

GLACIOLOGICAL LITERATURE

THIS is a selected list of glaciological literature on the scientific study of snow and ice and of their effects on the earth; for the literature on polar expeditions, and also on the "applied" aspects of glaciology, such as snow ploughs, readers should consult the bibliographies in each issue of the *Polar Record*. For Russian material the system of transliteration used is that agreed by the U.S. Board on Geographic Names and the Permanent Committee on Geographical Names for British Official Use in 1947. Readers can greatly assist by sending reprints of their publications to the Society, or by informing Dr J. W. Glen of publications of glaciological interest. It should be noted that the Society does not necessarily hold copies of the items in this list, and also that the Society does not possess facilities for microfilming or photocopying.

CONFERENCES

ZINDEREN BAKKER, E. M. VAN, *sr.*, ed. *Palaeoecology of Africa and of the surrounding islands and Antarctica. Vol. 5. International Council of Scientific Unions. Scientific Committee on Antarctic Research. Conference on Quaternary Studies held at the Scott Polar Research Institute, Cambridge, England, 24-27 July 1968.* Cape Town, A. A. Balkema, 1969. xiv, 240 p. [Contents: L. M. Cranwell, "Palynological intimations of some pre-Oligocene Antarctic climates", p. 1-19; H. H. Lamb, "Investigation of the climatic sequence: a meteorological-empirical approach", p. 21-63; D. L. Linton, "The abandonment of the term 'periglacial'", p. 65-70; D. L. Linton, "Evidence of Pleistocene cryonival phenomena in South Africa", p. 71-89; A. T. Wilson, "Ice age theories and Antarctica", p. 91-96; A. T. Wilson, "Chemistry and the Quaternary in the Antarctic", p. 97-108; J. T. Hollin, "The Antarctic ice sheet and the Quaternary history of Antarctica", p. 109-38; J. D. Hays, "Climatic record of Late Cenozoic Antarctic ocean sediments related to the record of world climate", p. 139-63; P. Bellair, "Données actuelles sur les Archipels des Crozet et des Kerguelen", p. 165-73; E. M. van Zinderen Bakker, Sr., "Quaternary pollen analytical studies in the southern hemisphere with special reference to the sub-Antarctic", p. 175-212; N. M. Wace, "The terrestrial biogeography of Antarctica", p. 213-38; E. M. van Zinderen Bakker, Sr., and M. W. Holdgate, "Proposals for future Quaternary studies in the Antarctic", p. 239-40.]

GLACIOLOGICAL INSTRUMENTS AND METHODS

- ALKEZWEENY, A. J. The millipore filter technique for ice nuclei measurement. *Journal of Applied Meteorology*, Vol. 9, No. 5, 1970, p. 796-99. [Investigation of this method.]
- BOGORODSKIY, V. V., ed. Radiofizicheskiye metody v issledovaniyakh Severnogo Ledovitogo Okeana i Antarktiki [Radiophysical methods in studies of the Arctic Ocean and the Antarctic]. *Trudy Arkticheskogo i Antarkticheskogo Nauchno-Issledovatel'skogo Instituta*, Tom 284, 1968, 216 p. [Includes radio-echo sounding of land ice and radar tracking of sea ice movement. English translation: *Radiophysical methods of research in the Arctic Ocean and Antarctica*. Jerusalem, Israel Program for Scientific Translations, 1970. v, 212 p. (Published for the National Science Foundation, Washington, D.C.)]
- CATCHPOLE, A. J. W., and others. Content analysis: a method for the identification of dates of first freezing and first breaking from descriptive accounts, by A. J. W. Catchpole, D. W. Moodie and B. Kaye. *Professional Geographer*, Vol. 22, No. 5, 1970, p. 252-57. [Method described and discussed for extracting quantitative data on environmental conditions from historical accounts.]
- HOBBS, P. V. Comparison of ice nucleus concentrations measured with an acoustical counter and millipore filters. *Journal of Applied Meteorology*, Vol. 9, No. 5, 1970, p. 828-29. [Comparison between two techniques reveals wide discrepancies.]
- PARSHIN, V. N. O popravkakh k izmerennym znacheniyam tverdykh osadkov [Corrections to measured values of solid precipitation]. *Meteorologiya i Gidrologiya*, 1970, No. 7, p. 92-99. [Critical analysis of methods of calculating correction factors.]
- PARUNGO, F. P., and RHEA, J. O. Field use of a simple technique for identifying silver iodide particles as snow crystal nuclei. *Journal of Applied Meteorology*, Vol. 9, No. 4, 1970, p. 651-56. [Method of identifying those AgI particles in ice crystals that have acted as nuclei.]
- ROMANOV, A. A., and ULITIN, V. I. O prostranstvennoy izmenchivosti tolshchiny antarkticheskogo pripaya i vysoty snezhnogo pokrova [Spatial variability of the thickness of Antarctic fast ice and of snow cover]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 76, 1970, p. 37-42. [Technique of making observations.]
- SCHMIDT, R. A., and SOMMERFELD, R. A. A photoelectric snow particle counter. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 88-91. [Instrument for measuring mass concentration of snow at several heights above snow surface. Tests not yet complete.]
- SHANNON, W. G. Snow surveying by electronic telemetry. *Proceedings of the Western Snow Conference*, 36th annual meeting, 1968, p. 95-98. [Describes briefly some systems now in operation.]
- TARBLE, R. D. California Federal-State snow sensor investigations, problems and rewards. *Proceedings of the Western Snow Conference*, 36th annual meeting, 1968, p. 106-09. [Discusses results of tests on various sizes of rubber pillows, metal disks, and platforms.]
- VERSHININA, L. K., and DIMAKSYAN, A. M., ed. Issledovaniya metodov, apparatury i tochnosti opredeleniya zapasov vody v snezhnom pokrove [Study of methods, instruments and accuracy in determining water content of snow cover]. *Trudy Gosudarstvennogo Gidrologicheskogo Instituta*, Vyp. 178, 1969, 174 p. [Collected papers on use of airborne gamma survey method.]

PHYSICS OF ICE

- BATTAN, L. J., and others. Attenuation of microwaves by wet ice spheres, by L. J. Battan, S. R. Browning and B. M. Herman. *Journal of Applied Meteorology*, Vol. 9, No. 5, 1970, p. 832-34. [Data for wavelengths 3.21, 5.5 and 10.0 cm.]
- BOGORODSKIY, V. V., ed. Fizika l'da [Physics of ice]. *Trudy Arkticheskogo i Antarkticheskogo Nauchno-Issledovatel'skogo Instituta*, Tom 295, 1970, 189 p. [Dielectric, optical and acoustic properties of land and sea ice, largely from point of view of using echo-sounding techniques.]
- DAVY, J. G., and MILLER, K. W. The diffusion of helium through ice. *Solid State Communications*, Vol. 8, No. 18, 1970, p. 1459-61. [Measurement of diffusion coefficient parallel to *c*-axis.]
- DERYAGIN, B. V. Superdense water. *Scientific American*, Vol. 223, No. 5, 1970, p. 52-64, 69-71. [Review of reasons for believing in polywater. Includes data on melting of ice in presence of polywater-water solutions.]
- EDWARDS, G. R., and others. Nucleation of ice by mechanical shock, [by] G. R. Edwards, L. F. Evans, S. D. Hamann. *Nature*, Vol. 223, No. 5204, 1969, p. 390-91. [Study of effect of shock waves on supercooled droplets shows no nucleation without solid particles.]
- FLETCHER, N. H. On contact nucleation. *Journal of the Atmospheric Sciences*, Vol. 27, No. 7, 1970, p. 1098-99. [Possibility that dry nucleus may cause freezing of a water droplet impacted upon it at temperature above that for freezing or direct contact deposition.]
- FRIEDMAN, I., and SMITH, G. I. Deuterium content of snow cores from Sierra Nevada area. *Science*, Vol. 169, No. 3944, 1970, p. 467-70. [Observed variations and their use as climatic indicator.]
- GITLIN, S. N. Shock waves and freezing. *Journal of Applied Meteorology*, Vol. 9, No. 4, 1970, p. 716-17. [Suggests cavitation is necessary for a disturbance to nucleate supercooled water.]
- HARDY, S. C., and CORTELL, S. R. Morphological stability of ice cylinders in aqueous solution. *Journal of Crystal Growth*, Vol. 7, No. 2, 1970, p. 147-54. [Stability of shape of cylindrical ice crystals growing in HCl and other solutions.]
- HASE, H., and KEVAN, L. Scavenger effects on electrons produced by γ rays and photoionization in alkaline ices at 77°K. *Journal of Physical Chemistry*, Vol. 74, No. 18, 1970, p. 3358-61. [Study of effect of acrylamide on electron trapping in irradiated ice.]
- HUFFMAN, P. J. Polarization of light scattered by ice crystals. *Journal of the Atmospheric Sciences*, Vol. 27, No. 8, 1970, p. 1207-08. [Measurement in laboratory cold chamber shows no measurable spectral variation.]
- JANCSO, G., and others. The vapor pressure of ice between $+10^{-2}$ and -10^{+20} , by G. Jancso, J. Pupezin, and W. A. Van Hook. *Journal of Physical Chemistry*, Vol. 74, No. 15, 1970, p. 2984-89. [New experimental data used to verify a new thermodynamic equation.]
- KAMB, W. B. Superheated ice. *Science*, Vol. 169, No. 3952, 1970, p. 1343-44. [Discussion of experiment reported by G. Schubert and R. E. Lingenfelter, *ibid.*, Vol. 168, No. 3930, 1970, p. 469-70.]
- KATAYAMA, K., and HAYASHI, Y. Heat and mass transfer in the sublimation of ice (2nd report). *Bulletin of JSME [Japan Society of Mechanical Engineers]*, Vol. 13, No. 58, 1970, p. 583-90. [Mechanisms of mass transfer in the three rate-determining steps of ice sublimation.]
- KATAYAMA, K., and others. Researches on heat and mass transfer by sublimation of ice, by K. Katayama, Y. Hayashi and T. Kimura. *Bulletin of JSME [Japan Society of Mechanical Engineers]*, Vol. 12, No. 50, 1969, p. 257-64. [Rate of sublimation of ice measured and found to be governed by three different processes in three pressure ranges.]
- KITAHARA, T., and others. Kōri no kōdo sokutei ni tsuite—toku ni sukeeto kyōgi no tame ni [Hardness measurements of ice in a laboratory and skating rinks]. [By] T. Kitahara, T. Kawamura, T. Kobayashi. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 289-93. [Modified Rockwell hardness tests on ice. English summary, p. 293.]
- KVAJIC, G., and BRAJOVIC, V. Nucleation of parasite crystals in constitutionally supercooled water on the surface of growing ice. *Canadian Journal of Physics*, Vol. 48, No. 18, 1970, p. 2188-91. [Observation of nucleation ahead of ice growing vertically upwards or downwards.]
- LAVROV, V. V. *Deformatsiya i prochnost' l'da [Deformation and strength of ice]*. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1969. 206 p. [Structure, behaviour of ice under load, mechanical properties and shape.]
- LEFEBRE, V. The pseudo melting potential effect. *Journal of Colloid and Interface Science*, Vol. 33, No. 4, 1970, p. 572-77. [No potential developed when ice with NH_4^+ or Cl^- ions in it melts, but potential develops when melting stops.]
- MAJOUBE, M. Fractionation factor of ^{18}O between water vapour and ice. *Nature*, Vol. 226, No. 5252, 1970, p. 1242. [Letter. Determination between -33.4°C and 0°C .]
- MASCARENHAS, S. Charge and polarization storage in solids. *Radiation Effects*, Vol. 4, Nos. 3-4, 1970, p. 263-70. [Studies of Costa Ribeiro effect, electrets and ferroelectricity in ice.]
- MILLER, R. D. Ice sandwich: functional semipermeable membrane. *Science*, Vol. 169, No. 3945, 1970, p. 584-85. [Possibility of using ice between two filters as a semipermeable membrane for e.g. purifying water.]
- MIZUNO, Y., and KUROIWA, D. Autoradiography de kansatsu shita kōri no naka no fujunbutsu no henseki [Solute segregation in ice observed by autoradiography]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 41-45. [Use of radioactive tracers to see where NaCl or HCl appear when dilute solutions are frozen. English summary, p. 61.]
- OTTO, A., and LYNCH, M. J. Characteristic electron energy losses of solid benzene and ice. *Australian Journal of Physics*, Vol. 23, No. 4, 1970, p. 609-12. [Measurement of loss of energy of 1150 eV electrons in ice.]
- PERNIKOVA, T. E., and others. Kinetics of polaron decay in the pulse radiolysis of crystalline ice, [by] T. E. Pernikova, S. A. Kabakchi, V. N. Shubin and P. I. Dolin. *Radiation Effects*, Vol. 5, Nos. 1-2, 1970, p. 133-34. [Polaron decay as parallel first and second order processes; the bimolecular reaction having activation energy of proton motion in ice.]

