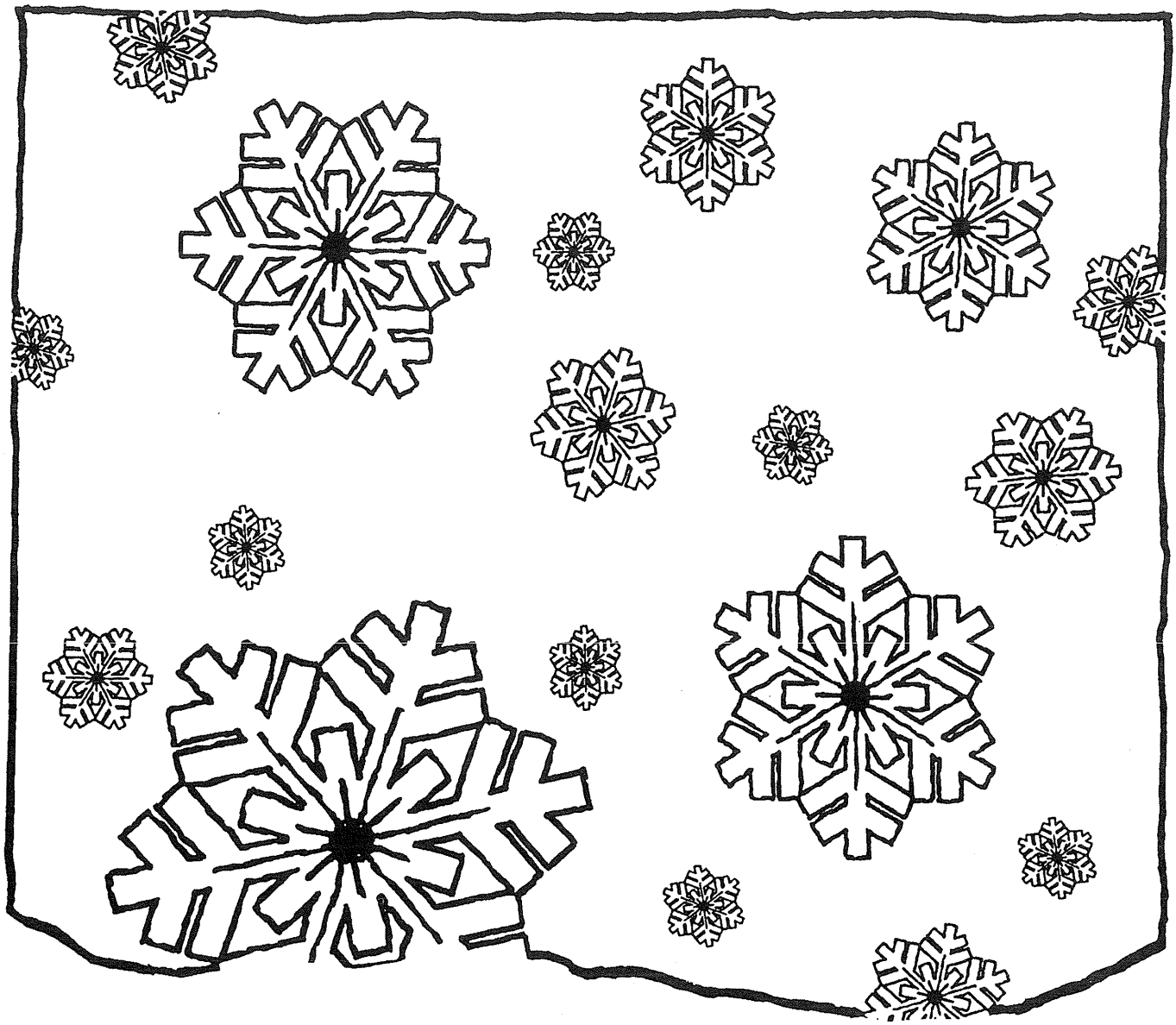

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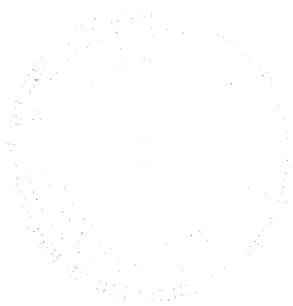
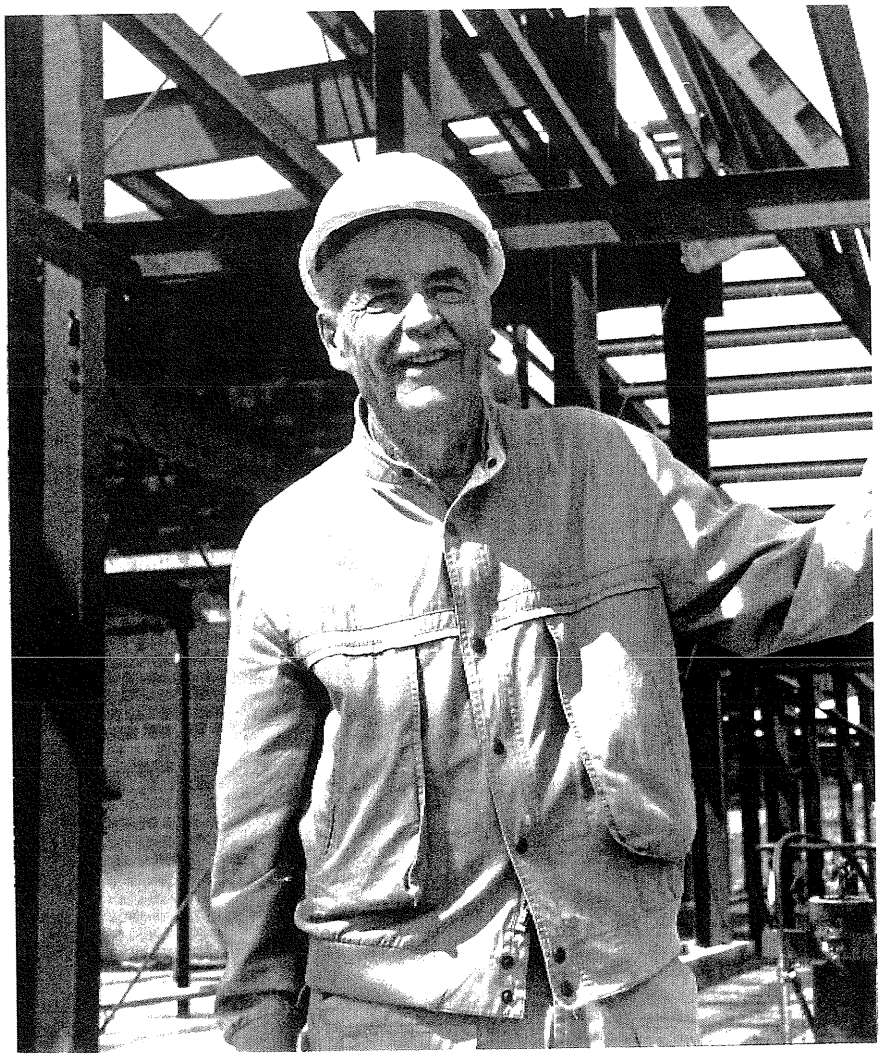


