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 *Recent Polar Literature*. 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.

General glaciology

BENTLEY, C. R., *and others*. The International Antarctic Glaciological Project standardization document, by C. R. Bentley, W. F. Budd, V. M. Kotlyakov, C. Lorius and G. de Q. Robin. *Polar Record*, Vol. 16, No. 101, 1972, p. 349–64. [Sets out agreed standards for various studies so that different national groups may produce readily comparable results.]

MÜLLER, F., *and others*. International Geographical Union. Field tour Ea2: Arctic Archipelago I. 22nd International Geographical Congress. Miscellaneous papers, [by] F. Müller and members of the expedition. *Axel Heiberg Island Research Reports, McGill University, Montreal*, 1972, iv, 56 p. [Contains the following papers: F. Müller, "Climatological research on Axel Heiberg Island", p. 1–3; A. Ohmura, "Some climatological notes on the expedition area", p. 5–13; R. Braithwaite, "Statistical modelling of the thermal interaction of ice masses with the atmosphere", p. 15–18; G. J. Young, "Snow sampling at the end of winter, Wolf River basin", p. 19–23; G. J. Young, "White Glacier mass balance", p. 25–30; A. Iken, "Velocity variations of the White Glacier", p. 31–38; H. U. Maag, "Ice-dammed lakes on Axel Heiberg Island, with special reference to the geomorphological effect of the outflowing lake water", p. 39–48; T. Caflisch, "Limnological investigations on Colour and Phantom lakes", p. 49–56.]

SAVEL'YEV, B. A. *Fizika, khimiya i stroyeniye prirodnykh l'dov i merzlykh gornykh porod* [*Physics, chemistry and structure of natural ice and frozen rocks*]. Moscow, Izdatel'stvo Moskovskogo Universiteta, 1971. 506 p.

SIMONOV, I. M. *Oazisy vostochnoy Antarktidy* [*Oases of eastern Antarctica*]. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1971. 176 p. [Study of formation, landscape, climate and natural history of oases along the coast from Dronning Maud Land to Wilkes Land.]

TRONOV, M. V., *ed*. *Glyatsiologiya Altaya* [*Glaciology of the Altay*]. *Vyp. 6*. Tomsk, Izdatel'stvo Tomskogo Universiteta, 1970. 288 p. [Twenty-one articles: no English abstracts.]

TUSHINSKIY, G. K., *ed*. *Inzhenernaya glyatsiologiya* [*Engineering glaciology*]. Moscow, Izdatel'stvo Moskovskogo Universiteta, 1971. 208 p. [Textbook based on course in Moscow State University. First part describes relevant mechanical properties of snow and ice; second part introduces many applications of glaciology.]

ZAMORUYEV, V. V. Rezul'taty glyatsiologicheskikh nablyudeniy na stantsii Bellinsgauzen v 1968 g. [Results of glaciological observations at "Bellingshausen" station in 1968]. *Trudy Sovetskoy Antarkticheskoy Ekspeditsii*, Tom 55, 1972, p. 135–44.

Glaciological instruments and methods

BOUTRON, C. Concentration of dilute solutions at p.p.b. level by non-boiling evaporation in quartz and teflon. *Analytica Chimica Acta*, Vol. 61, No. 1, 1972, p. 140–43. [Method for preconcentration of dilute ionic solutions in the presence of acids developed to allow flame spectrometry of Antarctic snow samples.]

JOLLYMORE, P. G. A portable digital sounding system for Arctic use. *International Hydrographic Review*, Vol. 48, No. 2, 1971, p. 35–42. [Describes a light-weight digital echo sounder for water depth determination through ice.]

LESCA, C. Metodo generalizzato per la determinazione di variazioni volumetriche con impiego della fotogrammetria e del calcolatore elettronico. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 281–98. [Application to glaciology discussed.]

VICKERS, R. S., *and* ROSE, G. C. Short pulse radar measurements of layered ice and snow. (*In 4th annual earth resources program review. Vol. 3. U.S. Geological Survey programs. Presented at the Manned Spacecraft Center, Houston, Texas, January 17 to 21, 1972*. Houston, Texas, NASA Manned Spacecraft Center, 1972, p. 67-1–67-20.) [Describes development of a high resolution system for the remote measurement of layer thickness, designed for eventual incorporation into light-weight aircraft.]

Physics of ice

ABURAKAWA, H., *and* YOSIDA, Z. Sekisetsu oyobi kōri no teishūha Yangu-ritsu sokutei-yō rensei-furiko [A double pendulum used for the determination of low frequency Young's modulus of snow and ice]. *Teion-kagaku: Low Temperature Science*, Ser. A. [No.] 29, 1971, p. 37–49. [Measurement of Young's modulus of snow and commercial ice down to 2.2 Hz. English summary, p. 47–49.]

AUVERT, G., *and others*. Low entropy form of ice I_h obtained from a linear step growth model, [by] G. Auvert, B. Bullemer and A. Kahane. *Solid State Communications*, Vol. 11, No. 8, 1972, p. 1031–34. [Linear growth, molecule by molecule, in the basal plane leads to non-equilibrium configurational entropy.]

AZOUNI, M. Effets d'une membrane sur la progression d'un front de glace dans l'eau. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences* (Paris), Sér. C, Tom. 275, No. 3, 1972, p. 155–57. [Effect of a semi-permeable membrane on rate of freezing of water.]

BALES, B. L., *and* KEVAN, L. Role of fluoride ion in irradiated aqueous systems. *Journal of Chemical Physics*, Vol. 57, No. 4, 1972, p. 1813–14. [Suggests that F^- can serve as a hole trap in irradiated ice doped with KF or NH_4F.]

BANTYSH, L. A., *and others*. Vliyaniye vneshnego magnitnogo polya na skorost' kristallizatsii vody i strukturu obrazuyushchegosya l'da [Effect of an external magnetic field on the rate of water crystallization and structure of the resulting ice]. [By] L. A. Bantysh, V. G. Popovskiy, B. R. Lazarenko, A. N. Kreponosova. *Elektronnaya Obrabotka Materialov*, 1972, No. 2, p. 54–58. [Both crystallization rate and structure are affected.]