- PETHICA, B. A., and others. Anomalous water not polywater, [by] B. A. Pethica, W. K. Thompson, W. T. Pike. *Nature, Physical Science*, Vol. 229, No. 1, 1971, p. 21–22. [Letter. Reasons why “anomalous water” is not likely to be a single substance.]
- PIKAYEV, A. K., and others. On the mechanism of low temperature radiolysis of crystalline ice, [by] A. K. Pikayev, B. G. Yershov, and S. Puntezis. *Radiation Effects*, Vol. 5, Nos. 3–4, 1970, p. 265–68. [Electron paramagnetic resonance and optical spectroscopy used to study free radicals in ice.]
- PINCHUKOV, YU. YE. Mezhdumolekularnyy perenos protona po vodorodnoy svyazi i dielektricheskiye svoystva kristallov l'da [Intermolecular proton transfer at the hydrogen bond and the dielectric properties of ice crystals]. *Zhurnal Strukturnoy Khimii*, Tom 11, No. 3, 1970, p. 415–20. [Theory of dielectric dispersion in ice based on proton movements along hydrogen bonds and not involving Bjerrum defects at all.]
- SCHWERDTFEGER, P. Absorption, scattering and extinction of light in ice and snow. *Nature*, Vol. 222, No. 5191, 1969, p. 378–79. [Letter. Relation between these quantities.]
- SHERBY, O. D., and others. Calculation of activation volumes for self-diffusion and creep at high temperatures, [by] O. D. Sherby, J. L. Robbins, and A. Goldberg. *Journal of Applied Physics*, Vol. 41, No. 10, 1970, p. 3961–68. [Success of theoretical calculation of activation volume for diffusion and creep in, among other things, ice. Implications for mechanism of diffusion.]
- SHIO, H., and MAGONO, C. Tankesshō-hyō no masatsu denki, I [Frictional electrification of a single crystal, I]. *Seppyō*, [Vol.] 31, [No.] 1, 1969, p. 1–6. [Sign of charge developed when two single ice crystals are rubbed together with prism plane against basal plane. English abstract, p. 6.]
- STANDISH, N., and LANG, G. Some observations of macrosegregation in ice ingots. *Journal of the Australian Institute of Metals*, Vol. 15, No. 2, 1970, p. 120–26. [Study of freezing of NaCl solutions at various rates.]
- SUZUKI, S. Kōri no bikesshō no sodaika ni kansuru kenkyū, I [Grain coarsening of microcrystals of ice, I]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 53–75. [Study of coarsening of two-dimensional layers of ice on a surface and variation with conditions including HF and NaCl doping and presence of fine solid particles. English summary, p. 74–75.]
- TABOR, D., and WALKER, J. C. F. Creep and friction of ice. *Nature*, Vol. 228, No. 5267, 1970, p. 137–39. [Study of creep over very wide range of strain-rates. Friction cannot be explained by creep data, but sliding recrystallizes interface to give orientations favouring easy glide.]
- TUSIMA, K., and YOSIDA, Z. Kōri no masatsu yūkai [Melting of ice by friction]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 17–30. [Study of the water produced during friction of an acrylic resin ring on ice. English summary, p. 28–30.]
- YAGI, T., and YOSIDA, Z. Takesshōhyō no hanpuku ichiji bubun joka kuriipu [Creep of polycrystalline ice subjected to partial load removal at regular intervals]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 1–16. [Experimental study of effect of reducing load by 20% for periods of 1 min at various stages during a creep test at -10°C . English summary, p. 14–16.]
- YAMADA, T., and ŌURA, H. Kōri no kochaku genshō no kenkyū, I. Hyōkyu to hyōban no aida no fuchakuryoku no sokutei [Studies of ice cohesion, I. A measurement of the cohesive force between an ice sphere and an ice plate]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 31–39. [Force required to separate sphere from plate after given time of contact. English summary, p. 39.]

LAND ICE. GLACIERS. ICE SHELVES

- AHLMANN, H. W., and others. Klimatologiska förändringar omkring Nordatlanten under gammal och nyare tid. En artikelserie, [by] H. W. Ahlmann, C. C. Wallén, B. Fristrup, S. Thorarinnsson, O. Liestøl, G. Østrem [and] V. Schytt. *Ymer*, Årg. 90, 1970, p. 219–42. [Climatological changes in North Atlantic region (Norwegian Sea, Denmark Strait, Greenland, Iceland, Švalbard, Norway and Sweden) from ninth century to present time. Glacier variations.]
- ALEKSANDROV, M. V. Izucheniye evolyutsii oledeneniya v pribrezhnoy polose Zemli Enderbi [Study of the evolution of coastal glaciation in Enderby Land]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 76, 1970, p. 23–29. [Changes between 1962 and 1967 near “Molodezhnaya” station.]
- AMES, A. Control topográfico del movimiento glaciar en el Pucahirca norte y el Uruashraju. *Boletín del Instituto Nacional de Glaciología, Peru*, 1969, No. 1, p. 58–59. [Movements of Pucahirca and Uruashraju glaciers, Peru, in 1968. Reprinted from *Revista Peruana de Andinismo y Glaciología*, 1966–1967–1968, No. 8.]
- AUTENBOER, T. VAN, and DECLER, H. Airborne radio-glaciological investigations during the 1969 Belgian Antarctic expeditions. *Bulletin de la Société Belge de Géologie, de Paléontologie et d'Hydrologie*, Tom. 78, Fasc. 2, 1969, p. 87–100. [Describes and discusses results of detailed ice thickness survey of Jelbartisen–Trolltunga area.]
- BONDAREV, L. G. Basseyn r. Akshiyrak [Basin of the river Akshiyrak]. *Katalog lednikov SSSR [Catalogue of glaciers of the U.S.S.R.]*, Tom 14, Vyp. 2, Chast' 6. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1970, 55 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of the glaciers in this part of Central Asia (Kirgiziya). The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR [Surface water resources of the U.S.S.R.]*.]
- CHEKASOV, P. A. Basseyn rek Biyen, Aksu, Lepsy [Basins of the rivers Biyen, Aksu and Lepsa]. *Katalog lednikov SSSR [Catalogue of glaciers of the U.S.S.R.]*, Tom 13, Vyp. 2, Chast' 6. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1970, 84 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of the glaciers in this part of central and southern Kazakhstan. The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR [Surface water resources of the U.S.S.R.]*.]
- CHERNIGOVSKIY, N. T. Al'bedo poverkhnosti Antarktidiy [Albedo of the surface of Antarctica]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 77, 1970, p. 68–72.