DEDICATION

Robert Sykes



Livingston Lansing, May 1992.

Livingston Lansing (1911–1992) was both my close professional and personal friend for nearly 30 years. Our association began soon after my mid-1961 arrival in Oswego, New York, during the late winter of 1961–1962 and under the auspices of the Atmospheric Sciences Research Center, State University of New York at Albany. Our professional relationship expanded rapidly due to common interests, especially lake-effect snow conditions (Liv in Boonville, New York, and I in Oswego) and due to developing involvements in the Eastern Snow Conference of which Liv had been president for the 1956–57 term. Within a few years, contacts increased to scores per year, some personal but mostly by telephone, especially during the snow seasons and lake-effect periods. Of course, it helped that in those early years synoptic and descriptive meteorology included also the meso-micro-features relating to lake-effect weather. Through interweaving of common weather interests I gained respect for Liv's ingrained characteristic for selfless sharing of his vast knowledge about lake-effect conditions. Later, I came to know how pervasive was Liv's selflessness.

Instead of applying the principle of "*Lex Talionis*"—measure-for-measure—in the customary negative way, Liv applied the principle very positively; i.e., he gave much more than he received in support, cooperation and resources. He was ever ready to "round corners" and to strike forward thoughtfully and bravely. Those courses and actions in weather matters which he considered false or directionless were quickly renounced. Customarily, he sought to develop from sound foundations. When opinions and/or recommendations were needed, he used gentlemanly and compassionate ways. When faced with problems and blockages, he thus characteristically reminded me of means to recognize and attack. When unforeseen developments arose, and these are legion in weather, he exhibited flexibility in considering and dealing with challenges using balanced and innovative judgments. He used a well-developed capacity to remember past events and circumstances without being inexorably tied to them.

During our years of association, several episodes, among many that could be listed, stand out boldly as significant to our interactions. These were:

a. The 4-1/3-day 1966 Blizzard Period with its 102-in. plus snowfall total (we had several dozen conversations);

b. The near-hurricane-strength synoptic and lake-effect storm of early December 1968, with scattered blizzard-affected areas (I traveled to Whiteface Mountain but then returned with him for a 2-day Boonville stay);

c. The 29th ESC meeting at Oswego, 3–4 February 1972, when blizzard conditions forced many attendees to stay over because some 55+ inches of snow fell during about 44 hours (Liv participated in storm-period field work, then headed a convoy out of Oswego during a break on the 4th);

d. And, in early December in one of the early 1970s when Liv asked me to crew for him in transferring his research vessel, the *Edith B*, to winter quarters along the St. Lawrence River. Since this episode was directly life-threatening, I will detail it briefly:

We departed Oswego about mid-morning. Shortly after departure we encountered heavy weather including some light snow, but much more importantly, 8 to 10-ft waves; rather large for his 35-ft boat. During some of the afternoon "heavings," and while we were out of sight of land, fire broke out in the engine compartment. His quick and calm action (plus "whatever") brought us through this travail so that we were able to limp during the evening to the U.S. Coast Guard outpost on Galloo Island, some 34 miles north-northeast of Oswego. We passed on to the wintering place during the following day. His boat sank a couple of days later!

In conclusion, Liv was a man of unquestioned integrity, possessing exceptionally high standards and principles in his professional and personal relationships. His word was his bond. He gave unstintingly of his talents, his knowledge and his resources. I was privileged to share some of these in my strivings for increased knowledge and understanding of weather, especially lake-effect snow conditions in our geographical area.

FOREWORD

The 50th annual Eastern Snow Conference (ESC) was held in Quebec City on June 8–10, 1993. The meeting was held jointly with the Western Snow Conference (WSC) whose members greatly contributed to the success of the conference and the publication of these proceedings. The program included oral and poster presentations and displays of scientific equipment. All of the papers at the conference were reviewed, and the revised papers appear in these proceedings.

