

EASTERN SNOW CONFERENCE

Report of the

COMMITTEE ON RESEARCH

February 1963

In November 1962 questionnaires were sent to all members of the ESC on the current mailing list asking them to report any research work on snow or ice that had not been included in the report of this committee in February 1962. The replies have been divided into four groups and dealt with as follows:

Group A consists of 30 projects that were not listed in February 1962. Very little editing was done on this group.

Group B consists of 17 projects that were listed in February 1962 and for which there is now significant new information. In this group the scope was omitted unless it included new material. Reports listed last year were not repeated. References to papers "in preparation" or "submitted but not yet accepted" were deleted.

Group C includes all the replies that indicated that the projects were still active but unchanged. Only project titles and investigators are listed.

The fourth group consists of 14 replies indicating that they had no research work to report this year. They have not been listed.

The replies also included a few bibliographies containing papers on snow and the comment that there are some good reports in the Proceedings of the Western Snow Conference April 1962.

SECTION I: SNOW RESEARCH PROJECTS

GROUP A: NEW PROJECTS

- 63A1 PHYSICAL CHEMISTRY OF ICE SURFACES.
H.H.G. Jellinek, Dept. of Chemistry, Essex College, Assumption Univ.,
Windsor, Ont.

To investigate the assumed liquid-like layer on ice surfaces by optical, electrical and other means.

- 63A2 ELASTIC PARAMETERS OF SEA ICE.
M.P. Langleben, Physics Dept., McGill Univ., Montreal, Que.

Elastic Properties of Arctic Sea Ice by E.R. Pounder and P. Stolinski. Int. Assoc. Sci. Hydrology, Publ. No. 54, p. 35, 1960.

Young's Modulus for Sea Ice by M.P. Langleben. Can J. Phys. 40, p. 1, 1962.

Elastic Parameters of Sea Ice by M. P. Langleben and E. R. Pounder. Conf. on Applied Glaciology, M.I.T. (in press).

63A3 ULTIMATE STRENGTH OF SEA ICE.

M.P. Langleben, Physics Dept., McGill Univ., Montreal, Que.

A continuing study of the ultimate strengths of sea ice, particularly tensile strength. The most recent measurements were made near Isachsen in May 1962.

Some Physical Properties of Sea Ice, II, by M. P. Langleben. Can. J. Phys. 37, p. 1438, 1959. Ring Tensile Strength of Sea Ice by P. Graystone and M. P. Langleben. Conf. on Applied Glaciology, M.I.T. (in press).

63A4 ICE CRYSTAL GROWTH.

E. R. Pounder, Physics Dept., McGill Univ., Montreal, Que.

A study of the influence of crystal orientation on growth rate.

Crystal Growth Rates as a Function of Orientation by E.R. Pounder. Conf. on Applied Glaciology, M. I. T. (in press).

63A5 THERMAL BALANCE OF AN ICE COVER.

P. Schwerdtfeger, Physics Dept., McGill Univ., Montreal, Que.

A continuing study of the thermal regime of the sea ice on Hudson Bay near Fort Churchill. Conductive flux through the ice, radiation, and convective flux above the ice are measured, the last being obtained from wind and temperature profiles.

63A6 AIR POLLUTION IN MONTREAL RELATED TO LOCAL METEOROLOGICAL CONDITIONS.

Peter W. Summers, Dept. of Meteorology, McGill Univ., Montreal, Que.

General investigation of the effect of various meteorological variables on smoke concentrations in downtown Montreal. Particular attention is being given to the effects of the winter snow cover on the stability of the atmosphere and hence on air pollution levels.

63A7 LAND USE, SNOWMELT AND STREAMFLOW REGIMEN IN CENTRAL NEW YORK.

Donald R. Satterlund, State Univ. College of Forestry, Syracuse 10, N. Y.

To develop and test techniques which will permit rigorous statistical comparison of streamflow regimen during the winter-spring high runoff period of Shackham Brook and Albright Creek from published records of U.S.G.S. and U.S.W.B. to add to the information already obtained by Schneider and Ayer with respect to changes in streamflow following reforestation in Central New York.