- CLAPPERTON, C. M. Channels formed by the superimposition of meltwater streams. A reply to comments by Thorsten Stenborg, 1969: Channel formation and glacier drainage. *Geografiska Annaler*, Vol. 52A, No. 2, 1970, p. 94-95. [Reply to Stenborg's criticisms, *ibid.*, Vol. 51A, No. 3, 1969, p. 112-13.]
- CLARKE, G. C., and CLASSEN, D. F. The Fox Glacier project. *Canadian Geographical Journal*, Vol. 81, No. 1, 1970, p. 26-29. [Describes scientific programme on surge-type glacier in quiescent period.]
- DENTON, G. H., and PORTER, S. C. Neoglaciation. *Scientific American*, Vol. 222, No. 6, 1970, p. 101-09. [Discusses glacier fluctuations since hypsithermal interval following last major glaciation.]
- DUBINSKIY, G. P., and MINAYEVA, YE. N. Nekotoryye itogi meteorologicheskikh i mikroklimaticheskikh issledovaniy na Lednike Alibek v 1964 g. [Some results of meteorological and microclimatic investigations on Lednik Alibek in 1964]. *Materialy Kavkazskoy Ekspeditsii (po Programme Mezhdunarodnogo Gidrologicheskogo Desyatiletia)*, Tom 7, 1969, p. 3-36. [Results of University of Kharkov expedition, 1964, to the Caucasus.]
- EPSTEIN, S., and others. Antarctic ice sheet: stable isotope analyses of Byrd station cores and interhemispheric climatic implications, by S. Epstein, R. P. Sharp and A. J. Gow. *Science*, Vol. 168, No. 3939, 1970, p. 1570-72. [Analyses of ice samples from 99-2162 m depth enabled temperature variations over last 75 000 years to be defined.]
- FATEYEV, V. P., and CHEBAN, V. A. Basseyny pravyykh pritokov r. Chu nizhe Boamskogo Ushchel'ya [Basins of the right tributaries of the river Chu below Boamskoye Ushchel'ya]. *Katalog lednikov SSSR [Catalogue of glaciers of the U.S.S.R.]*, Tom 14, Vyp. 2, Chast' 4. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1969. 59 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of the glaciers in this part of Central Asia (Kirgiziya). The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR [Surface water resources of the U.S.S.R.]*]
- FEDERER, B., and others. Outflow and accumulation of ice in Jarl-Joset station, Greenland, by B. Federer, H. V. Sury, K. Philberth and M. de Quervain. *Journal of Geophysical Research. Oceans and Atmospheres*, Vol. 75, No. 24, 1970, p. 4567-69. [Results of geodetic surveys of EGIG profile in 1959 and 1968, and absolute measurements of deformations of inclined shaft "Dumont", enabled vertical velocity and outflow of ice at 40 m depth to be determined.]
- FEDOTOV, V. I. Vliyaniye priboya na formirovaniye ledyanogo bar'yera v zalive Alasheyeva [Influence of surf on the formation of an ice cliff in "Alasheyev Bay"]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 76, 1970, p. 43-48. [Observations near "Molodezhnaya" station for several seasons.]
- GALON, R., and SZUPRYCZYŃSKI, J. Wyprawa Polskiego Towarzystwa Geograficznego na Islandię [Polish Geographical Society expedition to Iceland]. *Czasopismo Geograficzne*, Tom 41, Zeszyt 1, 1970, p. 41-55. [Describes some results of expedition to Skeidarárjökull and Sidujökull, Vatnajökull, in 1968. English summary.]
- GOVORUKHA, L. S. O tektonicheskoy strukture lednikov Severnoy Zemli [Tectonic structure of the glaciers of Severnaya Zemlya]. *Problemy Arktiki i Antarktiki*, Vyp. 34, 1970, p. 55-62. [Study of ice caps in 1965.]
- GROSVAL'D, M. G. Nekotoryye osobennosti oledeneniya materikovykh shel'fov [Some features of the glaciation of continental shelves]. *Materialy Glytsiologicheskikh Issledovaniy. Khronika. Obsuzhdeniya*, Vyp. 16, 1970, p. 196-207. [Barents Sea shelf.]
- GROSVAL'D, M. G., and KOTLYAKOV, V. M. Ledniki SSSR i issledovaniya byudzheta ikh massy [Glaciers of the U.S.S.R. and the study of their mass budget]. *Geofizicheskii Byulleten'*, No. 21, 1970, p. 3-17.
- JONSSON, S. Structural studies of subpolar glacier ice. *Geografiska Annaler*, Vol. 52A, No. 2, 1970, p. 129-45. [Study of ice blocks from Isfallsgläciären, Kebnekaise, north Sweden.]
- KOVALEV, P. V., and SERBINA, Z. P. Katalog izmeneniya oledeneniya Bol'shogo Kavkaza s kontsa XIX v. (90 gg.) po 1964 g. [Catalogue of changes in the ice cover of the Great Caucasus from the end of the nineteenth century (1890's) to 1964]. *Materialy Kavkazskoy Ekspeditsii (po Programme Mezhdunarodnogo Gidrologicheskogo Desyatiletia)*, Tom 7, 1969, p. 101-36.
- KRUCHININ, YU. A. Inversiya glytsiologicheskoy zonal'nosti v vostochnoy chasti berega Printsessy Astrid [Inversion of glaciological zoning in the eastern part of Prinsesse Astrid Kyst]. *Trudy Sovetskoy Antarkticheskoy Ekspeditsii*, Tom 38, 1968, p. 61-76. [Firn zone and ablation zone in reverse positions from those expected. Observations 1959-65.]
- KRUCHININ, YU. A. Opyt geneticheskoy klassifikatsii form mikrorel'yefa antarkticheskikh lednikov [Attempt to make a genetic classification of forms of microrelief of Antarctic glaciers]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 77, 1970, p. 51-56.
- KUZNETSOV, M. A. Izmeneniya poverkhnosti i radiatsionno-aktivnogo sloya snega i l'da v period tayaniya [Changes in the surface and in the radiation layer of snow and ice during the melt period]. *Trudy Sovetskoy Antarkticheskoy Ekspeditsii*, Tom 38, 1968, p. 39-60. [Observations of melting processes in upper layers of snow and ice in coastal region of Antarctica.]
- MAKSIMOV, N. V., and others. Basseyny rek Assa, Talas [Basins of the rivers Assa and Talas]. [By] N. V. Maksimov, V. P. Fateyev, V. A. Cheban, I. Ya. Inyutin. *Katalog lednikov SSSR [Catalogue of glaciers of the U.S.S.R.]*, Tom 14, Vyp. 2, Chast' 1. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1968. 67 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of the glaciers in this part of Central Asia (Kirgiziya). The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR [Surface water resources of the U.S.S.R.]*]
- MILLER, M. M. Glaciology of the Khumbu Glacier and Mount Everest. *National Geographic Society Research Reports*, 1961-1962 projects, 1970, p. 153-65. [Reviews results of glaciological programme of the American Mount Everest Expedition, 1963.]
- MILLER, M. M. 1946-1962 survey of the regional pattern of Alaskan glacier variations. *National Geographic Society Research Reports*, 1961-1962 projects, 1970, p. 167-89. [Annual surveys of glacier termini and *névé*-line positions compared with earlier glacier variations.]

- MORALES ARNAO, B. Estudio de la evolución de la lengua Glaciar del Pucahirca y de la Laguna Safuna. *Boletín del Instituto Nacional de Glaciología, Peru*, 1969, No. 1, p. 27-34. [Reports studies on mass balance of Pucahirca glacier and on Laguna Safuna, both in Peru. Reprinted from *Revista Peruana de Andinismo y Glaciología*, 1966-1967-1968, No. 8.]
- MORALES ARNAO, B. Estudios de ablación en la Cordillera Blanca. *Boletín del Instituto Nacional de Glaciología, Peru*, 1969, No. 1, p. 51-57. [Ablation of Pucahirca and Uruashraju glaciers. Reprinted from *Revista Peruana de Andinismo y Glaciología*, 1966-1967-1968, No. 8.]
- MORALES ARNAO, B. Perforaciones en los glaciares de la Cordillera Blanca. *Boletín del Instituto Nacional de Glaciología, Peru*, 1969, No. 1, p. 41-48. [Describes drilling methods and programme on Pucahirca and Uruashraju glaciers, Peru. Reprinted from *Revista Peruana de Andinismo y Glaciología*, 1966-1967-1968, No. 8.]
- MUROZUMI, M., and others. Chemical concentrations of pollutant lead aerosols, terrestrial dusts and sea salts in Greenland and Antarctic snow strata, by M. Murozumi, T. J. Chow and C. Patterson. *Geochimica et Cosmochimica Acta*, Vol. 33, No. 10, 1969, p. 1247-94. [Sample collection and analysis are described, and results presented and discussed in detail.]
- [OECHSLIN, M.] Eislawine am Wetterhorn. *Les Alpes. Bulletin Mensuel du Club Alpin Suisse*, 1970, No. 3, p. 59-60.
- PAL'GOV, N. N. *Zhizn' odnogo lednika* [The life of a glacier]. Alma-Ata, Izdatel'stvo "Nauka" Kazakhskoy SSR, 1970. 122 p. [Popular account of Lednik Tsentral'nyy Tuyuksu, in Tyan'-Shan', based on author's own work over 40 years.]
- PAWLÓWICZ, E. F. An isostatic study of northern and central Greenland based on gravity values and airborne radar ice-thickness measurements. *Dissertation Abstracts International*, B, Vol. 30, No. 7, 1970, p. 3247-B. [Investigation of glacio-isostatic conditions using free-air and Bouguer gravity anomalies. Abstract of Ph.D. thesis, Ohio State University, 1969. University Microfilms order no. 69-22188.]
- PODKOPAYEVA, L. D. Basseyn r. Chatkal [Basin of the river Chatkal]. *Katalog lednikov SSSR* [Catalogue of glaciers of the U.S.S.R.], Tom 14, Vyp. 1, Chast' 2. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1970. 43 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R., giving details of what is known of the glaciers in this part of Central Asia. The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR* [Surface water resources of the U.S.S.R.].]
- PYTTE, R., ed. Glasiologiske undersøkelser i Norge 1969. *Norges Vassdrags- og Elektrisitetsvesen. Rapport fra Hydrologisk Avdeling*, 1970, Nr. 5, 102 p., 2 maps [in pocket]. [Glaciological investigations in Norway, 1969. English summary, p. 85-94.]
- RAMPTON, V. Neoglacial fluctuations of the Natazhat and Klutlan glaciers, Yukon Territory, Canada. *Canadian Journal of Earth Sciences*, Vol. 7, No. 5, 1970, p. 1236-63. [Characteristics of moraines suggest initial Neoglacial advances of Natazhat Glacier occurred 3 300 B.P. and that of Klutlan Glacier 1 520 B.P.]
- RAYMOND, C. F. Flow in a transverse section of Athabasca Glacier, Alberta, Canada. *Dissertation Abstracts International*, B, Vol. 30, No. 7, 1970, p. 3244-B. [Pattern of flow in a nearly complete cross-section of a valley glacier. Abstract of Ph.D. thesis, California Institute of Technology, 1969. University Microfilms order no. 70-1420.]
- SEDGWICK, J. K., and HENOGH, W. E. S. *Peyto Glacier. General information: Le glacier Peyto. Renseignements utiles*. Ottawa, Dept. of Energy, Mines and Resources. Inland Waters Branch, 1970. Map. [English and French versions. Information printed on reverse of map, which has scale 1:10 000.]
- SHCHETINNIKOV, A. S., and PODKOPAYEVA, L. D. Reka Kashkadar'ya. Reka Kurkhandar'ya [Kashkadar'ya river. Kurkhandar'ya river]. *Katalog lednikov SSSR* [Catalogue of glaciers of the U.S.S.R.], Tom 14, Vyp. 3, Chast' 3, 4. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1969. 76 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of the glaciers in this part of Central Asia. The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR* [Surface water resources of the U.S.S.R.].]
- SOLOV'YEV, D. S., and KOGAN, A. L. Glubinnoye seymicheskoye zondirovaniye na Zemle Korolevy Mod [Deep seismic sounding in Dronning Maud Land]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 77, 1970, p. 33-38. [Sounding of crust beneath ice along 425 km profile parallel to coast, 1968-69.]
- THOMAS, R. H., and COSLETT, P. H. Bottom melting of ice shelves and the mass balance of Antarctica. *Nature*, Vol. 228, No. 5266, 1970, p. 47-49. [Concludes that very little bottom freezing occurs beneath any ice shelf.]
- THORARINSSON, S. Vatnajökull. *Iceland Review*, Vol. 8, No. 2, 1970, p. 36-43. [General description.]
- TSVETKOV, D. G. 10 let fotogeodezicheskikh rabot na lednikakh Polyarnogo Urala [10 years of photo-geodetic work on the glaciers of Polyarnyy Ural]. *Materialy Glytsiologicheskikh Issledovaniy. Khronika. Obsuzhdeniya*, Vyp. 16, 1970, p. 245-57. [Detailed glacier mapping.]
- VEATCH, F. Analysis of a 24-year photographic record of Nisqually Glacier, Mount Rainier National Park, Washington. *U.S. Geological Survey. Professional Paper* 631, 1969, iv, 52 p., map [in pocket]. [Describes what kind of data usable in analysing glacier characteristics can be obtained from simple programme of long-term photographic coverage from ground stations.]
- VILESOV, YE. N. Basseyna levyykh pritokov r. Irtysha. Basseyn r. Kaba. Basseyna rek Kurchum, Bukhtarmy, Ul'ba, Uba [Basins of the tributaries of the river Irtysh. Basin of the river Kaba. Basins of the rivers Kurchum, Bukhtarmy, Ul'ba and Uba]. *Katalog lednikov SSSR* [Catalogue of glaciers of the U.S.S.R.], Tom 15, Vyp. 1, Chast' 1, 2, 3. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1969. 79 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of the glaciers in this part of Altay and western Siberia (Altay mountains and upper Irtysh). The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR* [Surface water resources of the U.S.S.R.].]
- VILESOV, YE. N. Basseyna rek Charyn, Tekes [Basins of the rivers Charyn and Tekes]. *Katalog lednikov SSSR* [Catalogue of glaciers of the U.S.S.R.], Tom 13, Vyp. 2, Chast' 3. Leningrad, Gidrometeorologicheskoye