The ESC provides a valuable forum for discussion of recent work on operational, applied, and scientific issues related to snow and ice. To facilitate this process, the chairman of each session collects draft manuscripts at the meeting, and coordinates the review of papers in his/her session. If the chairman is also an author of a paper in the session, the responsibility for review of that paper is shifted to another chairman. The review process involves the membership of the conference and their colleagues in the preparation of thoughtful, constructive reviews. At least two reviews are obtained for each paper and returned to the authors before August 1. Final camera-ready manuscripts are submitted by the authors in early September. Involvement of members as authors and reviewers increases participation in the conference, and benefits the quality of these proceedings. The session chairs, reviewers and authors cooperate with the editors to assure timely publication.

In addition to the review process, the 1993 proceedings include the designation of an Honor Paper Award. Through this award the ESC annually recognizes members of the snow and ice community for a well-written and substantive paper. During the review of draft manuscripts the referees nominate papers that they consider worthy of this award. The criteria that are applied include:

1. Clarity of the written presentation
2. Originality of the contribution
3. Importance of the work in practice or in basic understanding of snow-and ice-related processes.

Four papers received unanimous nominations by the reviewers for consideration as the 1993 Honor Paper. The nominated papers were all of high quality. The final camera-ready version of each nominated paper was reviewed a second time by a five-person panel having a broad range of backgrounds and interests. The 1993 Honor Paper Award was presented to J.W. Pomeroy and R.A. Schmidt for their paper entitled "The use of fractal geometry in modeling intercepted snow accumulation and sublimation."

Publication of this year's proceedings was accomplished with the assistance of the Technical Communication Branch, Technical Resources Center, U.S. Army Cold Regions Research and Engineering Laboratory. This group willingly contributes their time and talent to enhance the quality of these proceedings while working under tight deadlines. The editors especially thank Sandra Smith and Edmund Wright for exceptional effort in the final production of this document.

The editors have received inquiries from authors concerning journal publication of papers presented at the ESC and published in these proceedings. We request that for journal publication authors expand on the work reported here. A final journal paper can discuss the same subject and include the parts of the ESC version that remain relevant, but the contents should not be identical. An acknowledgment of the ESC in the final work would be much appreciated and effective for increasing the interest in and vitality of the Conference.

Membership in the ESC is open to all interested individuals and corporations. Additional copies of the current proceedings and all back issues can be obtained from the Secretary. The annual meeting of the Eastern Snow Conference is co-sponsored by the American Geophysical Union and the American Water Resources Association. Publication of these proceedings is made possible in part by Corporate Memberships in the Conference held by:

Hydro Québec
75 Boulevard René Lévesque
Montréal, Québec
CANADA H2Z 1A4

Province of New Brunswick
Department of the Environment—Water Resources
P.O. Box 6000
Fredericton, New Brunswick
CANADA E3B 5H1

Ontario Hydro
700 University Ave.
Toronto, Ontario
CANADA M5G 1X6

Niagara Mohawk Power Corp.
300 Erie Blvd. West
Syracuse, NY 13202
U.S.A.

The historical setting of this year's meeting is described by "ESC Remembrances: '74 to '93," by Don Wiesnet. The reader is referred to the 1982 and 1985 Proceedings for other historical information on the conference.

This is our final Proceedings as ESC editors. We are especially appreciative of the assistance provided by our colleagues in the ESC and at CRREL. Their contributions have been invaluable and have made our term as editors a very enjoyable experience. We gained much both personally and professionally from their expertise and fellowship. The ESC is a unique group of professionals that nurtures growth by providing opportunities for collegial interaction in an informal setting. Our predecessor, John Lewis, and his predecessor, Barry Goodison, laid the groundwork for any success we have had in our endeavors. The editors for the 1994 Proceedings will be Mary Albert and Susan Taylor. We wish them success and enjoyment in their experiences with the ESC. We look forward to an outstanding 51st meeting in Dearborn, Michigan, June 1994.

Michael Ferrick
Editor

Timothy Pangburn
Co-Editor

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THE EASTERN SNOW CONFERENCE

The Eastern Snow Conference (ESC) is a joint U.S./Canadian organization which was founded in the 1940's. It is an association of people interested in research and applied aspects of the study of ice in all its forms, especially snow. The principal activities of the ESC are the organization of an annual meeting, in the U.S. or Canada in alternate years, and the production of the annual Proceedings of the Eastern Snow Conference, which now form more than forty volumes deposited in libraries throughout North America and Europe. The annual meetings are sometimes held in major cities such as Washington, Montreal, Toronto or Boston and sometimes in smaller cities such as Peterborough, Oswego, Portland or Fredericton.

The members of the ESC are a very diverse and, over the years, fluctuating, group. They include professional snow surveyors, engineers and technologists (of various stripes), professors and students, hydrologists and biologists, people responsible for keeping roads clear of snow and rivers free of ice, and others interested in snow and agriculture. The members are drawn from all parts of eastern North America, they live and work in places which extend from Maryland to the high Arctic. The line between the territory of the ESC and its counterpart in the other half of the continent, the equally venerable Western Snow Conference, is not a precise one. Residents of the Mid-west and of the Prairie provinces seem to join one or the other organization on the basis of personal whim such as a preference for Reno, Nevada, over Bangor, Maine, as a desirable meeting place.

In recent years, the annual ESC meetings have included sessions on snow and small mammals, snow and buildings, river ice, permafrost, remote sensing of snow and ice, biology of sea ice, snow and ice on lakes, measuring snow and ice, hydroelectricity and snow and ice, glaciers, icebergs, snow and farming, etc.