63A8 THIRD YELLOWSTONE FIELD RESEARCH EXPEDITION.

Vincent J. Schaefer, Director of Research, Atmospheric Sciences Research Center, State Univ. of New York, 8 Thurlow Terrace, Albany, N. Y.

Studies in Yellowstone National Park of localized seeding effect; snow crystal growth rates, homogeneous nucleation (colder than -40°C) glaciation in supercooled clouds; miniature hail; columnar frost, etc.

Report and papers available from Dr. D. G. Barry, Director, Atmospheric Sciences Research Center at above address.

Final Report, Second Yellowstone Field Research Seminar.

"The Vapor Method for Making Replicas", Jour. of Applied Meteorology 1, 413-418, (Sept. 1962).

"Condensed Water in the Free Atmosphere in Air Colder Than -40°C ", Jour. of Applied Meteorology, (Dec. 1962).

63A9 ASRC - LAKE EFFECT SNOWSTORM RESEARCH.

Vincent J. Schaefer - Director of Research, Atmospheric Sciences Research Center, State Univ. of New York, 8 Thurlow Terr., Albany, N. Y. with cooperation of State University Colleges at Fredonia & Brockport, N. Y. and Tug Hill Field Station ASRC - R. D. #2-Jackson Hill, Boonville, N. Y.

To study distribution, depth, density, duration, and snow crystal types in the severe snow storms which occur to the lee of Lake Ontario and Lake Erie by using a gridwork of observation points manned by capable high school students and others who live in the affected areas. The attempt is to see what information can be obtained with a relatively inexpensive program cost and at the same time perhaps interest some of our young people to develop into atmospheric scientists.

- 63A10 SNOW CREEP.
W. H. Mathews, Univ. of British Columbia, Vancouver, B. C.

To determine the effect of snow creep and needle ice on soil movements.

- 63A11 AVALANCHE SNOW PRESSURE.
K. E. Sommer, Aluminum Co. of Canada Ltd., Kitimat, B. C.

Investigations to record maximum pressure exerted on a stationary object by heavy, wet avalanches of short run and duration.

- 63A12 MAXIMUM RIME AND ICE LOAD.
K. E. Sommer, Aluminum Co. of Canada Ltd., Kitimat, B. C.

Investigations to record rime and ice loads on transmission line conductors.

- 63A13 SNOW INTERCEPTION BY FOREST.
H. I. Baldwin, Fox Research Forest, Hillsboro, N.H.

For 10 winters from 1933, snow stakes, rain gages, etc. were used in a variety of paired stations, inside and outside various forest types and aged stands.

Interception of snowfall by forests. Fox Forest Note No. 6, May 1938.
Effect of Forest on snow Cover. Proc. 13th Eastern Snow Conf. 1956.
Available free from H. I. Baldwin.

- 63A14 OBJECTIVE ANALYSIS OF PRECIPITATION OCCURRENCE & TYPE.
F. P. Ostby, The Travelers Research Center, Inc., 650 Main St.,
Hartford 3, Conn.

An objective technique was developed to analyze precipitation occurrence and type over large geographical areas based on surface observations from a few selected meteorological stations.

Objective Analysis of Precipitation Occurrence & Type, Report 7044-29,
by F. P. Ostby. Request from George A. Kern, the Travelers Research
Center.