- Izdatel'stvo, 1969. 40 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of the glaciers in this part of central and southern Kazakhstan. The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR* [Surface water resources of the U.S.S.R.].]
- VIVIAN, R. Sur quelques aspects de la glaciation himalayenne au Népal (1). *Bulletin de l'Association de Géographes Français*, Nos. 379-80, 1970, p. 67-77. [Discusses glaciers and glaciation of the Nepalese Himalaya.]
- VOSTERS, M., and others. Determination of Cl, Na, Mg, K and Ca in firn sample 66-A-z from New Byrd station, Antarctica—comparison with work of Murozumi, Chow and Patterson, by M. Vosters and F. Hanappe and P. Buat-Menard. *Geochimica et Cosmochimica Acta*, Vol. 34, No. 3, 1970, p. 399-401. [Values obtained are in agreement with those of other investigators.]
- WARNKE, D. A. Glacial erosion, ice rafting, and glacial-marine sediments: Antarctica and the Southern Ocean. *American Journal of Science*, Vol. 269, No. 3, 1970, p. 276-94. [Reviews recent work on glaciology of, and glacial erosion by, the Antarctic ice sheet and relates this to Antarctic glacial history.]
- WOOD, W. A. Recent glacier fluctuations in the Sierra Nevada de Santa Marta, Colombia. *Geographical Review*, Vol. 60, No. 3, 1970, p. 374-92. [Ice cover of 1969 compared with that of 1939.]
- WORNHAM, C. M. Ice-movement measurements in the Theron Mountains. *British Antarctic Survey Bulletin*, No. 21, 1969, p. 45-50. [Includes snow accumulation measurements.]

ICEBERGS. SEA, RIVER AND LAKE ICE

- ANCKER, P. Isrekognosering. *Grønland*, 1970, No. 2, p. 33-46. [General description of floating ice reconnaissance.]
- ANTONOV, V. S., ed. *Gidrologiya sibirskikh rek arkticheskoy zony* [Hydrology of Siberian rivers in the Arctic region]. *Trudy Arkticheskogo i Antarkticheskogo Nauchno-Issledovatel'skogo Instituta*, Tom 290, 1970, 184 p. [Fluctuations in flow, ice regime, erosive action.]
- AUFDERHEIDE, A. C. Observations on ice regimes of the Arctic Ocean. *Arctic*, Vol. 23, No. 2, 1970, p. 133-36. [Surface observations of pack ice in spring made by members of Plaisted Polar Expedition, 1968.]
- BARANOV, G. I., and others. Usloviya formirovaniya i nekotoryye svoystva morskikh antarkticheskikh l'dov (po nablyudeniym v 1963 g.) [Formation and some properties of Antarctic sea ice (from observations in 1963)]. [By] G. I. Baranov, Yu. L. Nazintsev [and] N. V. Cherepanov. *Trudy Sovetskoy Antarkticheskoy Ekspeditsii*, Tom 38, 1968, p. 77-89. [Indian Ocean sector.]
- BARR, S. B. Snow freezing on sea surface. Denmark Strait. *Marine Observer*, Vol. 40, No. 230, 1970, p. 159. [Reports formation of ice rind.]
- BEL'YAKOV, L. N. Nekotoryye osobennosti podlednykh dreyfovykh techeniy v more, pokrytom l'dom [Some features of under-ice drift currents in seas with ice cover]. *Problemy Arktiki i Antarktiki*, Vyp. 33, 1970, p. 30-38. [Based on work at Soviet drifting stations in Arctic Ocean.]
- BUSHUYEV, A. V., and VOLKOV, N. A. Meteorologicheskiye iskusstvennyye sputniki zemli kak sredstvo nablyudeniya za l'dami [Meteorological earth satellites as a means of observing ice]. *Problemy Arktiki i Antarktiki*, Vyp. 33, 1970, p. 5-12. [Some achievements in last three years in Arctic and Antarctic seas, and future possibilities.]
- [CAMPBELL, W. J., and WEEKS, W. F.] Icebergs for sale. *Nature*, Vol. 224, No. 5223, 1969, p. 937-38. [Brief review of scheme to use icebergs to alleviate water shortage in dry areas of world.]
- CHIKOVSKIY, S. S. O termicheskom vliyaniy materikovogo l'da na pereokhlazhdeniye morskikh vod [Thermal influence of continental ice on cooling of sea water]. *Problemy Arktiki i Antarktiki*, Vyp. 33, 1970, p. 57-66. [Influence of icebergs on waters of Southern Ocean.]
- DROUIN, M. Meteorological variables influencing the thermal thrust of an extending ice sheet. *Proceedings of the 26th annual Eastern Snow Conference*, 1969, p. 55-65. [Discusses estimation of thrust exerted by floating ice.]
- GLÄDE, P., and others. O vozmozhnostyakh ispol'zovaniya nablyudeniya iskusstvennykh meteorologicheskikh sputnikov pri issledovanii antarkticheskikh l'dov [Possibilities of using meteorological satellite observations in Antarctic ice studies]. [By] P. Gläde, H. Gernandt [and] V. A. Shamont'yev. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 73, 1969, p. 27-33. [Use of ESSA-6 photographs to help Soviet ships reach Mirny through pack ice.]
- GUDKOVICH, Z. M., and others. Baricheskii "polyusnyy priliv" i yego vliyaniye na ledovitost' arkticheskikh morey [The influence of "polar tide" on ice conditions of Arctic seas]. [By] Z. M. Gudkovich, E. I. Sarukhanyan and N. P. Smirnov. *Okeanologiya*, Tom 10, Vyp. 3, 1970, p. 426-37. [Study of 14-month fluctuations in atmospheric pressure above the Arctic Ocean. English summary.]
- HAMILTON, A. T. Observations of iceberg rafting in Glacier Bay, Alaska, and the identification of ancient ice-rafted deposits. *Geological Society of America. Bulletin*, Vol. 81, No. 3, 1970, p. 891-94. [Study of icebergs in modern glacial marine environment gives indication of content of ancient rocks that received iceberg-rafted material.]
- ISHIDA, T., and ONO, N. Ryūhyō jōkyō to rēdā-zō to no taiō [On the correlation of sea ice construction to radar pattern]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 317-25. [Describes studies of drift ice along shores of Sea of Okhotsk, correlation of sea ice construction to radar pattern being compared with air photographs. English summary, p. 325. English translation: *Canada. Defence Research Board. Translation* T 104 J, translated by E. R. Hope, 1970.]
- KHEYSIN, D. YE., and CHEREPANOV, N. V. Izmeneniye struktury l'da v zone udara tverdogo tela o poverkhnost' ledyanogo pokrova [Change of ice structure in a region where a solid object has struck the ice cover]. *Problemy Arktiki i Antarktiki*, Vyp. 34, 1970, p. 79-84. [Studies with floating ice, with possible application to shipping problems.]
- KHROL, V. P. O prichine mnogoletnikh izmeneniy v rasprostrane l'dov severnoy Atlantiki [Reason for long-term changes in distribution of ice in the North Atlantic]. *Trudy Gosudarstvennogo Okeanograficheskogo Instituta*, Vyp. 96, 1969, p. 39-55.

- KOZLOVSKIY, A. M. Osobennosti ustanovleniya pripaya v zalive Alasheyeva [Features in the build-up of fast ice in "Alasheyev Bay"]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 76, 1970, p. 49-51. [Observations in 1967.]
- KREITNER, J. D., and BENSON, C. S. The freezing cycle in a small turbulent stream. *Science in Alaska 1969. Proceedings [of the] 20th Alaska Science Conference, College, Alaska, August 24 to August 27, 1969*, 1970, p. 332-33. [Abstract. Comments upon freezing cycle throughout year with reference to Goldstream Creek, near Fairbanks.]
- LANGLEBEN, M. P. Reflection of sound at the water-ice interface. *Journal of Geophysical Research*, Vol. 75, No. 27, 1970, p. 5243-46. [Frequency range 20 to 450 kHz. Measurements in Tanquary Fiord, Ellesmere Island.]
- MAYBOURN, R. The *Manhattan* and the North-west Passage. *Marine Observer*, Vol. 40, No. 229, 1970, p. 110-13. [Voyage of icebreaking oil tanker; particular reference to ice conditions encountered.]
- NASTA, R., and NAWRATIL, R. Picture of the month. Giant icebergs in the Weddell Sea. *Monthly Weather Review*, Vol. 98, No. 10, 1970, p. 774-75. [Comments on presence and origin of two large icebergs in Duke Ernest Bay.]
- NIKOLAYEVA, A. YA. O vliyaniy pripaya na dreyf l'da [Influence of fast ice on ice drift]. *Problemy Arktiki i Antarktiki*, Vyp. 33, 1970, p. 110-14.
- ROMANOV, A. A. Osobennosti dreyfa l'da v pribrezhnoy zone vostochnoy Antarktidi [Features of ice drift in the coastal region of east Antarctica]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 77, 1970, p. 85-89.
- SHESTERIKOV, N. P. Promerzaniye mnogoletnikh l'dov [Freezing of old ice]. *Problemy Arktiki i Antarktiki*, Vyp. 33, 1970, p. 39-45. [Way in which temperature drops in thick floating ice during autumn.]
- SMIRNOV, V. I. O potentsial'noy soprotivlyayemosti l'da po nablyudeniym za ledyanym pokrovom s borta samoleta ili sudna [Potential resistance of ice from observations aboard aircraft or ship]. *Problemy Arktiki i Antarktiki*, Vyp. 33, 1970, p. 115-18. [How resistance of sea ice varies with age and temperature.]
- TABATA, T., and others. Rēdā kansoku ni yoru Hokkaidō Ohōtsuku-kaigen oki no ryūhyō bunpu [Distribution of pack ice field off the Okhotsk coast of Hokkaido according to radar observations (February, March, 1969)]. [By] T. Tabata, M. Aota, M. Ōi [and] M. Ishikawa. *Teion-kagaku: Low Temperature Science*, Ser. A, [Supplement to No.] 27, *Shiryō Shū: Data Report*, 1969, p. 23-38. [English translation: *Canada. Defence Research Board. [Translation] T 105 J*, translated by E. R. Hope, 1970.]
- TABATA, T., and others. Rēdā ni yoru ryūhyō no ugoki no kansoku [Observations on the movement of drift ice with the sea ice radar]. [By] T. Tabata, M. Aota, M. Ōi [and] M. Ishikawa. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 295-315. [Describes observation of distribution of drift ice along Okhotsk Sea coast by means of 3 radar stations set up on coastal mountains and discusses results. English summary, p. 314-15. English translation: *Canada. Defence Research Board. [Translation] T 103 J*, translated by E. R. Hope, 1970.]
- TIMOKHOV, L. A. K teorii vrashcheniya l'din ledyanogo pokrova razlichnoy splochnosti [Theory of ice floe rotation in ice cover of various concentrations]. *Problemy Arktiki i Antarktiki*, Vyp. 33, 1970, p. 46-56.
- TIMOKHOV, L. A. O svyazi turbulentnogo i osrednennogo dvizheniya l'dov [The link between turbulent and mean ice movement]. *Problemy Arktiki i Antarktiki*, Vyp. 34, 1970, p. 63-70. [Mathematical treatment of movement of floes on a large water-body.]
- TSURIKOVA, A. P., and TSURIKOV, V. L. Ionnyy sostav podlednykh vod [Ion content of sub-ice waters]. *Okeanologiya*, Tom 10, Vyp. 4, 1970, p. 637-45. [Studies beneath lake ice to clarify relationship between ion content and growth of ice above.]
- TSYKIN, YE. N. Primeneniye ledovykh strugov dlya predotvrashcheniya ledyanykh zatorov [The use of ice graders for the prevention of ice jams]. *Izvestiya Akademii Nauk SSSR. Seriya Geograficheskaya*, 1970, No. 3, p. 61-66. [Description of ice graders; results of experiments in 1968 and 1969.]
- URALOV, N. S. Kharakter i prichiny izmenchivosti ledovitosti u vostochnykh beregov Grenlandii [Character and reasons for change of ice off the east coast of Greenland]. *Trudy Gosudarstvennogo Okeanograficheskogo Instituta*, Vyp. 96, 1969, p. 3-38. [Factors affecting seasonal distribution of floating ice, 1898-1956.]
- VAYGACHEV, A. Z., and TRET'YAKOV, N. F. Sdvig ledyanogo ostrova Pobeda [Movement of the ice island Pobeda]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 76, 1970, p. 57-59. [Grounded tabular berg near Mirny found to have moved between 1965 and 1967.]
- VOLKOV, N. A., and SLEPTSOV-SHEVLEVICH, B. A. Dvukhletniy tsikl v kolebaniyakh ledovitosti [Two-year cycle in fluctuations of ice cover]. *Problemy Arktiki i Antarktiki*, Vyp. 34, 1970, p. 13-19. [In seas north of the U.S.S.R.]
- YEGOROV, K. L. K teorii dreyfa ledyanykh poley v gorizontāl'no neodnorodnom pole vetra [Theory of drift of ice floes in a horizontally heterogeneous wind field]. *Problemy Arktiki i Antarktiki*, Vyp. 34, 1970, p. 71-78.