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Eastern Snow Conference est une organisation internationale canado-américaine fondée dans les années '40. Elle regroupe des gens qui ont des intérêts communs dans l'étude théorique et pratique de la glace sous toutes ses formes, en particulier sous la forme de neige. Eastern Snow Conference a comme activités principales d'organiser sa réunion annuelle en alternant le site du Canada aux États-Unis, d'en produire les comptes-rendus qui se montent maintenant à plus de quarante volumes que l'on peut trouver dans les bibliothèques de l'Amérique du Nord et d'Europe. La réunion annuelle peut se tenir tout aussi bien dans des villes importantes comme Washington, Montréal, Toronto ou Boston comme dans des plus petites comme Peterborough, Oswego, Portland ou Frédéricton.

Les membres d' Eastern Snow Conference représentent un grand nombre de domaines reliés à la neige et la glace. On y retrouve des spécialistes des relevés de neige, des ingénieurs et des techniciens, des professeurs et des étudiants, des hydrologues et des biologistes, des gens ayant la responsabilité d'entretenir les chemins en hiver ou de contrôler la glace en riviére, d'autres ayant quelqu'intérêt dans la neige et l'agriculture. Tous ces membres viennent de l'est de l'Amérique du Nord et peuvent y habiter de Maryland, U.S.A., à l'Arctique. D'ailleurs la ligne qui sépare le territoire d' Eastern Snow Conference à son pendant de l'ouest la vénérable Western Snow Conference est assez diffuse. Les habitants du centre-ouest américain ou des Prairies peuvent choisir de rallier une ou l'autre organisation sur une base très personnelle comme de préférer d'aller à Reno, Nevada, plutôt que Bangor, Maine, pour leur colloque annuel.

Dans les derniéres années, aux réunions annuelles d' Eastern Snow Conference on a tenu des sessions sur la neige et les petits mammifères, la neige et le bâtiment, la glace de riviére, le pergélisol, la télédétection de la neige et de la glace, la biologie de la glace marine, la neige et la glace lacustres, la mesure de la glace et de la neige, l'hydroélectricité et la glace et la neige, les glaciers, les icebergs, la neige et l'agriculture, etc.

EASTERN SNOW CONFERENCE OFFICERS
1992–1993

PRESIDENT
Terry Prowse
NHRI
11 Innovation Blvd.
Saskatoon, Saskatchwan S7N 3H5

VICE-PRESIDENT
Derrill Cowing
U.S. Geological Survey
WRD, 26 Ganneston Drive
Augusta, ME 04330

PAST-PRESIDENT
Timothy Pangburn
U.S. Army—CRREL
72 Lyme Road
Hanover, New Hampshire 03755-1290

SECRETARY/TREASURER
John Metcalfe
161 London Road
Newmarket, Ontario L3Y 7A7

ASSISTANT SECRETARY
Donald Dunlap
12 Seaman Street
New Brunswick, New Jersey 08901

EDITORS
Michael Ferrick and Timothy Pangburn
U.S. Army—CRREL
72 Lyme Road
Hanover, New Hampshire 03755-1290

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THE PRESIDENT'S PAGE

The 1993 annual meeting of the Eastern Snow Conference (ESC) marked the 50th anniversary of this highly-vibrant informal society. The long history of the ESC owes much to past ESC Presidents. Their contributions were formally acknowledged at a President's Luncheon and marked by the production of a 50th anniversary gold snowflake pin. True dedication to the ESC is exemplified by the contributions of the late Livingston Lansing, the ESC's 14th President (1956; Syracuse, New York), to whom these proceedings have been dedicated .

Greatly contributing to the resounding success of our anniversary conference was the presence of the Western Snow Conference (WSC) which chose to combine their 61st annual meeting with our 50th celebration. Special thanks are due to Neil Berg, Tom Carroll, Jim Marron, and Al Rango of the WSC for their assistance in planning of the event. The meeting profited greatly from some unique forms of scientific and social synergism that developed between the two conferences, a convincing argument for holding future joint meetings. In recognition of the WSC's contribution to our golden anniversary, a set of golden shears (all formal tie-wearers beware) were presented to General Chairperson, Neil Berg.

The venue for the 50th ESC, the Chateau Frontenac of Quebec City overlooking the St. Lawrence River, was unsurpassable. On behalf of all those who attended the meeting, I would like to express our sincerest thanks to Paul Lamb and Gerry Jones who performed such a stunning job of local arrangements. Items such as the Canadian supper at Relais des Pins, the trip to the Mont Ste.-Anne ski centre, the boat cruise of the St. Lawrence, and the superb evening banquet were expertly arranged right down to the smallest detail and will ensure that everyone has fond memories of the meeting. Management of the finances for such a diverse event was no simple task. Our continuing fiscal stability has been very much a product of the pecuniary talents and commitment of our Secretary-Treasurer, John Metcalfe.

The scientific program for the three-day program was one of the largest in ESC history, comprising some 38 oral and 29 poster papers. Good representation from both the ESC and WSC was achieved in both categories. Derrill Cowing, the 1993 ESC Vice-President and program chairman, performed a superb job in arranging a stimulating and diverse technical program. Thanks are also due to all the contributing authors and presenters, especially to Ginette Devarennes for her paper entitled, "Composition physico-chemique de la neige artificielle et les impacts des eaux de fonte sur deux espèces végétales des écosystèmes montagneux au Québec," winner of the 50th Anniversary Student Paper Competition and recipient of the Wiesnet Medal, and to John Pomeroy and R.A. Schmidt for their paper entitled, "The use of fractal geometry in modeling intercepted snow accumulation and sublimation," winner of the ESC Honour Paper Award. In addition to these historically ESC awards, best oral and poster presentation awards were presented at the conference. These 50th meeting awards, which are part of the WSC tradition, were presented to Robert E. Davis for his oral presentation entitled, "Estimating total snow volume in a small alpine watershed using remotely sensed data and ground-based surveys," and Charles Troendle for his poster presentation entitled, "Partitioning the deposition of winter snowfall as a function of aspect on forested slopes." Given the size of the 50th proceedings, much credit is due to the ESC editors, Mike Ferrick and Tim Pangburn, who have produced such an excellent volume in so little time. Over the past few years, they have worked hard and succeeded at further elevating the quality of this internationally read annual publication.

