Hall  
F.G.S.