BARCHET, W. R., *and* CORRIN, M. L. Water vapor adsorption by pure silver iodide above ice saturation. *Journal of Physical Chemistry*, Vol. 76, No. 16, 1972, p. 2280–85. [Evidence for liquid-like adsorbate-vapour interface prior to nucleation. Classical nucleation theory is inadequate to explain these data.]

BLOM, B. E. Desalination by high-pressure solidification of water to ice IV [*sic*]. *Dissertation Abstracts International*, B, Vol. 32, No. 6, 1972, p. 3875-B. [Direct formation of ice VI from saline solutions by pressure used to show feasibility of desalination in this way. Second part of Ph.D. thesis, Clarkson College of Technology, 1971. University Microfilms order no. 72-1727.]

BODHAINE, B. A. The effects of ammonia on the electrification of freezing and splashing water drops. *Tellus*, Vol. 24, No. 5, 1972, p. 473–80. [Water drops containing NaCl and/or $(NH_4)_2CO_3$ were cooled and then fell on ice target. Charge deposited was measured and sign could be varied by control of impurities.]

BOGORODSKIY, V. V., *and* KHOKHLOV, G. P. Mezhdusloynaya polyarizatsiya vo l'du, soderzhashchem vklyucheniya NaCl [Interlayer polarization in ice containing sodium chloride inclusions]. *Trudy Arkticheskogo i Antarkticheskogo Nauchno-Issledovatel'skogo Instituta*, Tom 295, 1970, p. 103–07. [Measurements of electrical permittivity with and without blocking electrodes.]

BOGORODSKIY, V. V., *and* KHOKHLOV, G. P. Vliyaniye nekotorykh solevykh komponent i ikh sostava na elektricheskiye svoystva l'da [Effect of some salt components and their composition on the electrical properties of ice]. *Trudy Arkticheskogo i Antarkticheskogo Nauchno-Issledovatel'skogo Instituta*, Tom 295, 1970, p. 89–95. [Study of effect of KCl, NaCl and $MgCl_2$ on electrical properties of ice.]

BRYAN, J. B., *and* CURNUTTE, B. A normal coordinate analysis based on the local structure of liquid water. *Journal of Molecular Spectroscopy*, Vol. 41, No. 3, 1972, p. 512–33. [Includes calculation of far infra-red frequencies for ice in good agreement with measured peaks.]

CHATTERTON, P. A., *and* CROSS, J. D. Early stages of the growth of ice in the air at low pressure. *Nature, Physical Science*, Vol. 236, No. 67, 1972, p. 91–92. [Ice formed by condensing low-pressure water vapour at 160 K is not crystalline.]

DUVAL, P. Fluage et recristallisation dynamique de la glace polycristalline. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences* (Paris), Sér. D, Tom. 275, No. 3, 1972, p. 337–39. [Tertiary creep of randomly oriented polycrystalline ice and of strongly textured Antarctic ice studied for periods of several weeks.]

EDMONDS, D. T., *and* ZUSSMAN, A. Pure quadrupole resonance of ^{17}O in ice. *Physics Letters*, Vol. 41A, No. 2, 1972, p. 167–69. [Effect observed in ice enriched in ^{17}O and the quadrupole coupling constant observed is very different from that in isolated H_2O molecule due to hydrogen bonding.]

FALCIGLIA, F., *and others*. Magnetic quenching of orthopositronium in ice, [by] F. Falciglia, G. Iaci, M. Lo Savio and E. Turrisi. *Lettere al Nuovo Cimento della Società Italiana di Fisica*, Vol. 5, No. 3, 1972, p. 302–04. [Discusses how to resolve differences between observed and calculated values of this quantity.]

FAURE, P., *and* KAHANE, A. Modèle dynamique polaire de la glace Ih monocristalline. (*In* Nusimovici, M. A., *ed. Phonons. Comptes rendus de la conférence internationale, Rennes, France, 1971*. Paris, Flammarion Sciences, [c1971], p. 243–47.) [Model of ice with locally oriented regions which fluctuate rapidly.]

FLOYD, G. R., *and* PRINCE, R. H. Production of ionized water clusters by electron bombardment of ice. *Nature, Physical Science*, Vol. 240, No. 97, 1972, p. 11–12. [Bombardment in high vacuum at 153 and 193 K produced $H^+(H_2O)_n$ clusters with $3 \leqslant n \leqslant 8$ while bombardment at 77 K produced nothing.]

FRANKS, F., *ed. Water: a comprehensive treatise. Vol. 1. The physics and physical chemistry of water*. New York, London, Plenum Press, 1972. xx, 596 p. [Contains chapters on "The properties of ice", by F. Franks, p. 115–49; "Nuclear magnetic resonance studies on water and ice", by J. A. Glasel, p. 215–54.]

FRIEDRICHS, H. A., *and others*. Zur Auflösung eines Kristalls in der eigenen Schmelze, von H. A. Friedrichs, H. Jauer und O. Knacke. *Zeitschrift für Metallkunde*, Bd. 63, Ht. 4, 1972, p. 169–72. [Theory for melting of crystal in its own well-stirred melt derived, and model experiments on ice performed.]

GLASSER, M. L., *and others*. Analytic properties of the free energy for the "ice" models, [by] M. L. Glasser and D. B. Abraham and E. H. Lieb. *Journal of Mathematical Physics*, Vol. 13, No. 6, 1972, p. 887–900. [Theoretical calculation of free energy of 2-dimensional square lattice obeying Bernal–Fowler rules.]

GOBUSH, W., *jr., and* HOEVE, C. A. J. Calculation of the dielectric correlation factor of cubic ice. *Journal of Chemical Physics*, Vol. 57, No. 8, 1972, p. 3416–21. [Method for estimation of factor entering into theoretical calculation of entropy of cubic ice.]

GOLD, L. W. The process of failure of columnar-grained ice. *Philosophical Magazine*, Eighth Ser., Vol. 26, No. 2, 1972, p. 311–28. [Study of cracks forming during compressive creep.]

GOUGH, S. R. Comment on the microwave "dielectric constant" of ice. *Journal of Applied Physics*, Vol. 43, No. 10, 1972, p. 4251. [Points out that values obtained by J. W. Perry and A. W. Straiton, ibid., Vol. 43, No. 2, 1972, p. 731–33, are inconsistent with other experiments.]