Success of the meeting and continuation of the dynamic nature of the ESC depended very much on the energy and support provided by all the ESC officers, a list of whom is contained at the front of this set of proceedings. Space precludes a recounting of the myriad of duties, ongoing projects, and newly initiated tasks performed by the various officers and committees. These are, however, detailed within the ESC minutes and Duties of Officers that are freely obtainable from any officer of the ESC Executive. On this note, I strongly encourage any interested ESC member to review this material and, if they identify an area or position in which they would like to become involved or feel that they have something to contribute, to contact any officer of the ESC about joining the Executive. The strength of the ESC is

contribute, to contact any officer of the ESC about joining the Executive. The strength of the ESC is founded on volunteers within the snow and ice community; its future rests with the nurturing of new people into the organization.

Lastly, I would like to reflect on my own role as President. Performing the duties of the ESC President has actually been a job of relative ease because of the strong dedication to duty shown by the ESC Executive. I express my thanks to all twenty-six of them for making my presidential tenure so enjoyable and gratifying. I look forward to the ESC's 51st meeting in Dearborn, Michigan, and hope that you will make plans to attend.

Terry D. Prowse
50th President
Eastern Snow Conference

THE WESTERN SNOW CONFERENCE

The Western Snow Conference (WSC) provides an international forum for individuals and organizations to share scientific, management, and socio-political information on snow and runoff from any viewpoint. An aim of the WSC is to advance the snow and hydrological sciences. Membership is open to any person or institution having an interest in snow and runoff issues.

The WSC meets annually, in mid-April; both oral and poster papers are presented. The meeting location rotates geographically among four areas of the western United States and Canada. Each conference includes a technical field trip, often to operational facilities for hydroelectric power generation or water supply development.

Proceedings from the conference are published annually. The proceedings of the sixty-second annual meeting will be published by December 1994.

The origin of the WSC stems from the pioneering work in snow hydrology and runoff forecasting of Dr. James E. Church. Although these topics remain central themes of the WSC, issues discussed at recent conferences have broadened to include snow loading onto structures, global climatic change, snow chemistry, environmental influences on snow microbes, and snow management for soil reclamation.

The WSC periodically issues resolutions on topics of interest to members. One ongoing issue is the deployment of snow sensing devices in wilderness areas in the United States. In the past, members of the U.S. Congress have been notified of the WSC's position on this issue.

WESTERN SNOW CONFERENCE OFFICERS
1993–1994

General Chairperson
Neil Berg
Forest Service, USDA
Pacific Southwest Research Station
P.O. Box 245
Berkeley, California 94701

General Chairperson-Elect
Robert Richards
British Columbia Ministry of Environment
765 Broughton Street
Victoria, British Columbia V8V 1X4

Secretary/Treasurer
Gary Hester
California Department of Water Resources
1416 9th Street., Room. 1609-5
Sacramento, California 95814

Secretary/Treasurer-Elect
Eric Weiss
British Columbia Hydro
c/o 970 Burrard Street
Vancouver, British Columbia V6Z 1Y3

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THE GENERAL CHAIRPERSON'S PAGE

The joint meeting of the Eastern and Western Snow Conference in Quebec was a great success. Over 130 individuals registered officially, including more than 40 WSC members. High quality papers were presented and the numerous extracurricular activities (ranging from a boat ride down the St. Lawrence River to a traditional Canadian dinner) were memorable. The success of this meeting convinced members of both organizations that we should meet jointly more often. Details are being worked out, and don't be surprised if a joint meeting is held in 1998.

At Quebec, members from both organizations participated as session chairs and in decisions on the various "best paper" awards. But let's be honest; the ESC put in by far the bulk of the monetary backing and labor needed to make the conference a winner. I am indebted to Terry Prowse, Derrill Cowing, Paul Lamb, John Metcalfe, Mike Ferrick and a host of other ESC members for their contributions to the joint conference. They made my job a piece of cake! Western Snow Conference members who took particularly active roles include Tom Carroll, Jim Marron, and Al Rango. Tom and John should also be acknowledged as members of both Snow Conferences. They perform a unique "bridging" role that links our two organizations.

Terry Prowse, in his "President's Page," describes the best oral presentation and best poster paper awards presented at the banquet. Jim Marron was awarded Honorary Life Membership in the WSC for his many years of service as the Conference's Secretary, and for his continuing crucial role as consultant to the General Chairperson and Secretary/Treasurer. Jean Brown and Jack Pardee, both recent retirees from the California Department of Water Resources, and Ken Brust, of SCS Snotel Systems, were recognized as Retired Members. Oliver Johnson, a former employee of the Corps of Engineers, passed away since the 1992 WSC meeting.

The 1994 WSC will be held at the Inn at Loretto, Santa Fe, New Mexico, April 12–14. Santa Fe has a rich heritage of New Mexican architecture and cuisine set in an environment of majestic mountains overlooking arid valleys. Lodging costs, at $72 single/$90 double, will be no greater than federal per diem rates. There should be shuttle service directly from the Albuquerque airport to the Inn. There's no reason why you shouldn't join us in Santa Fe!!