GLACIAL GEOLOGY

- ANDREWS, J. T. Present and postglacial rates of uplift for glaciated northern and eastern North America derived from postglacial uplift curves. *Canadian Journal of Earth Sciences*, Vol. 7, No. 2, 1970, p. 703-15. [Field data from 58 sites enable maps to be presented showing spatial and temporal patterns of rates of post-glacial uplift.]
- ANDREWS, J. T., and others. Late-glacial chronology and glacio-isostatic recovery, Home Bay, east Baffin Island, Canada, by J. T. Andrews, J. T. Buckley [and] J. H. England. *Geological Society of America. Bulletin*, Vol. 81, No. 4, 1970, p. 1123-48. [Describes field work; discusses results.]
- BARR, W. Structurally-controlled fluvio-glacial erosion features near Schefferville, Québec. *Cahiers de Géographie de Québec*, 13^e An., No. 30, 1969, p. 295-320. [Emphasizes significance of structural control of melt-water drainage of Laurentide ice sheet.]

- BARTOSIK, J. Zasięg zlodowacenia środkowopolskiego na północno-wschodnim obrzeżeniu Gór Świętokrzyskich [Extent of the (Riss) glaciation of central Poland on the north-eastern periphery of the Świętokrzyskie mountains]. *Acta Geographica Lodziensia*, No. 24, 1970, p. 61-74. [Observations of present-day terrain enable extent of Quaternary glaciation of central Poland to be inferred. French summary, p. 73-74.]
- BIRD, J. B. The final phase of the Pleistocene ice sheet north of Hudson Bay. *Acta Geographica Lodziensia*, No. 24, 1970, p. 75-89. [Presents evidence from Southampton Island suggesting probable course of deglaciation.]
- BRAY, J. R. Temporal patterning of post-Pleistocene glaciation. *Nature*, Vol. 228, No. 5269, 1970, p. 353. [Discusses results of study of timing of the 4 phases of post-Pleistocene glaciation and predicts future glacial conditions.]
- BUCKLEY, J. T. Gradients of past and present outlet glaciers. *Canada. Geological Survey. Paper* 69-29, 1969, v, 13 p. [Linear relationship exists between over-all length and gradient of present-day outlet glaciers thus enabling reconstruction to be made of ice surfaces of former outlet glaciers in areas previously glaciated.]
- CROWELL, J. C., and FRAKES, L. A. Phanerozoic glaciation and the causes of ice ages. *American Journal of Science*, Vol. 268, No. 3, 1970, p. 193-224. [Distribution of Palaeozoic glaciation described. Continental drift suggested to be basic cause of ice ages.]
- DETTERMAN, R. L. Early Holocene warm interval in northern Alaska. *Arctic*, Vol. 23, No. 2, 1970, p. 130-32. [Evidence from a radiocarbon date of 8400 ± 300 B.P. obtained from poplar log found in region.]
- FUNDER, S. Notes on the glacial geology of eastern Milne Land, Scoresby Sund, East Greenland. *Grønlands Geologiske Undersøgelse. Rapport*, No. 30, 1970, p. 37-42. [Field work during 1969 expedition.]
- GASKELL, T. F. Is a new ice age beginning? *Science Journal*, Vol. 6, No. 12, 1970, p. 31-34. [Reviews theories of causes of ice ages and suggests man's activities may affect Earth's temperature.]
- HOPPE, G. The Würm ice sheets of northern and arctic Europe. *Acta Geographica Lodziensia*, No. 24, 1970, p. 205-15. [Discusses results of field studies in relevant regions.]
- JONES, J. G. Intraglacial volcanoes of the Laugarvatn region, southwest Iceland, II. *Journal of Geology*, Vol. 78, No. 2, 1970, p. 127-40. [Describes constituents, structure, and development of two basaltic volcanoes which grew in melt-water ponds in ice sheet.]
- KUPRINA, N. P. Stratigrafiya i istoriya osadkonakopleniya pleystotsenovykh otlozheniy tsentral'noy Kamchatki [Stratigraphy and sedimentation history of Pleistocene deposits of central Kamchatka]. *Trudy Geologicheskogo Instituta*, Vyp. 216, 1970, 148 p.
- LAMB, H. H., and WOODROFFE, A. Atmospheric circulation during the last ice age. *Quaternary Research*, Vol. 1, No. 1, 1970, p. 29-58. [Prevailing surface temperatures in summer and winter at several different stages of last ice age used to study climatic behaviour of times concerned.]
- LASCA, N. P. The surficial geology of Skeldal, Mesters Vig, northeast Greenland. *Meddelelser om Grønland*, Bd. 176, Nr. 3, 1969, 56 p. [Chronology for glacial retreat since last glacial maximum.]
- LINDSAY, J. F. Clast fabric of till and its development. *Journal of Sedimentary Petrology*, Vol. 40, No. 2, 1970, p. 629-41. [Processes of till fabric development are discussed and related to englacial and subglacial environment.]
- LINDSAY, J. F. Depositional environment of Paleozoic glacial rocks in the central Transantarctic Mountains. *Geological Society of America. Bulletin*, Vol. 81, No. 4, 1970, p. 1149-72. [Conclusions from discussion of field work include suggestion that ice sheet of continental dimensions was centred on southern Victoria Land.]
- LUNDQVIST, J. Studies of drumlin tracts in central Sweden. *Acta Geographica Lodziensia*, No. 24, 1970, p. 317-26. [Describes distribution and appearance of drumlins, and suggests mechanism of formation.]
- MAKSMOV, YE. V. Kosmicheskiye faktory oledeneniya [Cosmic factors in glaciation]. *Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva*, Tom 102, Vyp. 4, 1970, p. 339-46. [Cyclic theory of ice ages.]
- MANGERUD, J. Late Weichselian vegetation and ice-front oscillations in the Bergen district, western Norway. *Norsk Geografisk Tidsskrift*, Bd. 24, Ht. 3, 1970, p. 121-48. [Suggests behaviour of ice front, mainly on basis of fossiliferous till and sediments below till.]
- MERCER, J. H. Antarctic ice and interglacial high sea levels. *Science*, Vol. 168, No. 3939, 1970, p. 1605-06. [Criticizes C. Emiliani's hypothesis, *ibid.*, Vol. 166, No. 3912, p. 1503-04. Reply by Emiliani.]
- NEWELL, W. L. Factors influencing the grain of the topography along the Willoughby Arch in northeastern Vermont. *Geografiska Annaler*, Vol. 52A, No. 2, 1970, p. 103-12. [Pattern of topography not modified by glaciation; probable that movement of flowing glacial ice near ground was deflected by topography.]
- ÖSTREM, G., and ARNOLD, K. Ice-cored moraines in southern British Columbia and Alberta, Canada. *Geografiska Annaler*, Vol. 52A, No. 2, 1970, p. 120-28, 1 loose folded map. [Air photography indicates proportion of ice-cored end moraines increases from coast inland, highest ratio being found where glaciation limit reaches highest altitude.]
- PARIZEK, R. R. Glacial ice-contact rings and ridges. *Geological Society of America. Special Paper* No. 123, 1969, p. 49-102. [Nature, proposed mechanism, and environment of formation are discussed in relation to manner and history of ice retreat and as aid in interpretation of origin of associated landforms and deposits.]
- PÉWÉ, T. L. Alltplanation terraces of early Quaternary age near Fairbanks, Alaska. *Acta Geographica Lodziensia*, No. 24, 1970, p. 357-63. [Suggests method of formation of terraces and, simultaneously, of coarse gravel in creek valley bottoms.]
- PREST, V. K., and GRANT, D. R. Retreat of the last ice sheet from the Maritime Provinces. Gulf of St. Lawrence region. *Canada. Geological Survey. Paper* 69-33, 1969, iv, 15 p. [Summarizes authors' conclusions regarding extent and movement of ice sheet at its maximum during subsequent recessional stages in this area; these views are at variance with generally-held concepts.]
- RICHMOND, G. M. Comparison of the Quaternary stratigraphy of the Alps and Rocky Mountains. *Quaternary Research*, Vol. 1, No. 1, 1970, p. 3-28. [Glacial and periglacial deposits and soils of the two regions are compared and discussed in relation to their glaciations and interglacials.]