GOUGH, S. R. A low temperature dielectric cell and the permittivity of hexagonal ice to 2 K. *Canadian Journal of Chemistry*, Vol. 50, No. 18, 1972, p. 3046–51. [Measurement of high-frequency permittivity from 2 to 270 K.]

GOW, A. J., *and* WILLIAMSON, T. C. Linear compressibility of ice. *Journal of Geophysical Research*, Vol. 77, No. 32, 1972, p. 6348–52. [New technique at relatively low pressures (less than 0.5 kbar) described.]

GRÄNICHER, H. NMR investigations of ice crystals. I. Proton magnetic resonance in ice. (*In* Blinc, R., *ed. Pulsed magnetic and optical resonance. Proceedings of the Ampère International Summer School II, Basko polje, 2–13 September 1971*. Ljubljana, Institut "Jozef Stefan", 1972, p. 223–31.) [Review of past work and what can be deduced from it.]

GREENBERG, J. M. Absorption and emission of radiation by nonspherical particles. *Journal of Colloid and Interface Science*, Vol. 39, No. 3, 1972, p. 513–19. [Absorption and emission cross-sections of very small particles depend on their shapes even when the Rayleigh approximation is valid. Detailed application to infra-red absorption spectrum of ice.]

GRITSAY, V. A., *and others*. Adgeziya l'da k nekotorym plastikam [Adhesion of ice to some plastics]. [By] V. A. Gritsay, A. I. Nechipor, Z. I. Shvayshteyn, I. Ya. Kamenetskiy. (*In* Borisenkov, Ye. P., *ed. Teoreticheskiye i eksperimental'nyye issledovaniya usloviy obledeneniya sudov*. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1971, p. 146–49.) [Adhesion force of ice to 10 plastics less than to steel or aluminium, and increases with decreasing temperature.]

GROSS, G. W. Solute interference effects in freezing potentials of dilute electrolytes. (*In* Jellinek, H. H. G., *ed. Water structure at the water–polymer interface. Proceedings of a symposium held on March 30 and April 1, 1971, at the 161st National Meeting of the American Chemical Society*. New York, London, Plenum Press, 1971, p. 106–25.) [Observations of charge separation phenomena during freezing and of interference effects between different solute species.]

HAHNE, E. W. P., *and* GRIGULL, U. Regelation of ice. Problem of heat conduction. *International Journal of Heat and Mass Transfer*, Vol. 15, No. 5, 1972, p. 1057–66. [Experiments on penetration of wires of various conductivity and diameter through ice. Theory agrees well with results.]

HANLEY, T. O'D. Freezing potentials in potassium fluoride solutions at constant growth rate. *Dissertation Abstracts International*, B, Vol. 33, No. 3, 1972, p. 1250-B. [Measurement of freezing potentials and their interpretation. Abstract of Ph.D. thesis, St. Louis University, 1971. University Microfilms order no. 72-23945.]

HELMREICH, D. Molecular forces of heavy and light ice. (*In* Nusimovici, M. A., *ed. Phonons. Comptes rendus de la conférence internationale, Rennes, France, 1971*. Paris, Flammarion Sciences, [c1971], p. 279–83.) [Deduction of variation of intermolecular force constants with temperature and pressure.]

JONES, D. R. H., *and* CHADWICK, G. A. Experimental measurement of the solid–liquid interfacial energies of transparent materials. *Philosophical Magazine*, Eighth Ser., Vol. 22, No. 176, 1970, p. 291–300. [Includes ice–water interfacial energy.]

JONES, D. R. H., *and* CHADWICK, G. A. An expression for the free energy of fusion in the homogeneous nucleation of solid from pure melts. *Philosophical Magazine*, Eighth Ser., Vol. 24, No. 190, 1971, p. 995–98. [Includes correction to ice–water interfacial energy as determined from homogeneous nucleation.]

KAWABATA, K., *and others*. Shoulder of optical absorption spectrum of the trapped electron in gamma-irradiated crystalline ice, [by] K. Kawabata, S. Okabe and S. Taniguchi. *Journal of Chemical Physics*, Vol. 57, No. 7, 1972, p. 2855–56. [Precise measurements suggest at least two components in the spectrum.]

KRAUSE, P. M. Conduction mechanisms in pure and doped hexagonal ice. *Dissertation Abstracts International*, B, Vol. 33, No. 3, 1972, p. 1250-B–51-B. [Measurements on pure ice and ice doped with KCl and HCl, 50 Hz to 20 kHz, −100° C to 0° C. Abstract of Ph.D. thesis, St. Louis University, 1970. University Microfilms order no. 72-24043.]

LEBEDEV, D. P., *and* ANDREYEV, YE. F. Optimal'nyye usloviya desublimatsii l'da v vakuume i zavisimost' ot nikh ρ i λ l'da [Optimum conditions of ice de-sublimation *in vacuo* and dependence of ρ and λ of ice on these conditions]. *Inzhenerno-Fizicheskiy Zhurnal*, Tom 23, No. 1, 1972, p. 33–41. [Visual and photographic observations of ice deposition process from vapour. Form of interface, its density and thermal conductivity at different vapour pressures. English summary, p. 40.]

MAENO, N. Enka-kariumu-hyō no yūden bunsan. III. Kōnōdo-hyō no yūden bunsan [The dielectric dispersion of KCl ice. III. The dielectric dispersion of high-concentration ice]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 1–10. [Above concentration of 10^{-2}M, two dielectric dispersions are observed, that at high frequencies showing a single relaxation process. English summary, p. 10.]

RAHMAN, A., *and* STILLINGER, F. H. Proton distribution in ice and the Kirkwood correlation factor. *Journal of Chemical Physics*, Vol. 57, No. 9, 1972, p. 4009–17. [Correlation due to Bernal–Fowler rules calculated for ice Ih and ice Ic. Consequent value of effective dipole moment of water molecule in ice is 2.92 D.]