Neil Berg, General Chairperson
Western Snow Conference

ESC REMEMBRANCES: '74 TO '93

by

Donald R. Wiesnet

I still remember well my very first Eastern Snow Conference (ESC). It was in the beautiful city of Ottawa, Canada, in 1974 at the Chateau Laurier. I was very much impressed. The Chateau was a beautiful place to have a meeting. I had come up from Washington to present a paper on the newly found ability of satellites to monitor transient snow cover to those hydrologists interested in snow cover and snow runoff. Ray Falconer was the president that year and the legendary Gordon Ayer was Secretary. I also found to my surprise that an old high school chum, Art Eschner of the University College of Forestry at Syracuse, was also a member of the ESC; it was a delightful reunion for me. I learned first hand of the wide diversity of the ESC, by hearing papers on the making of artificial snow, frost depth and heat-flow models. And of course the inevitable saga of the snow-burst phenomenon, an Oswego special by Bob Sykes, who was to become a lifelong ESC buddy and good friend. I also discovered that many members of the ESC were very much addicted to one of my hobbies, the drinking of Canadian ale. And thus I was hooked at that my very first meeting in the beautiful city of Ottawa—hooked to a group of people who had similar goals to mine, who were convivial, and who really cared about snow.

The following year, 1975, the ESC was scheduled for Manchester, New Hampshire. It was at this meeting that I first met Barry Goodison, a bright-eyed and bushy-tailed young fellow eager to make all of our snow measurements standardized and error free. I began to realize the great interest this group had towards accuracy—the accuracy of snow survey data and the elimination of the errors inherent in some of the equipment and instruments then in use. Bob Dickinson and Dave Daugherty were also very much in evidence at that meeting discussing their work in experimental watersheds in New Brunswick. Art Eschner told us of his work on snowfall/wind relationships in the Heiberg Forest of Germany.

At this time we began to see papers on remote sensing of snow. Phil Howarth and Ming Ko-Woo, who were to become active in Conference activities, gave their first paper on snow-cover remote sensing at this meeting. Charles Hopkins of the River Forecast Center in Hartford was the president at this time and was succeeded by Bob Dickinson. Ron Allen took over the role of Secretary from an ailing Gordon Ayer. In honor of his long years of service, Gordon was named Secretary Emeritus. It was at this meeting that I felt emboldened to identify myself as the "Suitland Groundhog," a mythical beast who would come out every February at the ESC Meeting and fearlessly and flawlessly forecast the snow cover for the remainder of the winter. Well fearlessly, anyway. If we had a Snow-Foo Award at this juncture, I certainly would have won it.

In '76, we had a very interesting meeting in the small town of Glens Falls, New York. I remember vividly our landing at the small airport at night on the commuter flight from Albany in an Otter on a glare ice runway. It caused me to ruminate on whether I could convince NOAA to pay me hazardous duty pay for attending Eastern Snow Conferences. Art Eschner became president at this meeting. There were a lot of papers on snow cover at this meeting, but I particularly remember being impressed by a paper by Sam Colbeck of the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, New Hampshire, whose expertise in the physics of snowmelt and snow metamorphosis left me with a sense of inadequacy which persists to this very day. I continued to present papers in my own field of satellite detection of snow cover.

The memorable winter of 1977 was one that Buffalonians will not forget. The record 200 inches of snow had a strangling effect on transportation in the region. It was emergency time. Mother Nature was letting us know that snow could be a mighty force indeed. Down in tropical Washington I planned to

come to Belleville, Ontario, to attend the Conference, but the airlines told me they just could not get me there. I called Art Eschner to see whether driving was possible, but he had serious doubts. Later I was to hear accounts of how he made it only by the grace of God and a huge snow plow which he followed through the Snow Belt east of Lake Ontario. The 34th Conference was held in spite of the weather, but it did have a decided Canadian flavor that year. John Peters, the jovial gentleman of the Water Survey of Canada, and the Vice president and Chairman of the meeting, must have lost a few hairs before that meeting was completed. H. L. Ferguson of AES, with whom I had become good friends, presented a paper at the meeting on his pet project, the St. John Basin, which lies in both Maine and New Brunswick. H.L. twisted my arm until I agreed that NOAA would cooperate in using the basin as a testing ground for operational snow cover measurements from NOAA's weather satellites. It was a good idea, and the cooperation went a long way toward giving an international impetus to the use of remote sensing to monitor the snow cover of various basins around the world. The Belleville meeting also featured several papers on snow loading, which was deemed highly appropriate during a season of record-breaking snowfall in so many areas in the Northeast and the Maritimes.

In 1978 we congregated in Hanover, New Hampshire, a beautiful spot. CRREL sponsored the Conference; Dartmouth College was nearby. There was much discussion on the difficulty of travel during the first week in February. At the Executive Session in that place a momentous decision was made. No longer would we try to brave the cold winds of February and the heavy snows; from now on we would hold our meeting in early June.

Many of the old timers hung their heads and said, "It won't be the same without the snow and ice." Liv Lansing as I recall looked very sad as he said, "It's the dawn of a new era." He was right. Don Dunlap assumed the Presidency for the 78–79 period as the Conference closed, and Barry Goodison became the Proceedings Editor, a position he would hold for six years. Ron Allen would continue on as Secretary. The first early June meeting was held at the Thousand Islands Club Resort in Alexandria Bay, New York. Lake-effect snow conditions was the theme of this meeting and a lively panel discussion was held with Bob Sykes, the sage of Oswego, as the moderator. This arrangement struck me as odd as Bob Sykes was never moderate about anything he did. Ken Dewey and Liv Lansing contributed their expertise on the conditions on the east shore of Lake Ontario and in the snow belt of Lake Erie.