- 63A15 KEEPING PIER NO. 31 FREE OF ICE.
City of Montreal, Dept. of Roads, 930 St. Denis St., Montreal, Que.
- To keep pier No. 31 of the National Harbours Board, free of ice by using three 10 PH Aqua-therm equipment. The pier is used to dispose of snow from snow-removing operations.
- 63A16 GLACIERS AND SNOW AND ICE CONDITIONS IN NORTHERN ELLESMERE ISLAND.
G. Hattersley-Smith, Geophysical Research Section, Defence Research Board, Ottawa, Ont.
- Glacier regime and glacial-meteorological investigations.
- Ablation Effects Due to Wind-Blown Dust by G. Hattersley-Smith. J. Glaciol., V.13, N.30, p.1153, 1961.
- 63A17 FRESH WATER ICE INVESTIGATIONS.
J. T. Andrews, Geographical Branch, Dept. of Mines and Tech. Surveys, 601 Booth St., Ottawa 4, Ont.
- Variability of Lake Ice Growth and Quality in the Schefferville Region, Central Labrador-Ungava, by J. T. Andrews. J. of Glaciology V.4 N. 33, Oct. 1962.
- 63A18 RIVER ICE CONDITIONS IN CANADA.
J. R. Mackay, Geographical Branch, Dept. of Mines and Tech. Surveys, 601 Booth St., Ottawa 4, Ont.
- To analyse relationships between climate and river ice conditions related to dates of break-up and freeze-up.
- River Ice Conditions in the Nelson River Drainage System by D. K. Mackay. Geographical Paper No. 34.
- Trends and Factors Affecting Break-up and Freeze-up Dates in the Nelson River Drainage System by D. K. Mackay. Geographical Paper No. 35.
- Historical Records of Freeze-up and Break-up on the Churchill and Hayes Rivers by J. R. Mackay and D. K. Mackay. Geographical Bull. (in press).

- 63A19 SNOW GAUGE RESEARCH.
Meteorological Branch, 315 Bloor St. West, Toronto 5, Ont.

To test and compare various snow gauges and snow cover samplers.

- 63A20 SEA ICE OBSERVING AND RECONNAISSANCE.
Meteorological Branch, 315 Bloor St. West, Toronto 5, Ont.

Since 1957 aerial ice observing reconnaissance has been expanded to include most of the eastern and northern coastal waters of Canada. These are supplemented by shipboard and shore station ice reports. Satellite pictures are also being evaluated.

Annual technical circulars containing observed ice conditions are available for: (a) Eastern Canadian Seaboard, 1958 to 1961; (b) Hudson Bay Route, 1960 and 1961; (c) Western Arctic, 1957 to 1961.

- 63A21 LAKE ICE OBSERVING AND RECONNAISSANCE.
Meteorological Branch, 315 Bloor St. West, Toronto 5, Ont.

Since 1960 aerial ice reconnaissance has been expanded to include the Great Lakes and the Lower Mackenzie River.

Annual technical circulars containing observed ice conditions are available for: (a) Great Lakes, 1960 and 1961; (b) Lower MacKenzie 1961.

- 63A22 ICE THICKNESS AND FREEZE-UP AND BREAK-UP DATES.
Meteorological Branch, 315 Bloor St. West, Toronto 5, Ont.

Ice Thickness Data for Canadian Stations. Freeze-up 1958 to Break-up 1961. Circular 3537.

Ice Thickness Data for Selected Canadian Stations Freeze-up 1961 to Break-up 1962. Circular 3711.

Break-up and Freeze-up Dates of Rivers and Lakes in Canada. Circular 3156.

- 63A23 LABORATORY INVESTIGATIONS OF CREEP AND CRACK FORMATION IN ICE UNDER VARIOUS LOADS.
L. W. Gold, Div. of Building Research, National Research Council, Ottawa, Ont.

The Cracking Activity in Ice During Creep by L.W. Gold. Can. Jour. of Physics, V.38, N.9, Sept. 1960.

Etching Technique to Study Plastic Deformation of Ice by A.S. Krausz. Jour. of Glaciology, V.3, N.30, Oct. 1961.

Formation of Cracks in Ice Plates by Thermal Shock by L.W. Gold. Nature, V. 192, N.4798, 14 Oct. 1961.

The Creep of Ice in Bending by A.S. Krausz. Canadian Jour. of Physics (in press).

63A23 LABORATORY INVESTIGATIONS OF CREEP AND CRACK FORMATION
IN ICE UNDER VARIOUS LOADS.

L. W. Gold, Div. of Building Research, National Research Council,
Ottawa, Ont.

The Cracking Activity in Ice During Creep by L. W. Gold. Can.
Jour. of Physics, V. 38, N. 0, Sept. 1960.

Etching Technique to Study Plastic Deformation of Ice by A. S. Krausz.
Jour. of Glaciology, V. 3, N. 30, Oct. 1961.