RASMUSSEN, D. H., *and* MACKENZIE, A. P. Effect of solute on ice–solution interfacial free energy; calculation from measured homogeneous nucleation temperatures. (*In* Jellinek, H. H. G., *ed. Water structure at the water–polymer interface. Proceedings of a symposium held on March 30 and April 1, 1971, at the 161st National Meeting of the American Chemical Society*. New York, London, Plenum Press, 1971, p. 126–45.) [Measurements for a number of solutions.]

REISCHEL, M. T. Ice whiskers. *Weather*, Vol. 27, No. 10, 1972, p. 423–30. [Discusses reports of whisker growth on ice, and whiskers' possible properties, origin and significance.]

RENKER, B. Lattice dynamics of D_2O-ice Ih. (*In* Nusimovici, M. A., *ed. Phonons. Comptes rendus de la conférence internationale, Rennes, France, 1971*. Paris, Flammarion Sciences, [c1971], p. 167–70.) [Phonon dispersion curves measured by inelastic neutron scattering at 90 K.]

ROZENTAL', O. M. Voprosy obrazovaniya l'da v vode i rastvorakh. III. Zarozhdeniye l'da pri radiolize vody [Problem of the formation of ice in water and solutions. III. Formation of ice during radiolysis of water]. *Zhurnal Fizicheskoy Khimii*, Tom 46, Vyp. 4, 1972, p. 971–72. [Increase in number of dissociated molecules when water is irradiated with γ rays assists ice nucleation in supercooled water. English translation in *Russian Journal of Physical Chemistry*, Vol. 46, No. 4, 1972, p. 559–60.]

SCHMIDT, V. H. NMR investigations of ice crystals. II. Deuteron spin-lattice relaxation in D_2O ice. (*In* Blinc, R., *ed. Pulsed magnetic and optical resonance. Proceedings of the Ampère International Summer School II, Basko polje, 2–13 September 1971*. Ljubljana, Institut "Jozef Stefan", 1972, p. 232–37.) [Two pairs of lines observed at

−80° C which broaden, and one pair vanish, on heating to −8° C. Interpreted as showing deuterons move by vacancy, not Bjerrum defect, diffusion.]

SHIO, H., *and* MAGONO, C. Frictional electrification of polycrystalline and single ice crystals. *Journal of the Meteorological Society of Japan*, Vol. 50, No. 3, 1972, p. 159–65. [Concludes that polycrystalline ice is always electrified positively when rubbed with single crystal ice.]

SPENGLER, J. D., *and* GOKHALE, N. R. Freezing of freely suspended, supercooled water drops in a large vertical wind tunnel. *Journal of Applied Meteorology*, Vol. 11, No. 7, 1972, p. 1101–07. [Description of tunnel and observation of behaviour of large drops as they freeze.]

SUZUKI, S. Asshuku henkei de shōjiru kōtino saikesshō [Recrystallization of compressed ice]. *Teion-kagaku: Low Temperature Science*, Ser. A. [No.] 29, 1971, p. 11–28. [Observation of recrystallization phenomena in compressed ice bicrystals. English summary, p. 28.]

VILLAIN, J. The 3-dimensional eight vertex model and the proton–proton correlation functions in ice. *Solid State Communications*, Vol. 10, No. 10, 1972, p. 967–70. [Theoretical study of statistics of protons in ice as compared with two-dimensional model.]

VODOVSKIY, A. L. Eksperimental'noye opredeleniye davleniya pri rashirenii l'da [Experimental determination of pressure when ice expands]. *Gidrotekhnicheskoye Stroitel'stvo*, 1972, No. 8, p. 46–47.

VON HIPPEL, A. R., *and others*. Dielectric and mechanical response of ice I_h single crystals and its interpretation, by A. [R.] Von Hippel, R. Mykolajewycz, A. H. Runck and W. B. Westphal. *Journal of Chemical Physics*, Vol. 57, No. 6, 1972, p. 2560–71. [Interpretation of the seven dielectric relaxation spectra found in ice Ih crystals using data on HF-doped crystals. Mechanical relaxation attributed to different process.]

WEITHASE, M., *and others*. Proton spin relaxation in hexagonal ice. II. The $T_{1\rho}$ minimum, [by] M. Weithase, F. Noack and J. von Schütz. *Zeitschrift für Physik*, Bd. 246, Ht. 1, 1971, p. 91–96. [Measurement of this relaxation time shows minimum at low field strengths and allows determination of proton correlation time.]

ZADUMKIN, S. N., *and* KHOKONOV, KH. B. Akusticheskiy effekt pri kristallizatsii vody [Acoustic effect during the crystallization of water]. *Trudy Vysokogornogo Geofizicheskogo Instituta*, No. 17, 1970, p. 255–59. [Ferroelectric detectors used to sense acoustic emission during freezing of water and melting of ice.]

ZWEERINK, G. L. The thermal accommodation coefficients of helium, neon and argon on surfaces. *Dissertation Abstracts International*, B, Vol. 32, No. 12, Pt. 1, 1972, p. 6966-B. [Measurements on ice surfaces at 77 K. Abstract of Ph.D. thesis, University of Missouri, Rolla, 1971. University Microfilms order no. 72-18195.]

LAND ICE. GLACIERS. ICE SHELVES

AMBACH, W. Zur Schätzung der Eis-Nettoablation im Randgebiet des grönländischen Inlandeises. *Polarforschung*, 42. Jahrg., Nr. 1, 1972, p. 18–23. [Relation between net ablation and height above sea-level.]

BARNAKOVA, G. M., *and* ROTOTAYEVA, O. V. Basseyn r. Surkhob mezhdu ust'yami rek Obikhingoy i Muksu [Basin of the river Surkhob between the mouths of the Obikhingoy and Muksu rivers]. *Katalog lednikov SSSR* [*Catalogue of glaciers of the U.S.S.R.*], Tom 14, Vyp. 3, Chast' 6. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1971. 90 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 (Amu-Dar'ya). The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR* [*Surface water resources of the U.S.S.R.*].]

BELLONI, S. Ricerche di laboratorio sulle precipitazioni occulte e sui parametri che le determinano. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 299–309. [Discusses the effect of condensation from the air (hidden precipitation) on the hydraulic balance of a glacier and describes a method of measuring this. Discussion, p. 309.]