Two papers utilizing satellite data were given. One, on the ice cover of Chesapeake Bay using Landsat data by Jim Foster of NASA, included a spectacular color image of the Bay. Another notable paper was "Observations of lake ice and snow cover." by Peter Adams of Trent University. A junior author on one of the papers was Terry Prowse. Wayne Tobiasson of CRREL gave his first ESC paper on dye studies through snowpacks. A second unusual event that year was the first student paper award to a woman. Margaret Leech of McGill University spoke on the climatology of freezing rain in the Montreal area. An all-time high of seven student papers were submitted that year. President Don Dunlop handed the gavel over to new President Sam Lazier of Queens University in Kingston, Ontario.

In 1980 we journeyed to Peterboro, Ontario, the natural habitat of Peter Adams and the home of Trent University. Appropriately enough B.R. Wolf, one of Peter's students, won the student paper award for a paper on "The Role of Lake Winter Cover on the Phosphorous Budget of a Southern Ontario Lake." The idea of meeting in June seemed to be working out. We had a large number of papers at this meeting from a variety of disciplines. The individual champion was probably Peter Adams, who presented several papers, one of which he co-authored with T.D. Prowse. Another pair of relentless researchers, Goodison and Metcalfe, gave their assessment of the AES Nipher Shield for precipitation gages. Wayne Tobiasson became President at the close of this meeting. I remember the businesslike way Wayne ran his conference and the thoughtful way he streamlined and clarified the bylaws of the ESC and the duties of its officers.

In 1982 we deviated from normal procedure and met jointly with the Western Snow Conference in Reno, Nevada, to help our sister organization celebrate its 50th Anniversary. Barry Goodison of AES became President that year and Don Dunlop succeeded Bob Sykes as Secretary, a position he has held to this very day. Liv Lansing gave a very interesting presentation on "Reminiscences of the Eastern Snow

Conferences from 1950–1981." A lot of the ESC faithful, especially the gamblers, made this trip West and thoroughly enjoyed it. Newcomers like Tom Carroll, who would in the future give a host of papers on snow water equivalent measurements using low-flying aircraft and gamma-ray detectors, and Tom Chang, Al Rango, and Jim Foster all from NASA Goddard were there. Of course, some of us possess dual citizenship in both the Eastern and Western Snow Conferences. It was a great meeting in a great setting, and a good time was had by all. One of the things that impressed us during the conference was the "El Farsante" Award. This award is for the biggest snafu of the year by a member (preferably a notable one). Some of us were so taken with the award that we decided that the ESC should inaugurate a similar one. Thus the "Sno-Foo" award was conceived.

Returning back East in 1983 we met in one of North America's loveliest cities: Toronto. Phil Hansen of Ducks Unlimited presided at the meeting and turned over the reins to yours truly, who had just retired from NOAA/NESDIS and was entering a new career as a consultant. It was a good year as 26 papers were presented at the meeting.

The 1984 meeting was held in New Carrolton, Maryland, a suburb of Washington. It was the farthest south the ESC had ever ventured, and it was a hot one! What a contrast to the early heroic age of the ESC, when attendees sloughed through snowdrifts! At this meeting, air-conditioned cars were required lest we blister our behinds on the leather seats. Bob Ryan, D.C. weatherman, who is currently serving as President of the American Meteorological Society, was our featured speaker for the banquet. I handed the role of president over to Peter Adams, but not before we had a five-paper session on the *Remote Sensing of Snow and Ice*. There was also a session on *Snow and Buildings* which had six papers. Despite the heat and humidity, Barry Goodison turned out a Proceedings of 247 pages.

At the '85 meeting in Montreal, we hit another notable benchmark, the passing of Gorden Ayer, Secretary of the ESC for many years and Secretary Emeritus until his death. The Proceedings were dedicated to him. There, Peter Adams gave a paper that should be read by all Members of ESC. It was entitled "The Development and Roles of the Eastern Snow Conference." I would like to quote one item from his concluding remarks: He said, "The existence of the Western Snow Conference should not be ignored." In all fairness to Peter let me read the sentence that followed that profound remark. "In the past it was customary for the presidents of the ESC and the WSC to attend each others meetings. This has lapsed, although as indicated above contact between the two organizations has not been lost." Gazing around the room, I would have to say that contact has indeed not been lost, and that this Anniversary is the occasion for a joyful reunion between East and West. We are all richer for it.

Also it was at this meeting that Terry Prowse was able to finally present a paper not as a junior author but as sole author. It was entitled "Recommendations for Site-Specific Observations of River Ice." In fact T.D. presented not one paper, but two. At the 1985 meeting I must tell you that I was given the "coveted" Sno-Foo Award for perpetrating the outstanding blooper of the year. It sort of put a stake through the heart of the Suitland Groundhog, as my prediction of extensive snow cover in the Upper Midwest to Tom Carroll went vastly astray. Incongruously, the Wiesnet medal was inaugurated in '85. Its purpose was to encourage greater participation by students in the competition for the best student paper award. John Lewis of McGill University became the new Editor of the Proceedings.

June '86 and the ESC is back in Hanover, New Hampshire. CRREL was again our host and about 90 attendees heard 19 papers on a variety of topics ranging from permafrost to acid shock on streams from snow melt. This meeting saw the introduction of Poster sessions. Sessions on Ice and Snow Recreation were featured. Hilda Snelling of the USAF at Scott Air Base, Illinois, became our first female president. Peter Adams won the Sno-Foo Award for his research and experimentation on yellow snow.

In 1987 we went to Fredericton, the capital of New Brunswick on the banks of the St. Johns River. Jean Louis Bisson from Hydro Quebec presided. We were greatly encouraged by the submission of seven student papers vying for the student award. Cameron Wake from Wilfrid Laurier University was the winner. Several papers were delivered on dynamic ice breakup and river ice by Mike Ferrick and others from CRREL and our own Terry Prowse.