Formation of Cracks in Ice Plates by Thermal Shock by L. W. Gold.
Nature, V. 192, N. 4798, 14 Oct. 1961.

The Creep of Ice in Bending by A. S. Krausz, Canadian Jour. of
Physics (in press).

63A24 FRAZIL ICE.

G. P. Williams, Div. of Building Research, National Research Council,
Ottawa, Ont.

Frazil Ice: A Review of its Properties with a Selected Bibliography
by G. P. Williams. The Engineering Jour., V. 42, N. 11, Nov. 1959.

Two notes relating to frazil ice formation:

1. An empirical method of estimating total heat losses from open-water
surfaces.
2. Some observations on super-cooling and frazil ice produc-
tion by G. P. Williams. Seminar on Ice Problems by Hydraulic Structures,
Internat. Assoc. of Hydraulic Research 1959.

63A25 AVALANCHE INVESTIGATIONS AT ROGERS PASS B. C.

P. A. Schaerer, Div. of Building Research, National Research Council,
Ottawa, Ont.

The Avalanche Defence on the Trans-Canada Highway at Rogers Pass
by P. A. Schaerer. Proceedings of the Western Snow Conference, Apr.
1960.

Planning Avalanche Defence Works for the Trans-Canada Highway at
Rogers Pass by P. A. Schaerer.

The Engineering Jour., V. 45, N. 3, Mar. 1962.

Avalanche Defenses for the Trans-Canada Highway at Rogers Pass
by P. A. Schaerer. Tech. Paper No. 141, DBR, NRC, Nov. 1962.

The Avalanche Hazard Evaluation and Prediction at Rogers Pass by
P. A. Schaerer. NRC Publication No. 7051, Oct. 1962.

63A26 DEVELOPMENT OF TELEMETERING EQUIPMENT.

H. R. Smith, Div. of Radio and Elec. Engineering, National Research
Council, Ottawa, Ont.

The development and testing of apparatus for telemetering informa-
tion on wind, temperature, snowfall rate, and occurrence of avalanches.

63A26 (continued)

Wind Velocity Telemetering System by R. Beaulieu and G. Neal. Electronics, 15 July 1960.

Automatic Telemetry Equipment Aids Avalanche Prediction by G. Neal. Can. Electronics Engineering Apr. 1962.

Hybrid Telemeter Detects Avalanches by G. Neal and S. A. Stone. Electronics, 15 Dec. 1961.

63A27 COMPARATIVE SNOWMELT ON CUTOVER AND CONTROL WATERSHEDS. J.W. Hornbeck, Northeastern Forest Experiment Station, Parsons, W.V.

Snowcover on the Fernow Experimental Forest in West Virginia is intermittent. In this region, a large proportion of flood flows result from a combination of rainfall and snowmelt; high flows are more frequent in March than in any other month. Gaged-watershed experiments on effect of forest practices on streamflow indicate that changes in high flows in the dormant season are caused by changes in rate of snow melt. This is an informal study, now in the planning stage, to obtain snowmelt information to explain streamgaging results. It is a small project but of interest because it may be the southernmost snow research in the eastern United States.

63A28 SOUTH POLE MICROMETEOROLOGY AND RECONNAISSANCE IN GREENLAND.

Jane Howe Westbrook, Q.M.R. & E. Command, Natick, Mass.

South Pole Micrometeorology Program, Part II, Data Analysis Q.M. Research and Engineering Command, Natick, Mass.

Reconnaissance of Sukkertoppen Ice Cap and Adjacent Taselsiag Area, Southwest Greenland. The Ohio State University Research Foundation, Columbus 12, Ohio.

63A29 THE WATER CONTENT OF SNOWFALL IN NEW YORK STATE.

A. Boyd Pack, U.S. Weather Bureau Office, Cornell University, Ithaca, N.Y.

To compare the variation of the water content of new snow (snow/water ratio) among stations representing each of the several climatic regions of New York State. To determine the variation at each station according to portion of the snowfall season. To compare the variation among several snowfall seasons at each station. State regions to be investigated: Lake Erie, Lake Ontario, Eastern Plateau, Adirondacks, Hudson Valley and the Atlantic Coastal.