BENSON, C. S., *and others*. Glaciers, [by] C. [S.] Benson, W. [D.] Harrison, C. [F.] Raymond, M. [F.] Meier, R. [L.] Shreve and G. Weller. *Eos. Transactions. American Geophysical Union*, Vol. 53, No. 3, 1972, p. 248–53. [Summarizes U.S. studies conducted in North American and Antarctic glacier basins since 1965 as part of the International Hydrological Decade.]

BENTLEY, C. R. Seismic-wave velocities in anisotropic ice: a comparison of measured and calculated values in and around the deep drill hole at Byrd station, Antarctica. *Journal of Geophysical Research*, Vol. 77, No. 23, 1972, p. 4406–20. [Results of ultrasonic (28 kHz) velocity measurements carried out at depth of 1 550 m in 1969–70.]

BERRY, M. V. On deducing the form of surfaces from their diffracted echoes. *Journal of Physics*, *A*, Vol. 5, No. 2, 1972, p. 272–91. [Theoretical explanation.]

BJÖRNSSON, H. Bægisárjökull, north-Iceland. Results of glaciological investigations 1967–1968. Part I. Mass balance and general meteorology. *Jökull*, Ár 21, 1971, [pub. 1972], p. 1–23. [Investigation of the water balance of a glacier-fed drainage area along with general meteorological and energy budget measurements on the glacier. Icelandic summary, p. 22–23.]

BOULTON, G. S., *and* VIVIAN, R. Underneath the glaciers. *Geographical Magazine*, Vol. 45, No. 4, 1973, p. 311–16. [Describes study of processes taking place beneath glaciers, with reference to activities in the subglacial laboratory beneath Glacier d'Argentière in France and to the behaviour of jökulhlaups in Iceland.]

BREWER, T. A two-year mass-balance study of the Rusty Glacier, 1968–1969. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3*. New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972, p. 75–82.) [Summary of results.]

BROSCOE, A. J. Some aspects of the geomorphology of meltwater streams, Steele Glacier terminus. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3*. New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972, p. 47–51.) [Study of two channels flowing from Steele Glacier.]

BUCHER, P., *and* STAUFFER, B. Bore hole isotope studies at Byrd station, Antarctica. *Antarctic Journal of the United States*, Vol. 7, No. 4, 1972, p. 110–11. [Describes sampling technique, 1971–72.]

BUSHNELL, V. C., *and* RAGLE, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3.* New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972. ix, 261 p. [Some articles have been published previously; the others are listed separately.]

CAPELLO, C. F. Il rilievo stereofotogrammetrico del ghiacciaio della Brenva. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 17–30. [Describes stereophotogrammetric survey of this glacier in the Monte Bianco massif.]

CERUTTI, A. V. Osservazioni sul progresso dei ghiacciai del Monte Bianco nell'ultimo decennio. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 251–72. [Discusses advance, since 1962, of the glaciers of the Mont Blanc group. Discussion, p. 272.]

CHEBAN, V. A., *and* YABLOKOV, A. A. Basseyn verkhov'yev r. Chu [Basin of the upper reaches of the river Chu]. *Katalog lednikov SSSR [Catalogue of glaciers of the U.S.S.R.]*, Tom 14, Vyp. 2, Chast' 3. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1971. 56 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of 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.]*.]

CLASSEN, D. F., *and* CLARKE, G. K. C. Thermal drilling and ice-temperature measurements in the Rusty Glacier. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3.* New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972, p. 103–16.) [Temperature measurements indicated that the glacier was below the pressure-melting point throughout; temperature profiles suggest a disturbed thermal regime due to a previous surge.]

CROSSLEY, D. J., *and* CLARKE, G. K. C. Gravity and shallow-ice temperature measurements on the Rusty Glacier. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3.* New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972, p. 93–101.) [Gravity survey shows maximum depth of 88 m in the accumulation region. Near-surface temperature measurements indicate Rusty and near-by glaciers are sub-polar.]

DICKSON, E. M. Mercury and lead in the Greenland ice sheet: a reexamination of the data. *Science*, Vol. 177, No. 4048, 1972, p. 536–38. [Criticizes results of H. V. Weiss and others, ibid., Vol. 174, No. 4010, 1971, p. 692–94. Reply by C. C. Patterson and others, p. 538.]

DOLGUSHIN, L. D., *and* OSIPOVA, G. B. Pul'satsii lednikov i problema ikh prognozirovaniya na primere lednika Medvezh'yego (Zapadnyy Pamir) [Pulsations of glaciers and the problem of forecasting them as exemplified by Lednik Medvezhniy (western Pamir)]. *Izvestiya Akademii Nauk SSSR. Seriya Geograficheskaya*, 1972, No. 2, p. 26–38. [Records changes between 1963 and 1970.]

EIRÍKSSON, C. J., *and* BÁRÐARSON, H. R. Vatnajökulsleiðangur 1969, 24. maí–6. júní. *Jökull*, Ár 21, 1971, [pub. 1972], p. 60–69. [Narrative of the Iceland Glaciological Society's expedition to Vatnajökull in spring 1969.]

ENDŌ, Y. Gansetsu o fukumu hyōgasui nokōzō to soshiki [Structure and texture of glacier ice containing rock fragments]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 177–84. [Sample of ice from an iceberg examined and some conclusions about the behaviour of the glacier from which it came. English summary, p. 182–83.]

EVANS, S., *and* ROBIN, G. DE Q. Ice thickness measurements by radio echo sounding, 1971–1972. *Antarctic Journal of the United States*, Vol. 7, No. 4, 1972, p. 108–10. [Presents preliminary results, including subglacial topography, from flights from "McMurdo" station.]

EVANS, S., *and others*. Radio-echo sounding in Antarctica, 1971–72, by S. Evans, D. J. Drewry and G. de Q. Robin. *Polar Record*, Vol. 16, No. 101, 1972, p. 207–12. [Report of third field season in joint S.P.R.I. and N.S.F. programme, flying over ice sheet from "McMurdo" station.]

FABER, T. Hydrological study of the Rusty Glacier. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3.* New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972, p. 83–92.) [Small contribution of this glacier to the total discharge from the basin occupied by it and Trapridge and Backe glaciers is in accordance with the expectation that it will surge.]