The Sleepers River boys, Bates, Pangburn, and Greenan, gave the results of their continuing research in that experimental basin. Also at this meeting we must note that Barry Goodison nominated his associate, John Metcalfe, for the prestigious Sno-Foo award for managing to break the one and only snow sampler they had in Saskatchewan at the start of a series of aircraft microwave studies.

In '88 the scene shifted to Lake Placid, New York, where at our banquet, David Ludlum, the noted meteorological historian, commemorated the 100th anniversary of the Blizzard of '88 with tales of that memorable snow event. This was followed by an extensive slide presentation taken from his book "Blizzard, the Great Storm of '88." John Lewis, an unsung hero of ESC, continued to edit and publish the Proceedings. There are many unsung heroes in our group, but few will be named here today. Yet their work adds to the luster of this communal effort to provide information so vital to the science and engineering of the snow resource. President David Daugherty from the University of New Brunswick was succeeded by James Foster of NASA Goddard. What about the Sno-Foo Award? Well our own inimitable Bob Sykes, whose live demonstration of a simulated lake effect snowstorm turned into something more akin to a large feathered dumpling, won it walking away.

The 1989 ESC should be well remembered, for it was held here in Quebec at the Chateau Frontenac in June. There were 103 participants. Twenty-three papers were presented orally and a record 21 poster papers were displayed. A special session on snow research in various parts of the world was held. The Conference was cosponsored by the American Geophysical Union and the American Water Resources Association. John Lewis ended his 5-year tenure as Editor, and Gerry Jones from the University of Quebec ascended to the presidency. J. R. Metcalfe became the new Secretary-Treasurer, and Don Dunlop became assistant Secretary. Mike Ferrick and Tim Pangburn became the Editors of the Proceedings. The winner of the student paper contest, André Giguère of the Physics Department at McGill University, received the Wiesnet Medal for his paper "Comparison of Measurements of Snowfall by Radar using an S-Band and X-Band Transmitter." Papers on Pakistan, western U.S., the Scottish Highlands and the Alps lent an international flavor to this meeting. The Sno-Foo awardee for '89 was the congenial Dr. Gerry Jones who ignored his health in subzero field work in Scotland and had to be carried back to civilization. We all felt that giving Gerry the Sno-foo award was quite literally adding insult to injury.

We opened the 1990s by having our Conference in Bangor, Maine. At this meeting we inaugurated the Honor Paper Award to select the best written paper or papers presented. The initial award was presented to Austin Hogan and Mike Ferrick of CRREL. The student paper prize and Wiesnet Medal went to A. K. Abdel-Zaher of the Civil Engineering Department at the University of New Brunswick.

Tom Carroll of NWS gave a fine paper on the operational activities of the National Operational Hydrologic Remote Sensing Center in Minneapolis. On a personal note it certainly is gratifying to see the rudimentary research in snow remote sensing done decades ago by me and many other NESDIS and NASA personnel—Al Rango being the foremost—grow into sophisticated systems. Thank you Tom Carroll. Stan Zeccolo presented the Sno-Foo award to Prof. Kersi Davar, who generously paid his registration fee and dues—twice. Kersi had the last laugh though, when his student won the Wiesnet Medal.

The 1991 meeting was held in Guelph, Ontario, at the University of Guelph. The Honor Paper was awarded to Alan Hewitt, Jim Cragin and Sam Colbeck for their paper "Effects of Crystal Metamorphisis on the Elution of Chemical Species from Snow." D. Samelson won the student paper and Medal for a paper on an improved method of predicting snowpack water equivalent. The Sno-Foo Award was given to our beloved Terry Prowse for the sacrilege of bringing into his presentation an applause sign, thereby reaching a new low in bad taste. Furthermore he was later discovered trying to intimidate the members of the Sno-Foo Committee into supplying him with liquid libations. Terry, welcome to the club.

In 1992 we returned to Oswego, New York, for the 49th annual Eastern Snow Conference. The oldtimers remembered the fateful snowburst there twenty years before, but most were mollified by the idea that lightning, i.e., a snowburst, couldn't strike again—besides it was June. Buttle, Vonk, and Taylor won the Honor Paper Award that year, for a paper on "Environmental Isotope Hydrograph Separation During Snowmelt in a Suburban Catchment." The Student Paper Award was won by D.W. Cline of

the University of Colorado. President Tim Pangburn turned over the Conference reins to Terry Prowse of Saskatoon, Saskatchewan, who presides even as we speak. Of course a day in Oswego without Bob Sykes is like a day without sunshine. He presented two papers and was a most congenial host. It was a popular conference; twenty-three papers were given orally; nine were given as posters.

EPILOGUE

I have watched this group grow over the years from an organization loosely connected by its interest in snow to a sophisticated scientific body. We take our science and data exchanges seriously, but we—happily—still don't take ourselves too seriously. Science is what passes for our current best guess. If you doubt that statement, read a medical text from the '30s—or read our Proceedings from the '50s.

We have over the years become more scientific in our papers. This trend, which sees fewer papers by businessmen and engineers, is not desirable. I believe we should make a real effort to solicit papers from snow-removal people, airport managers and the like, in order to gain insight into applications and to give them the benefit of our activities and writings.

Today we work in an age of computers and satellites. We cannot know what the next century or half century will bring. We do know, however, that it will bring change. Therein lies our challenge: to take those changes and apply and integrate them into our discipline. Some of you neophytes may be around for our one-hundredth anniversary in the year 2043, but if it is okay with you, I'll just take it one year at a time.