- 63A30 SNOW DETECTION BY WEATHER RADAR.
R. Granger, U.S. Weather Bureau Airport Station, Box 1406, Missoula,
Mont.

To determine the efficiency of snow detection by Weather Radar. Comparisons are made between seasonal, monthly, daily, and hourly snowfall as measured by gages, snow surveys, etc., and as determined by the Radar.

Report to be published in 10th Weather Radar Conference Proceedings.

GROUP B: PROJECTS LISTED PREVIOUSLY

- 63B1 TELEMETERING HYDROLOGIC DATA FROM MOUNTAIN LOCATIONS
C. C. Warnick, Univ. of Idaho, Moscow, Idaho.
- 63B2 STUDY OF METHODS FOR AUTOMATIC MEASUREMENT OF SNOW
WATER CONTROL.
C. C. Warnick, Univ. of Idaho, Moscow, Idaho,
- 63B3 STUDY OF RADIOISOTOPE SNOW GAGE COMPONENTS AND TECHNIQUES.
D. L. Duncan, Univ. of Idaho, Moscow, Idaho.

A limited supply of new progress reports on the three projects above are available on request from the Univ. of Idaho.

- 63B4 AXEL HEIBERG ISLAND EXPEDITION.
Fritz Muller, McGill Univ., Montreal 2, Que.

Relationship: Glaciers to climate.

Muller, F., 1962 "Glacier Mass-Budget Studies on Axel Heiberg Island, Canadian Arctic Archipelago". Symposium on Variations of the Regime of Existing Glaciers, I.U.G.G., Pub. No. 58, pp. 131-142.

Muller, F., 1962 "Zonation in the Accumulation Area of the Glaciers of Axel Heiberg Island, Northwest Territories, Canada". Journal of Glaciology, Vol. 4, No. 33, pp. 302-310.

Havens, James M., 1962 "Summer Weather Observations on a Canadian Arctic Ice Cap". Weather, Vol. XVII, No. 6, pp. 197-209.

- 63B5 SNOW SURVEY AT SCHEFFERVILLE.
W.G. Mattox, McGill Sub-Arctic Research Lab., P.O. Box 790, Schefferville, Que.

McGill Sub-Arctic Research Papers Nos. 9, 11, 12, and 15.

- 63B6 SNOWFALL INTERCEPTION.
David H. Miller, Geography Dept., Univ. of Wisconsin, Madison, Wisc.

Micrometeorological factors, resulting from joint action of forest stands, edges and openings on atmospheric conditions, in their effect on interception of falling snow by tree crowns, and on the subsequent disposition of the intercepted snow. Analysis of published data.

Snow in the Trees -- Where Does It Go? 30th Annual Western Snow Conference Proceedings, 21-27, 1962. Additional information is available from Mr. David H. Miller.

- 63B7 RELATIONSHIP BETWEEN DENSITY OF NEW FALLEN SNOW AND METEOROLOGICAL VARIABLES.
Bernard A. Power, Weather Engineering Corporation of Canada Ltd., 2030 Crescent Street, Montreal 25, Que.

Power, B. A., 1962: "Relationship Between Density of Newly Fallen Snow and Form of Snow Crystals". Nature, 193, p.1171.

Power, B. A., P. W. Summers, J. d'Avignon, 1962: "Snowfall Density, Crystal Forms, and Related Meteorological Conditions". Final Report to National Science Foundation, Contract C-181. Weather Engineering Corporation of Canada Ltd., Montreal.

- 63B8 BIBLIOGRAPHY ON SNOW, ICE AND PERMAFROST.
David H. Kraus, Library of Congress, Science and Technology Division, Washington 25, D. C.

The bibliography is published on an annual volume basis. Volume 15 dated January 1961 is available for \$4.00 per copy as AD 277537, and volume 16 dated January 1962 is available for \$3.50 per copy as AD 278593 from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D. C. Official requests for copies of the bibliography may be addressed to the U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, N.H.