- TRICART, J. *Geomorphology of cold environments*. Translated by Edward Watson. London, Macmillan, [c1970]. xvi, 320 p. [Translation of *Géomorphologie des régions froides*. Paris, Presses Universitaires de France, 1963.]
- TROTSKIY, L. S. O vliyaniy struktury lednikov na formirovaniye kholmisto-gryadovogo morennogo rel'yefa na Shpitsbergene [Influence of glacier structure on formation of ridge moraine relief in Spitsbergen]. *Materialy Glyatsiologicheskikh Issledovaniy. Khronika. Obsuzhdeniya*, Vyp. 16, 1970, p. 178-83.
- WASTENSON, L. Spår av istid. *Sveriges Natur*, Årsbok 1970, p. 36-48. [Defines some concepts in glacial geology and gives examples of their occurrence in Sweden.]
- WEBBER, P. J., and others. Post-glacial uplift and substrate age at Cape Henrietta Maria, southeastern Hudson Bay, Canada, [by] P. J. Webber and J. W. Richardson and J. T. Andrews. *Canadian Journal of Earth Sciences*, Vol. 7, No. 2, 1970, p. 317-25. [Post-glacial emergence history of area obtained by fitting post-glacial emergence curve to a number of radiocarbon dated marine strandlines of known elevation.]
- WEIDICK, A., and BRINK, N. W. TEN. Quaternary deposits between the Sukkertoppen ice cap and Nordre Strømfjord. *Grønlands Geologiske Undersøgelse. Rapport*, No. 28, 1970, p. 23-25. [Glacial and emerged marine deposits studied in West Greenland.]

FROST ACTION ON ROCKS AND SOIL. FROZEN GROUND. PERMAFROST

- ALLAN, R. J. Clay mineralogy and geochemistry of soils and sediments with permafrost in interior Alaska. *Dissertation Abstracts International*, B, Vol. 30, No. 7, 1970, p. 2984-B-85-B. [Investigation of poorly drained soils with permafrost and frozen sediments. Abstract of Ph.D. thesis, Dartmouth College, 1969. University Microfilms order no. 69-21223.]
- BALL, D. F., and GOODIER, R. Morphology and distribution of features resulting from frost-action in Snowdonia. *Field Studies*, Vol. 3, No. 2, 1970, p. 193-218. [Description and classification of phenomena in this area of Wales.]
- BASHLAVIN, D. K. O roli pozharov v formirovaniy sklonov v rayonakh razvitiya vechnoy merzloty (na primere Yakutii) [Role of fires in slope formation in permafrost (based on examples in Yakutiya)]. *Izvestiya Sibirskogo Otdeleniya Akademii Nauk SSSR*, 1970, No. 11, p. 115-17.
- BENEDICT, J. B. Downslope soil movement in a Colorado alpine region: rates, processes, and climatic significance. *Arctic and Alpine Research*, Vol. 2, No. 3, 1970, p. 165-226. [Study of frost creep and solifluction.]
- BENEDICT, J. B. Frost cracking in the Colorado Front Range. *Geografiska Annaler*, Vol. 52A, No. 2, 1970, p. 87-93. [Cracks are caused by tensional forces produced by differential frost heaving.]
- BROCHU, M. Indice de gélivation de la roche en place et des formations meubles. *Bulletin de l'Association des Géographes Français*, Nos. 373-74, 1969, p. 469-77. [Defines quantitatively, for granites and limestones, freeze-thaw action on bedrock and on recently deposited material.]
- CORTE, A. E. Geocryology and engineering. (In Varnes, D. J., and Kiersch, G., ed. *Reviews in engineering geology*. Vol. 2. Boulder, Colorado, Geological Society of America, 1969, p. 119-85.) [Discusses seasonally and perennially frozen ground, and experimental and applied research dealing with engineering aspects.]
- CZUDEK, T., and DEMEK, J. Thermokarst in Siberia and its influence on the development of lowland relief. *Quaternary Research*, Vol. 1, No. 1, 1970, p. 103-20. [Description.]
- DIONNE, J.-C. Bibliographie annotée du glacié; aspects morpho-sédimentologiques: An annotated bibliography of "glacié" [sic] studies; morpho-sédimentological aspects. *Revue de Géographie de Montréal*, Vol. 23, No. 3, 1969, p. 339-49.
- DIONNE, J.-C. Nouvelles observations de fentes de gel fossiles sur la côte sud du Saint-Laurent. *Revue de Géographie de Montréal*, Vol. 23, No. 3, 1969, p. 307-16. [Describes 3 main types of fossil ice wedges found recently. Development related to retreating ice front during Quaternary.]
- FOSTER, H. D. Establishing the age and geomorphological significance of sorted stone-strips in the Rhinog Mountains, North Wales. *Geografiska Annaler*, Vol. 52A, No. 2, 1970, p. 96-102.
- GRAVIS, G. F. Sklonovyye otlozheniya Yakutii (usloviya nakopleniya i promerzaniya, kriogennoye strayeniye) [Slope deposits of Yakutiya (conditions of accumulation and freezing, permafrost structure)]. Moscow, Izdatel'stvo "Nauka", 1969. 128 p. [Analysis of solifluction and associated processes.]
- HAMELIN, L.-E. Le glacié de Iakoutie, en Sibérie nordique. *Cahiers de Géographie de Québec*, 13^e An., No. 29, 1969, p. 205-16. [Periglacial phenomena in Yakutskaya A.S.S.R.]
- JAHN, A. Najniższe stanowisko czynnych gruntów strukturalnych w Tatrach i problem dolnej granicy występowania zjawisk peryglacjalnych w górach [The lowermost site of active patterned ground in the Tatras and the problem of the lower limit of periglacial phenomena in mountains]. *Acta Geographica Lodzienia*, No. 24, 1970, p. 217-24. [Discusses factors causing development of patterned ground in this region. Suggests tree-line be regarded as lower limit of periglacial phenomena. English summary, p. 224.]
- JOURNAUX, A., and BARDEY, P. Réflexions sur les sols polygonaux, les sols striés et les nids de pierre. *Acta Geographica Lodzienia*, No. 24, 1970, p. 249-58. [Discusses mechanism of formation of various periglacial features.]
- KINOSITA, S., and others. Kitami Mombetsu ni okeru tōjō kansoku (Shōwa 43-44 tōki) [Frost heaves in Kitami and Mombetsu (1968-69)]. [By] S. Kinoshita, Y. Suzuki, K. Horiguchi, K. Tanuma, M. Aota [and] T. Ono. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 379-93. [Various observations discussed, including effect on pipes buried in ground, composition of frozen ground, and increase of moisture content during freezing. English summary, p. 392-93.]
- KINOSITA, S., and others. Tōjō to chika suii to no kankei, I [Change of water level during frost heaving, I]. [By] S. Kinoshita, Y. Suzuki, K. Horiguchi [and] K. Tanuma. *Teion-kagaku: Low Temperature Science*, Ser. A,

- [No.] 27, 1969, p. 367-77. [Describes construction of water-resistant basin filled with frost-susceptible soil for studies of frost heaving under controlled conditions. Discusses results when no water was supplied after soil began to freeze. English summary, p. 376-77.]
- LEWELLEN, R., and BROWN, J. Man induced erosion on permafrost. *Science in Alaska 1969. Proceedings [of the] 20th Alaska Science Conference, College, Alaska, August 24 to August 27, 1969*, 1970, p. 333-34. [Abstract. Effect of draining lakes and constructing roads.]
- LUGOVOY, P. N. *Osobennosti geokriologicheskikh usloviy gornyykh stran [Features of geocryological conditions of mountainous countries]*. Moscow, Izdatel'stvo "Nauka", 1970. 136 p. [Factors influencing presence of permafrost, with special reference to some mountain areas in the U.S.S.R.]
- MARKOV, K. K. Le froid et le périglaciaire du Pléistocène. *Acta Geographica Lodziensia*, No. 24, 1970, p. 337-41. [Discusses briefly extent of cooling and periglacial features due to the Pleistocene.]
- NICHOLS, R. L. Geomorphology of Ingfield Land, North Greenland. *Meddelelser om Grønland*, Bd. 188, Nr. 1, 1969, 109 p. [Includes glaciation and periglacial features.]
- POPOV, A. I. Underground ice of northern Eurasia. *Acta Geographica Lodziensia*, No. 24, 1970, p. 365-69. [Describes present-day features, and formation during Pleistocene, of underground ice.]
- POTTER, N., jr. Rock glaciers and mass-wastage in the Galena Creek area, northern Absaroka Mountains, Wyoming. *Dissertation Abstracts International*, B, Vol. 30, No. 8, 1970, p. 3711-B-12-B. [Rock debris varies from 1-1.5 to 2-3 m thick over glacier ice. Rate of accumulation area to ablation area 1:7. Abstract of Ph.D. thesis, University of Minnesota, 1970. University Microfilms order no. 69-20049.]
- RINKER, J. N., and FROST, R. E. Application of remote sensing to arctic environmental studies. (In Welch, R. I., ed. *The use of remote sensing in conservation, development, and management of the natural resources of the State of Alaska*. Juneau, Alaska, Dept. of Economic Development, [1970?], p. 105-16.) [Describes briefly how remote sensing may be applied to problems of engineering construction on frozen ground.]
- SOKOLOV, B. L. Raschet nalednogo stoka [Calculating run-off from icings]. *Meteorologiya i Gidrologiya*, 1970, No. 7, p. 82-87.
- SVENSSON, H. Fossila skandinaviska frostmarksformer. En jämförelse med recent permafrost på Spetsbergen och i Jakutien. *Geologiska Föreningens i Stockholm Förhandlingar*, Vol. 92, Pt. 3, No. 542, 1970, p. 323-35. [Compares fossil Scandinavian permafrost features and ice wedge polygons and pingos in recent permafrost areas in Spitsbergen and Yakutskaya A.S.S.R. English summary.]
- SVENSSON, H. Spår av "fluted surfaces" från den senaste nedisningen. *Geologiska Föreningens i Stockholm Förhandlingar*, Vol. 92, Pt. 1, No. 540, 1970, p. 79-85. [Air photographs suggest fluted moraine surfaces were normal form of ground moraine in front of receding Scandinavian ice sheet. English summary.]
- TAKAGI, S. An analysis of ice lens formation. *Water Resources Research*, Vol. 6, No. 3, 1970, p. 736-49. [Suggests mechanism for ice lens formation which could assist in formulation of frost heaving process.]
- TANUMA, K. Tōjō no sai no dochū suibun idō to kangekiritsu to no kankai [The relation between the soil moisture transfer and porosity during frost heaving]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 359-66. [Experimental method described and results discussed. English summary, p. 365-66.]
- THOM, B. G. New permafrost investigations near Schefferville, P.Q. *Revue de Géographie de Montréal*, Vol. 23, No. 3, 1969, p. 317-27. [Reviews recent research: (1) development of techniques for mapping permafrost where it occurs near surface and to interpret variation in permafrost with depth; (2) relationship of permafrost in area to present and past environments.]
- TRICART, J. Convergence de phénomènes entre l'action du gel et celle du sel. *Acta Geographica Lodziensia*, No. 24, 1970, p. 425-36. [Compares action of naturally occurring salt in soil with that of frost.]
- VTYURINA, YE. A., and VTYURIN, B. I. *L'dobrazovaniye v gornyykh porodakh [Ice formation in rocks]*. Moscow, Izdatel'stvo "Nauka", 1970. 280 p. [Includes genetic classification of ice types found in subsoil.]
- WARDER, D. L. Behavior and analysis of a model soil-ice barrier. *Dissertation Abstracts International*, B, Vol. 30, No. 11, 1970, p. 5038-B. [Investigation of artificially frozen soil as a barrier around the periphery of a model shaft with regard to stress-deformation characteristics of the soil-ice cylinder. Abstract of Ph.D. thesis, Michigan State University, 1969. University Microfilms order no. 70-9652.]
- WASHBURN, A. L. An approach to a genetic classification of patterned ground. *Acta Geographica Lodziensia*, No. 24, 1970, p. 437-46. [Classification presented with author's comments.]