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FUJIWARA, K., *and* YOSHIDA, Y. Ryutso-Horumu-wan tōgan no hyōga ryūdō sokutei [Ice flow measurements on the east coast of Lützow-Holm Bay [Antarctica]]. *Nankyoku Shiryō: Antarctic Record*, No. 44, 1972, p. 79–92. [Measurements made at several points along the margin of the ice sheet and at glaciers descending into the bay. English summary, p. 79–80.]

GOODMAN, D. Ecological investigations of ice worms on Casement Glacier, southeastern Alaska. *Ohio State University. Institute of Polar Studies. Report* No. 39, 1971, v, 59 p. [*Mesenchytraeus soliflugus*, observed during summer 1967.]

GOW, A. J. Glaciological investigations in Antarctica. *Antarctic Journal of the United States*, Vol. 7, No. 4, 1972, p. 100–01. [Reports 1971 investigations of debris patterns, and the mechanics of their emplacement, in several glaciers along the southern foothills of the Royal Society Range.]

GOW, A. J., *and* EPSTEIN, S. On the use of stable isotopes to trace the origins of ice in a floating ice tongue. *Journal of Geophysical Research*, Vol. 77, No. 33, 1972, p. 6552–57. [Technique enabled a distinction to be made between several different ice types in the Koettlitz ice tongue floating on sea-water in McMurdo Sound, Antarctica.]

[GREENLAND: GLACIERS.] Cambridge Staunings expedition 1970. *Cambridge Expeditions Journal*, 1970–71, [pub. 1971], p. 32–35. [Glaciology, mainly feasibility of radio echo sounding in measuring ice depth, in the Stauning Alper, East Greenland.]

HATTERSLEY-SMITH, G. F. *Present Arctic glaciation.* Ottawa, Defence Research Board. Defence Research Establishment Ottawa, 1972. viii, 30 p. (DREO Technical Note No. 72-7.) [Reviews glacier classifications,

surveys glacier regimes and discusses their roles in terms of their effect on climate, the ecosystem and their contributions to geomorphology and possible future economic uses.]

HAYNES, V. M. The relationship between the drainage areas and sizes of outlet troughs of the Sukkertoppen ice cap, west Greenland. *Geografiska Annaler*, Vol. 54A, No. 2, 1972, p. 66–75. [Results suggest that troughs are associated solely with present-day ice and are distinct from those used by the inland ice sheet during the Pleistocene.]

HUGHES, T. J. Is the west Antarctic ice sheet disintegrating? *ISCAP Bulletin* (Ohio State University), No. 1, 1972, [x], 90 p. [Data pertaining to the dynamics and history of the ice sheet are reviewed and interpreted in terms of a possible inherent instability of the ice cover. ISCAP = Ice Streamline Cooperative Antarctic Project.]

HUGHES, T. J. Thermal convection in polar ice sheets related to the various empirical flow laws of ice. *Geophysical Journal of the Royal Astronomical Society*, Vol. 27, No. 2, 1972, p. 215–29. [A more detailed analysis of the original application of thermal convection theory to polar (specifically Antarctic) ice sheets is made, considering the empirical flow laws of ice for a wide range of stress and temperature.]

[ICELAND: ICE CAPS.] Cambridge University KJ (Iceland) expedition. *Cambridge Expeditions Journal*, 1970–71, [pub. 1971], p. 35–37. [Survey work on western part of Vatnajökull.]

KHODAKOV, V. G., *and* MOISEYEVA, G. P. Ledniki kak indikatory vodnosti [Glaciers as indicators of water content]. *Meteorologiya i Gidrologiya*, 1972, No. 6, p. 83–86. [Water content of different regions of the U.S.S.R. assessed by study of ablation, climate, distribution and morphology of glaciers.]

LESCA, C. L'archivio fotografico del C.G.I. e la sua catalogazione con elaboratore. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 31–42. [Describes rearrangement of the photographic collection of the Comitato Glaciologico Italiano.]

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MOTTERSHEAD, D. N., *and* WHITE, I. D. The lichenometric dating of glacier recession, Tunsbergdal, southern Norway. *Geografiska Annaler*, Vol. 54A, No. 2, 1972, p. 47–52. [Growth curve constructed for *Rhizocarpon geographicum* and shown to be exponntial. Used for dating moraines.]

NOVOKOVA, Z. S., *and others*. Basseyny reSChary i Vitima (khrebet Kodar) [Basins of the rivers Chara and Vitim (Kodar mountain range)]. [By] Z. 1. Novokova [and] A. M. Grinberg.—Khrebet Orulgan (basseyny rek Leny, Yany, Omoloya) [Orulgan mountain range (basins of the Lena, Yana and Omoloy rivers)]. [By] D. K. Bashlavin. *Katalog lednikov SSSR* [*Catalogue of glaciers of the U.S.S.R.*], Tom 17, Vyp. 2, Chast' 1, Vyp. 5, Chast' 2. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1972. 44 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of glaciers in this part of the Lena-Indigirka region. The Tom and Vyp. numbers correspond with those of *Resursy poverkhnostnykh vod SSSR* [*Surface waters resources of the U.S.S.R.*].]

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OMMANNEY, C. S. L. *Glacier surveys by District personnel of the Water Survey of Canada. 2. Peyto Glacier*. Ottawa, Dept. of the Environment. Inland Waters Directorate, 1972. vi, 20 p. (Glacier Inventory Note No. 7.) [Summary of information relating to this glacier from the Dominion Water and Power Bureau reports, 1945–62, with a brief description of its present state.]

OROMBELLI, G. Una visita al ghiacciaio Sachen, gruppo del Nanga Parbat, Pakistan Occidentale. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 43–46. [Observations in 1971 showed that the two southernmost lobes of Sachen Glacier have almost completely retreated, and recession has also occurred in the main lobe.]

OROZGOZHOYEV, B. O. Basseyn r. Kokshaal.—Reki basseyna oz. Chatyrkel' [Basin of the river Kokshaal.—Rivers of the Chatyrkel lake basin]. *Katalog lednikov SSSR* [*Catalogue of glaciers of the U.S.S.R.*], Tom 14, Vyp. 2, Chast' 10, 11. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1971. 84 p. [Part of the I.H.D. catalogue of glaciers of the U.S.S.R. giving details of what is known of 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.*].]