- 63B9 SNOW SURVEY DATA.
Meteorological Branch, 315 Bloor St. West, Toronto 5, Ont.

The 12 snow survey stations will probably be increased next winter. Depth of snow cover is now measured daily at about 1000 stations.

Snow Cover Data. Published annually by the Meteorological Branch.

- 63B10 INVESTIGATIONS ON SNOW ROADS.
B. H:son Ager, Div. of Building Research, National Research Council,
Ottawa, Ont.
- Studies on Density of Naturally and Artificially Formed Fresh-Water
Ice by B. H:son Ager. Jour. of Glaciology, V.4, N.32, P.207-214, June
1962.
- 63B11 LOAD BEARING CAPACITY OF AN ICE SHEET FOR TRANSPORTATION
PURPOSES.
J.G. Willmot, Research Engineer, Ontario Hydro Research Div., 200
Kipling Ave. South, Toronto 18, Ont.
- Eastern Snow Conference, Proc. 1961-62 Annual Meetings, pp. 149-
162.
- The R-O-R Model Si-1 Safe Ice Load Computer and Motor-Driven
Ice Coring Tool for Estimating the Bearing Capacity of an Ice sheet for
Transportation Purposes by J.G. Willmot, R-O-R Associates Limited.
1470 Don Mills Rd., Don Mills, Ont. Dec. 1962.
- 63B12 SNOW MANAGEMENT RESEARCH.
Henry W. Anderson, Pacific Southwest Forest & Range Expt. Sta., P.O.
245 Berkeley 1, Calif.
- The aim is, to develop a, hydrologic base for land management decis-
ions. The hydrologic effects of wildfires, of attempts at conversion of
brushlands to grass, and of logging and other uses are to be evaluated. At
present 20 studies are underway, emphasizing snow accumulation and melt
as related to terrain and meteorological conditions.
- There are 13 additions this year to the list of reports obtainable from
H.W. Anderson.
- 63B13 CORRELATION OF SNOWPACK WATER EQUIVALENT AND CLIMATIC
CONDITIONS.
G.A. McKay, Prairie Farm Rehabilitation Office, 614 Motherwell Bldg.
Regina, Sask.
- "A Snow Budget for the Prairies" by G.A. McKay. Royal Met. Soc.
Canadian Br. Conf. June 6-7, 1962. Available from author.
- 63B14 RESE ARCH ON SNOW, ICE, FROZEN GROUND, AND PHOTOGRAPHIC
INTERPRETATION.
W.K. Boyd, Technical Director, U.S. Army Cold Regions Research and
Engineering Laboratory, P.O. Box 282, Hanover, N.H.

Research is conducted by four technical divisions: Research, Exper-
imental Engineering, Photographic Interpretation, and Technical Services.

63B14 (continued)

The program covers a wide field of about 60 in-house projects and 25 outside contracts or grants with universities. These projects include basic and applied research, development and design criteria evaluation, research on methods of photo interpretation of the earth surface and development of instruments and techniques applicable to cold regions problems.

All research and technical reports are available to Government contractors through Armed Services Technical Information Agency, Arlington Hall Station, Arlington 12, Virginia, by citing applicable contract number. Many of these reports are available to science and industry in microfilm or photocopy form at cost of reproduction from the Office of Technical Services (OTS), Department of Commerce, Washington 25, D.C. Direct distribution is made by CRREL to agencies and organizations participating directly in the work performed by the Laboratory.

- 63B15 SNOWFALL FREQUENCIES AND SNOWCOVER DATA.
Robert E. Lautzenheiser, U.S. Weather Bureau, State Climatologist, 1900 P.O. Bldg., Boston 9, Mass.

Reports are now available at the above address for the following additional stations: Maine: Winthrop, Eastport, Woodland; Vermont: Rutland.

- 63B16 INTERACTION BETWEEN ABNORMAL SNOW FIELD AND OVERLYING ATMOSPHERE.
Jerome Namias, U.S. Weather Bureau, Washington 25, D.C.

To determine effect of extensive snow fields on atmospheric structure & circulation, with a view to explaining and forecasting long period climatic fluctuations of the order of a month or season.