METEOROLOGICAL AND CLIMATOLOGICAL GLACIOLOGY

- AUER, A. H., jr., and VEAL, D. L. The dimensions of ice crystals in natural clouds. *Journal of the Atmospheric Sciences*, Vol. 27, No. 6, 1970, p. 919-26. [Studies of replicas of over 1 500 natural crystals.]
- HOFFER, T. E., and WARBURTON, J. A. Observations of diffusional ice crystal growth in clouds. *Journal of the Atmospheric Sciences*, Vol. 27, No. 7, 1970, p. 1068-73. [Comparison of observed size with that predicted by diffusion growth theory.]
- LIST, R., and others. Structural properties of two hailstone samples, by R. List, J.-G. Cantin and M. G. Ferland. *Journal of the Atmospheric Sciences*, Vol. 27, No. 7, 1970, p. 1080-90. [Density, crystal size and orientation, and opacity studied in detail.]
- REITER, R. On the causal relation between nitrogen-oxygen compounds in the troposphere and atmospheric electricity. *Tellus*, Vol. 22, No. 1, 1970, p. 122-36. [Uses laboratory data on NO₃⁻ concentration gradients along growing ice needles in theory of thunderstorm electricity.]
- WAKAHAMA, G., and FUJINO, K. Norikura korona kansokusho no chakuhyō no chōsa [Icing on the dome of the Norikura corona station]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 135-42. [Study of points of origin of riming and of structure. English summary, p. 141.]

SNOW

- AKITAYA, E. Chichū kara sekisetsunai e nagareru netsuryū no sokutei [Measurement of heat flow from ground into snow cover]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 409-13.
- [AVALANCHES.] Doklady po lavinnoy tematike [Papers on avalanches]. *Materiály Glyatsiologicheskikh Issledovaniy. Khronika. Obsuzhdeniya*, Vyp. 16, 1970, p. 31-161. [Read at meeting at Terskol, U.S.S.R., 1968. English summaries.]
- BARNES, J. C., and BOWLEY, C. J. Operational snow mapping from satellite photography. *Proceedings of the 26th annual Eastern Snow Conference*, 1969, p. 79-103. [Describes recent studies on methods of mapping snow cover distribution in Upper Mississippi-Missouri River basins region.]
- BARNES, J. C., and BOWLEY, C. J. Satellite photography for snow surveillance in western mountains. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 34-40. [Describes application of previously developed satellite techniques to mountainous terrain. Discusses limitations.]
- BARSHI, R. E., and BURNASH, R. J. C. Forecasting short-term discharge from snowmelt. *Proceedings of the Western Snow Conference*, 36th annual meeting, 1968, p. 41-45. [Compares temperature data and snow pillow data.]
- BINDER, L. Messungen der Schneedichte in Wien seit 1951 und insbesondere im schneereichen Winter 1969/70. *Wetter und Leben*, Jahrg. 22, Ht. 7-8, 1970, p. 158-60. [Compares mean values and frequencies of density of snow cover for winter 1969-70 and since 1951 in Vienna.]
- BRADLEY, C. C. Collapsing snow. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 63-68. [Discusses conditions leading to snowpack collapse and implications of this to avalanche safety and snowpack hydrology.]
- BRYAZGIN, N. N. O vvedenii popravok v izmereniya osadkov v Arktike [On the introduction of corrections in measuring precipitation in the Arctic]. *Problemy Arktiki i Antarktiki*, Vyp. 33, 1970, p. 67-71. [Problem of distinguishing blowing snow from falling snow.]
- BURROWS, D. A., and HOBBS, P. V. Electrical charges on snow particles. *Journal of Geophysical Research*, Vol. 75, No. 24, 1970, p. 4499-505. [Airborne snow particles show positive and negative charges. Charge frequency distribution discussed.]
- CHARBONNEAU, R. Modèle mathématique de crues dues à la fonte de la neige. *Naturaliste Canadien*, Vol. 96, No. 4, 1969, p. 683-710. [Mathematical model of run-off due to snow melt presented, based only on daily maximum temperature values.]
- CHINN, T. J. Snow measurements, South Canterbury. *New Zealand Alpine Journal*, Vol. 23, No. 2, 1970, p. 470-74. [Outlines methods and results of snow surveys on snow courses and glaciers in this part of New Zealand.]
- DEWALLE, D. R. Disposition of selected late-lying snowpacks in forests of the Colorado Rockies. *Dissertation Abstracts International*, B, Vol. 30, No. 7, 1970, p. 3261-B. [Observations on ablation, and melt-water movements in snow, in soil, and at soil-snow interface during melt of late-lying snowpacks. Abstract of Ph.D. thesis, Colorado State University, 1969. University Microfilms order no. 69-22307.]
- DINÇER, T., and others. Snowmelt runoff from measurements of tritium and oxygen-18, [by] T. Dinçer, B. R. Payne and T. Florkowski [and] J. Martinec [and] E. Tongiorgi. *Water Resources Research*, Vol. 6, No. 1, 1970, p. 110-24. [Two-thirds of the melt water infiltrated to the soil, pushing an almost equal amount of water toward the drainage network of the basin.]
- DOTY, R. D., and JOHNSTON, R. S. Comparison of gravimetric measurements and mass transfer computations of snow evaporation beneath selected vegetation canopies. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 57-62.
- DREWRY, D. J. Snow penitents. *Weather*, Vol. 25, No. 12, 1970, p. 556, cover photograph. [Describes formation and meteorological reason for development with reference to example from Iran.]
- ELKINS, N., and LINKLATER, D. Snow rollers at Kirkwall, Orkney. *Meteorological Magazine*, Vol. 98, No. 1169, 1969, p. 387, plate. [Describes rollers observed February 1969.]
- ESCHNER, A. R., and others. Soil moisture priming, soil temperature and water available for snowmelt runoff, by A. R. Eschner, R. E. Leonard and A. L. Leaf. *Proceedings of the 26th annual Eastern Snow Conference*, 1969, p. 19-23. [Preliminary studies into relationship between soil moisture and snow-melt run-off, and possibility of forecasting snow-melt yield from soil moisture information.]
- FARNES, P. E., and ROMPEL, J. Montana telemetry system. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 102-07. [Describes recent improvements and modifications in apparatus for measuring snowpack in remote mountainous regions.]
- FFOLIOTT, P. F., and THORUD, D. B. Snowpack density, water content and runoff on a small Arizona watershed. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 12-18. [Study of spatial and temporal variations in snowpack density and associated water content, and of relation of these variations to hydrograph characteristics.]
- HARLAN, R. L. Soil-water freezing, snow accumulation and ablation in Marmot Creek Experimental Watershed, Alberta, Canada. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 29-33. [Results presented and discussed, with particular reference to run-off forecasting.]
- HASHOLT, B. En undersøgelse af sneens vandækvivalent vinteren 1969-70. *Geografisk Tidsskrift*, Bd. 69, Halvbd. 1, 1970, p. 57-92. [Investigation of water equivalent of snow in drainage area of river Vidå, south Jylland, Denmark, in 1969-70. English summary, p. 83-90.]
- HAUPT, H. F. A 2-year evaluation of the snowmelt lysimeter. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 99-101. [Instrument which monitors directly volume of flow from base of column of undisturbed snow, either as surface melt or as rain percolate and surface melt combined.]
- HORNBECK, J. W., and PIERCE, R. S. Changes in snowmelt runoff after forest clearing on a New England water-