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ØSTREM, G., *and others*. Slamtransportstudier i norska glaciärälvar, [by] G. Østrem, T. Ziegler, S. R. Ekman. *Stockholms Universitet. Naturgeografiska Institutionen. Forskningsrapport* 9, 1970, 68 p. [Sediment transport in selected glacier streams in Norway. English summary, p. 55–63.]

OULIANOFF, N. À propos des "glaciers dangereux". *Bulletin Technique de la Suisse Romande*, 98e An., No. 18, 1972, p. 299–302. [Stresses importance of recognizing when glaciers are in a state likely to be of danger to man, and ways of averting this.]

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PEDEN, I. C. VLF dielectric and loss properties of the ice sheet at Byrd station. *Antarctic Journal of the United States*, Vol. 7, No. 5, 1972, p. 164–65. [Summarizes results of experiment using wire antenna 34 km long.]

PEDEN, I. C., *and others*. Complex permittivity of the Antarctic ice sheet in the VLF band, [by] I. C. Peden, G. E. Webber and A. S. Chandler. *Radio Science*, Vol. 7, No. 6, 1972, p. 645–50. [Properties of the surface magnetic field between 5 and 20 kHz were measured in the vicinity of a buried 34 km dipole antenna just under the surface of the snow. Dielectric and loss parameters determined.]

PHILBERTH, K. Über den inneren Wärmehaushalt in mächtigen Eisschilden. *Polarforschung*, 42. Jahrg., Nr. 1, 1972, p. 11–17. [The total amount of geothermal heat and frictional heat in thick ice shelves is transported in a horizontal direction; this may be related to the temperature profile.]

RIST, S. Jöklabreytingar 1931–64, 1964–70 og 1970–71. IHD Mælistaðir alþjóðavatnafræðiáratugsins: Glacier variations in meters 1931–64, 1964–70 and 1970–71. International Hydrological Decade 1965–74. *Jökull*, Ár 21, 1971, [pub. 1972], p. 73–77. [Lists glacier variations in Iceland.]

ROGERS, J. C., *and* PEDEN, I. C. Effect of Byrd drill hole diameter variations on *in situ* electrical measurement o the ice sheet. *Antarctic Journal of the United States*, Vol. 7, No. 5, 1972, p. 165–66. [Diameter of drill hole measured to 1 500 m depth and influence observed of its variations on the input admittance of the dipole probe lowered into the hole to investigate the complex permittivity of the ice sheet as a function of depth and frequency in the VLF range.]

SMITH, B. M. E. Automatic plotting of airborne geophysical survey data. *Journal of Navigation*, Vol. 25, No. 2, 1972, p. 162–75. [Technique used to compute track of aircraft conducting ice thickness measurements in Antarctica.]

THOMSON, S. Movement observations on the terminus area of the Steele Glacier, July 1967. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3.* New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972, p. 29–37.) [Study of this surging glacier to observe formation of glacial deposits and means of incorporating debris into the ice mass, involving determination of direction and rate of movement of the active ice and reactivation of dead ice.]

ÞORLEIFSSON, P. Til Grímsvatna á snjósleðum vorið 1970. *Jökull*, Ár 21, 1971, [pub. 1972], p. 58–60. [Note on trip on Vatnajökull by snow scooter in spring 1970.]

TOKMAGAMBETOV, G. A., *and others, ed.* Rezhim lednikov Kazakhstana [Kazakhstan glacier regimes]. [Edited by] G. A. Tokmagambetov, K. G. Makarevich, Ye. N. Vilesov, P. A. Cherkasov, T. A. Shchukina. *Akademiya Nauk Kazakhskoy SSR. Glyatsiologicheskiye Issledovaniya v Kazakhstane*, Vyp. 9, 1971, 159 p. [Seventeen articles.]

TUSHINSKIY, G. K., *ed. Fitoindikatsionnyye metody v glyatsiologii* [*Plant indicators in glaciology*]. Moscow, Moskovskiy Gosudarstvennyy Universitet, 1971. 160 p. [Collection of 14 articles. Examples are taken mainly from glaciers in Altay, the Caucasus and Khibiny (Murmanskaya Oblast').]

TWISLETON-WYKEHAM-FIENNES, *Sir* R. *Ice fall in Norway*. London, etc., Hodder and Stoughton, 1972. 160 p. [Narrative of expedition to Jostedalsbreen, 1970. Survey work on Fåbergstølbreen; first descent of Briksdalsbreen.]

VIVIAN, R. Le laboratoire sous glaciaire d'Argentière. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 273–79. [Describes instruments for glaciological measurements situated 2 km above the front and 90 m beneath the surface of this French glacier.]

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WALFORD, M. E. R. Glacier movement measured with a radio echo technique. *Nature*, Vol. 239, No. 5367, 1972, p. 93–95. [Measurement of the daily displacement of a site on Fleming Glacier, Antarctic Peninsula, using a radio echo sounder.]

WARBURTON, J. A. Natural concentrations of silver and iodine in Antarctic ice. *Antarctic Journal of the United States*, Vol. 7, No. 4, 1972, p. 121–22. [As well as sampling, an ice crystal replicating machine was used to obtain data on the growth characteristics and effective temperature growth regimes affecting snow falling at each of the three stations visited.]

WEISS, H. V. Determination of selenium in glacial ice by radioactivation. *Analytica Chimica Acta*, Vol. 56, No. 1, 1972, p. 136–39. [Describes procedure.]

WEISS, R. F., *and others*. Compositional variations of gases in temperate glaciers, [by] R. F. Weiss, P. Bucher, H. Oeschger and H. Craig. *Earth and Planetary Science Letters*, Vol. 16, No. 2, 1972, p. 178–84. [Reports measurements of N_2, O_2, Ar and CO_2 in ice from Aletschgletscher and compares results with those of previous workers.]