"Influences of Abnormal Surface Heat Sources and Sinks on Atmospheric Behavior" by J. Namias. Proceeding of the International Symposium on Numerical Weather Prediction in Tokyo, Nov. 7-13, 1960. Published by the Meteorological Soc. of Japan.

- 63B17 SNOW MELT PROCEDURE.
William Winston, U.S. Weather Bureau River Forecast Center, 719 P.O. Bldg., Cincinnati 2, Ohio.

A more detailed evaluation of the snow melt process utilizing all available factors such as wind, sky condition, temperature, latitude, etc. on a heat budget concept.

GROUP C: STILL ACTIVE BUT UNCHANGED

- 63C1 PRECIPITATION CHARACTERISTICS.
Edwin T. Engman, Agric. Research Serv., Sleepers River Research
Watershed, Danville, Vt.
- 63C2 INFLUENCE OF SNOW AND FROZEN SOILS ON RUNOFF.
Martin L. Johnson, Agric. Research Serv., Sleepers River Research
Watershed, Danville, Vt.
- 63C3 INFLUENCE OF SOIL AND LAND USE ON RUNOFF.
George Comer, Agric. Research Serv., Sleepers River Research
Watershed, Danville, Vt.
- 63C4 SNOW AND FROST MEASUREMENTS ON GAGED WATERSHEDS.
Robert S. Pierce, Northeastern Forest Expt. Sta., U.S. Forest Service,
Laconia, N.H.
- 63C5 SNOW AND FROST MEASUREMENTS FOR CALIBRATION AND TREAT-
MENT OF GAGED WATERSHEDS.
Robert S. Pierce, Northeastern Forest Expt. Sta., U.S. Forest Service,
Laconia, N.H.
- 63C6 SNOW AND FROST RELATIONSHIPS TO THE FOREST ENVIRONMENT.
Robert S. Pierce, Northeastern Forest Expt. Sta., U.S. Forest Service,
Laconia, N.H.
- 63C7 ST. LAWRENCE RIVER ICE AND TEMPERATURE SURVEYS.
E. Turner, Div. of Mech. Engineering, National Research Council,
Ottawa, Ont.
- 63C8 LABORATORY INVESTIGATIONS OF AIR BUBBLING SYSTEMS FOR PRE-
VENTING ICE.
S. Ince, Div. of Mech. Engineering, National Research Council, Ottawa,
Ont.
- 63C9 RADAR DETECTION OF SNOW.
B.L. Wiggin, Weather Bureau Airport Station, Greater Buffalo International
Airport, Buffalo, N.Y.

SECTION II : BIBLIOGRAPHIES CONTAINING
PAPERS ON SNOW

ANNOTATED BIBLIOGRAPHY ON HYDROLOGY, 1941-1950, (United States and Canada). Prepared by American Geophysical Union, National Research Council of the National Academy of Sciences in cooperation with the Subcommittee on Hydrology of the Federal Inter-Agency River Basin Committee (now known as Inter-Agency Committee on Water Resources). Notes on Hydrologic Activities, Bulletin No. 5, June 1952.

ANNOTATED BIBLIOGRAPHY ON HYDROLOGY, 1951-54, AND SEDIMENTATION, 1950-54, (United States and Canada). Supplement to the above. Joint Hydrology-Sedimentation Bulletin No. 7, December 1955.

ANNOTATED BIBLIOGRAPHY ON HYDROLOGY AND SEDIMENTATION (United States and Canada) 1955-58. Compiled by H. C. Riggs, U.S. Geological Survey, Water Resources Div., Washington 25, D. C. Geological Survey Water-Supply Paper 1546 published in 1962 contains 236 pages. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price \$1.00 (paper cover).

A BIBLIOGRAPHY OF CANADIAN CLIMATE 1763-1957. Compiled by Morley K. Thomas. Published jointly by the Meteorological Branch, Dept. of Transport, and the Div. of Building Research, National Research Council, Ottawa, Canada, 1961. Contains nearly 1400 items and includes subject and author indexes. Price \$1.00.