- shed. *Proceedings of the 26th annual Eastern Snow Conference*, 1969, p. 104–12. [Cumulative streamflow was advanced 4–8 days during periods of major snow melt, with peak flow in earlier part of season. Total volume not significantly changed.]
- HUZIOKA, T., and others. Eniwadake sesshitsu chōsa hōkoku, II [Snow cover observations at Mt. Eniwa, II]. [By] T. Huzioka, H. Shimizu, E. Akitaya [and] H. Narita. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 255–65. [Further investigations of physical properties of natural and artificially hardened snow. English summary, p. 265.]
- HUZIOKA, T., and others. Seppō kansoku jikkenshitsu jikken shamen no sesshitsu chōsa hōkoku, III (Shōwa 43–44 nen fuyu) [Snow cover observations at avalanche research station, Toikanbetsu, northern Hokkaido, III (1968–69)]. [By] T. Huzioka, H. Shimizu, E. Akitaya [and] H. Narita. *Teion-kagaku: Low Temperature Science*, Ser. A, [Supplement to No.] 27, *Shiryō Shū: Data Report*, 1969, p. 15–21.
- IVANOV, V. B. Eolovyye formy mikrorel'yefa snezhnoy poverkhnosti na lednikakh Antarktīdy i Arktiki [Eolian forms of microrelief of the snow surface of glaciers in Antarctica and the Arctic]. *Trudy Sovetskoy Antarkticheskoy Ekspeditsii*, Tom 38, 1968, p. 22–38. [Description of sastrugi, snow barchans and other surface forms.]
- JUDY, C., and others. Deuterium variations in an annual snowpack, [by] C. Judy and J. R. Meiman [and] I. Friedman. *Water Resources Research*, Vol. 6, No. 1, 1970, p. 125–29. [Metamorphism and melt of the snowpack greatly reduce large initial variability in deuterium content of individual snowfalls.]
- KANAYEV, I. A., and CHIRKOVA, A. A. Osobennosti massovogo lavinoobrazovaniya v gorakh Uzbekistana zimoy 1968/1969 g. [Characteristics of mass avalanche formation in Uzbekistan mountains during the winter of 1968–69]. *Meteorologiya i Gidrologiya*, 1970, No. 6, p. 86–91. [Based on surveys. English summary.]
- KAZANSKIY, A. B. Rezhim tayaniya vysotnykh firnovykh poley v svyazi s problemoy iskusstvennogo vozdeystviya na etot protsess [The regime of thawing of high altitude firn fields in connection with the problem of artificial influence on this process]. *Geofizicheskii Byulleten'*, No. 20, 1969, p. 20–26. [Based on results of expedition in 1964, which conducted continuous measurements on Pik Lenina, Altay.]
- KEELER, C. M. The relationship between the mechanical and other properties of a mountain snow cover, Alta, Utah, 1967. *Dissertation Abstracts International*, B, Vol. 30, No. 7, 1970, p. 3241–B. [Attempt to quantify fundamental properties, grain size, shape, and fabric, of dry, seasonal snow and relate to variations in derived properties of bulk density and mechanical strength. Abstract of Ph.D. thesis, McGill University, 1969. Microfilm order from National Library of Canada, Ottawa.]
- KOBAYASHI, D. Mizo no fuchi ni dekiru koyuki-bisashi [A small cornice on an edge of a trench]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 405–07.
- KOBAYASHI, D., and others. Mizo ni yoru jifubuki-ryō no sokutei [Measurement of snow-drift using parallel trenches]. [By] D. Kobayashi, S. Kobayashi [and] N. Ishikawa. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 99–106. [Describes and discusses method used; results inconclusive. English summary, p. 105–06.]
- KOBAYASHI, S. Setsumen ni hataraku kaze no chikara no sokutei [Measurements of the wind drag force of the snow surface]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 87–97. [Describes direct measurement, in laboratory and field, of drag force exerted on snow surface by wind and discusses results. English summary, p. 96–97.]
- KOBAYASHI, S., and ISHIKAWA, N. Jifubuki ni yoru sekisetsu hyōmensō shinshoku to taiseki, I [Snow erosion and snow accumulation by wind, I]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 107–14. [Field observations. English summary, p. 114.]
- KOBAYASHI, T. Yuki no kesshō no nishoku kōgen ni yoru kenbikyō satsueihō [Photomicrographs of snow crystals by means of two-coloured illustrations]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 395–97.
- KOJIMA, K. Kenbikyō ni yoru hisetsu ryūshi no kansoku [Microscopic observations of drifting snow particles]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 115–29. [Describes and discusses series of observations on shapes and size distribution of drifting snow particles on campus of Hokkaido University. English summary, p. 128.]
- KOJIMA, K. Yūsetsu-ki ni okeru sekisetsu hyōmen no jōhatsu keisū ni tsuite [On an empirical formula for the rate of evaporation from a snow surface in the melting season]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 399–403.
- KOJIMA, K., and others. Sapporo no heichi sekisetsu danmen sokutei shiryō hōkoku, Shōwa 42–43 nen tōki [Report of pit-wall observations of snow cover on flat ground in Sapporo, 1967–68]. [By] K. Kojima, D. Kobayashi, S. Kobayashi, E. Akitaya, H. Narita [and] R. Naruse. *Teion-kagaku: Low Temperature Science*, Ser. A, [Supplement to No.] 27, *Shiryō Shū: Data Report*, 1969, p. 1–13.
- KUPETSKIN, V. N. O vzaimosvyazi antarkticheskogo snegonakopleniya, urovnya mirovogo okeana i solnechnoy aktivnosti [Link between Antarctic snow accumulation, the level of the world ocean, and solar activity]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 77, 1970, p. 46–50.
- KUROIWA, D., and others. Daisetsu-san oyobi Happō-one ni okeru kōkasetsu no chōsa [Observations of hard snow on Mt. Daisetsu and the Happō ridge]. [By] D. Kuroiwa, G. Wakahama [and] K. Fujino. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 247–54. [Studies on mechanism of densification and hardening at 2 sites in Japan. English summary, p. 254.]
- KUROIWA, D., and others. Zaiō no juhyō chōsa hōkoku [Monsters (giant rimed trees) at Mt. Zao (Yamagata prefecture)]. [By] D. Kuroiwa, G. Wakahama [and] K. Fujino. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 131–34, 2 plates. [Describes internal structure of rime on these trees, which are covered with thick deposit during winter. English summary, p. 134.]
- LAVILA, T. O. Die Verteilung des als Schnee gefallenen Niederschlags im Nordkalottengebiet 1931–1960. *Oulun Tliopiston Maantieteen Laitoksen Julkaisuja*, 28, 1970, 44 p. [Regional distribution of snowfall in northernmost Scandinavia in 1931–60. Also published in *Nordia*, 1970, No. 1.]

- LEAF, C. F. Snow pack depletion and runoff in Colorado. *Dissertation Abstracts International*, B, Vol. 30, No. 7, 1970, p. 3262-B. [Study of ablation and run-off on 4 watersheds. Abstract of Ph.D. thesis, Colorado State University, 1969. University Microfilms order no. 69-22318.]
- LORIUS, C., and others. Kolebaniya srednego soderzhaniya deyeriya v osadkakh v Antarktide [Fluctuations of the mean content of deuterium in precipitation in Antarctica]. [By] C. Lorius, L. Merlivat [and] R. Hagemann. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 77, 1970, p. 57-62.
- LUNDQVIST, J., and BENGTTSSON, K. The red snow—a meteorological and pollenanalytical study of longtransported [sic] material from snowfalls in Sweden. *Geologiska Föreningens i Stockholm Förhandlingar*, Vol. 92, Pt. 3, No. 542, 1970, p. 288-301. [Red substance probably originated in southern U.S.S.R.]
- McKENZIE, G. D. Rate of collapse of snow-bank kames in Adams Inlet, southeastern Alaska. *Ohio Journal of Science*, Vol. 70, No. 2, 1970, p. 107-11. [Defines term "snow-bank kames". Rate of collapse was 2.2 cm per day.]
- MARSDEN, M. A., and DAVIS, R. T. Regression on principal components as a tool in water supply forecasting. *Proceedings of the Western Snow Conference*, 36th annual meeting, 1968, p. 33-40. [Mathematical relation sought between measurements of winter mountain precipitation and summer water supply.]
- MEIMAN, J. R., ed. *Proceedings of the Workshop on Snow and Ice Hydrology at Colorado State University, August 18-22, 1969*. Colorado, Colorado State University, College of Forestry and Natural Resources, [1970]. ix, 142 p.
- NARITA, H. Sekisetsu no hihyōmenseki no sokutei, I [Specific surface of deposited snow, I]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 77-86. [Describes method used and discusses results. English summary, p. 85-86.]
- NELSON, M. W., and CLARK, J. M. Soil condition measurements as a forecasting parameter. *Proceedings of the 26th annual Eastern Snow Conference*, 1969, p. 42-45. [Discusses soil moisture measurements in relation to yield from snowpack.]
- ORD, M. J. Some comparisons from the use of radio reporting isotope snow gages and the snow pressure pillows. *Proceedings of the Western Snow Conference*, 36th annual meeting, 1968, p. 89-94. [Preliminary report; not yet possible to determine which is most accurate.]
- ŌURA, H., and others. Ikutora (Kaneyama Damu ryūiki) ni okeru yūsetsu no kenkyū, II [A study of snow melt in Ikutora, a part of the drainage basin of Kaneyama Dam, II]. [By] H. Ōura, K. Kojima, D. Kobayashi, S. Kobayashi, R. Naruse [and] N. Ishikawa. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 143-62. [Presents and discusses further results on study of snow melt and melt-water run-off, in progress since 1966. English summary, p. 160-62.]
- PACK, A. B. The water content of snowstorms in New York State: variations among different physiographic regions. *Proceedings of the 26th annual Eastern Snow Conference*, 1969, p. 46-54. [Investigation using published climatological records from representative weather stations.]
- PEAK, G. W. A snowpack evapo-sublimation formula. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 1-11. [Development of evaporation and sublimation formulae and application to snow-melt run-off analysis of watershed.]
- RILEY, J. P., and others. Snowmelt simulations, by J. P. Riley, D. G. Chadwick and K. D. Eggleston. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 49-56. [Proposes 3 mathematical models of snow-melt process.]
- SATTERLUND, D. R., and HAUPT, H. F. The disposition of snow caught by conifer crowns. *Water Resources Research*, Vol. 6, No. 2, 1970, p. 649-52. [Conifers caught about one-third of the snow that fell during study period; more than 80% ultimately reached the ground, after washing off, falling or melting.]
- SCHERMERHORN, V., and BARTON, M. A method for integrating snow survey and precipitation data. *Proceedings of the Western Snow Conference*, 36th annual meeting, 1968, p. 27-32. [In Pacific Northwest, combination of snow-water equivalent and winter precipitation, coupled with fall and spring precipitation indexes, appears to yield better forecasts than either index alone.]
- SMITH, J. L., and HELVERSON, H. G. Hydrology of snow profiles obtained with the profiling snow gage. *Proceedings of the Western Snow Conference*, 37th annual meeting, 1969, p. 41-48. [Presents and discusses data on water holding capacities of snowpacks in various stages of metamorphism.]
- SYKES, R. B., jr. Snowfall measurement in respect to current weather conditions. *Proceedings of the 26th annual Eastern Snow Conference*, 1969, p. 30-41. [Discusses effect of exposure, wind, drifting, snow-flake and/or crystal features, compaction, and evaporation on snow depth measurements.]
- THEAKSTON, F. H. Instant snow storms. *Proceedings of the 26th annual Eastern Snow Conference*, 1969, p. 66-78. [Laboratory model for studying snow deposition qualitatively.]
- TIMEREV, A. A. Yesyestvennaya osveshchennost' i proniknoveniye sveta v sneg v tsentral'noy Arktike [Natural illumination and light penetration into snow in the central Arctic]. *Problemy Arktiki i Antarktiki*, Vyp. 34, 1970, p. 35-41. [Observations of effect of snow on daylight made at drifting station SP-15 in Arctic Ocean, 1967.]
- TRABANT, D., and others. Physical-thermal processes in the seasonal snow cover of northern Alaska, by D. Trabant, C. S. Benson and G. Weller. *Science in Alaska 1969*. *Proceedings [of the] 20th Alaska Science Conference, College, Alaska, August 24 to 27, 1969*, 1970, p. 328-32. [Compares snow of Arctic Slope with that of interior Alaska between Brooks and Alaska ranges.]
- WAKAHAMA, G., and TAKAHASHI, T. Arasuka no seppyō chōsa [Field studies for snow and ice (in Alaska, February-March 1968, a report of the Arctic Hydrosphere Expedition, February-March 1968)]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 195-212. [Properties of snow cover at Barrow, Fairbanks and Anchorage compared. Observations on internal structure and flow of Mendenhall Glacier reported. English summary, p. 210-11.]

- WAKAHAMA, G., *and others*. Daisetsu-san no sekkei chōsa, IV (dai 4, 5 nendo) [Studies of firn on Mt. Daisetsu in summer, IV (fourth and fifth years)]. [By] G. Wakahama, R. Naruse, H. Shimizu, T. Kitahara, E. Akitaya, N. Satō, H. Narita, N. Ishikawa, K. Tanuma, T. Kawamura [and] T. Yamada. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 27, 1969, p. 181–94. [Continues previous work on Yukikabe snow-patch, observing metamorphism of snow texture and process of ablation. English summary, p. 193–94.]
- WARDLE, P. Pleistocene snow lines in the Fox Glacier area. *New Zealand Journal of Geology and Geophysics*, Vol. 13, No. 2, 1970, p. 560. [Suggests lowering of snow line, as indicator of temperature depression during Pleistocene in New Zealand, was less than that postulated previously.]