WENDLER, G., *and others*. Mass balance studies on McCall Glacier, Brooks Range, Alaska. A contribution to the International Hydrological Decade, [by] G. Wendler, C. Fahl and S. Corbin. *Arctic and Alpine Research*, Vol. 4, No. 3, 1972, p. 211–22. [Results for 1968–69 and 1969–70 hydrological years, and analysis for preceding eleven years, were negative for this high-latitude continental glacier.]

WEST, K. E., *and* KROUSE, H. R. Abundances of isotopic species of water in the St. Elias Mountains. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3.* New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972, p. 117–30.) [The origin of the ice and the flow pattern of Rusty Glacier are among features discussed in the light of isotope data from snow and ice samples collected from Mt. Logan, Divide accumulation area and Rusty Glacier.]

WHILLANS, I. M. Ice-sheet dynamics near Byrd station. *Antarctic Journal of the United States*, Vol. 7, No. 4, 1972, p. 111. [Describes 1972 study of ice sheet deformation.]

WOOD, W. A. Steele Glacier, 1935–1968. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3.* New York, American Geographical Society; Montreal, Arctic Institute of North America, 1972, p. 1–8.) [Describes early observations and recent behaviour of this surging glacier.]

YOSHINO, T. The effects of a subarctic glacier on radio-wave propagation in summer. (*In* Bushnell, V. C., *and* Ragle, R. H., *ed. Icefield Ranges Research Project. Scientific results. Vol. 3.* New York, American Geographical

Society; Montreal, Arctic Institute of North America, 1972, p. 143–52.) [Describes investigation of the attenuation of radio waves reflected on a glacier surface, and propagation loss through ice, and discusses results.]

ZANON, G. Bilancio di massa del ghiacciaio del Caresèr per il 1969–70. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 311–16. [Gross accumulation was 990 mm water, and ablation 1 620 mm. Equilibrium line at 3 155 m above sea-level.]

ZICK, W. Eisbewegungen am Eqip Sermia und im westlichen Randgebiet des grönländischen Inlandeises (EGIG Arbeitsgebiet). *Polarforschung*, 42. Jahrg., Nr. 1, 1972, p. 24–30. [Results of measurements to determine the horizontal and vertical movements of this glacier and of some markers at the western end of the EGIG profile at Disko Bugt.]

ICEBERGS. SEA, RIVER AND LAKE ICE

ALVAREZ, J. A., *and* COBAS, F. J. Glaciología y operatividad en el Mar de Weddell. *Boletín del Servicio de Hidrografía Naval*, Vol. 8, No. 2, 1971, p. 87–124. [Discusses factors affecting ice conditions in the Weddell Sea.]

ANISIMOVA, E. P., *and* SPERANSKAYA, A. A. Statisticheskiye kharakteristiki poley skorosti i temperatury v vodoyemakh, pokrytykh l'dom [Statistical characterization of velocity and temperature field in ice-covered water bodies]. *Meteorologiya i Gidrologiya*, 1972, No. 6, p. 68–73. [English abstract, p. 73.]

ANTONOV, V. S., *ed.* Problemy gidrologii ust'evykh oblastey sibirskikh rek [Problems of the hydrology of Siberian river estuaries]. *Trudy Arkticheskogo i Antarkticheskogo Nauchno-Issledovatel'skogo Instituta*, Tom 297, 1972, 146 p. [Fifteen papers dealing with problems of ice and hydrological regimes, calculations and methods of observation.]

AOTA, M. Hokkaidō Ohōtsuku-kai engan-oki ni okeru kaikyōhendō no kenkyū. III [Studies of the variation of oceanographic conditions to the north-east of Hokkaido in the Sea of Okhotsk. III]. *Teion-kagaku: Low Temperature Science*, Ser A, [No.] 29, 1971, p. 213–24. [High-salinity undercurrent observed off the coast in late autumn and early spring seems to have no effect on the date of first ice formation in the harbour. English summary, p. 224.]

AOTA, M., *and others.* Rēdā kansoku ni yoru Hokkaidō Ohōtsuku kaigan-oki no ryūhyō bunpu—1971 nen 1 gatsu–4 gatsu [Distribution of pack ice field off Hokkaido island (shore of Sea of Okhotsk) observed with radar—January–April 1971]. [By] M. Aota, M. Ōi, M. Ishikawa [and] H. Fukushi. *Teion-kagaku: Low Temperature Science*, Ser. A, [Supplement to No.] 29, *Shiryō Shū: Data Report*, 1971, p. 29–67.

BARNES, J. C. Application of satellite infrared measurements to mapping sea ice. (*In 4th annual earth resources program review. Vol. 4. National Oceanic and Atmospheric Administration programs and U.S. Naval Research Laboratory programs. Presented at the Manned Spacecraft Center, Houston, Texas, January 17 to 21, 1972.* Houston, Texas, NASA Manned Spacecraft Center, 1972, p. 88-1–88-6.) [Summary of recent work, including mapping ice distribution at night.]

BELYAKOV, L. N. Metody isklyucheniya elementov dreyfa l'da pri obrabotke nablyudenii za techeniyami, vypolnennykh s dreyfuyushchikh l'dov i sudov [Methods of excluding drift elements of ice from data on currents obtained from moving ice and ships]. *Problemy Arktiki i Antarktiki*, Vyp. 40, 1972, p. 31–36. [Soviet research in the Arctic Basin.]

BRIGHT, C. V. Diving in the Arctic. *Naval Research Reviews*, Vol. 25, No. 8, 1972, p. 1–12. [Tests showed that SCUBA-equipped divers can work efficiently and safely under ice, can measure under-ice features, take photographs, collect samples, and perform other tasks.]

BRYAN, M. L., *and* MARCUS, M. G. Physical characteristics of near-shore ice ridges. *Arctic*, Vol. 25, No. 3, 1972, p. 182–92. [Describes structure, morphology, composition and distribution of these features, formed by the action of wind and spray along the shores of the Canadian Great Lakes.]

CHEREPANOV, N. V. Prostranstvennaya uporyadochennost' kristallicheskoy struktury morskikh l'dov [Spatial arrangement of sea ice crystal structure]. *Problemy Arktiki i Antarktiki*, Vyp. 38, 1971, p. 137–40.

CHEREPANOV, N. V. Sistematizatsiya kristallicheskikh struktur l'dov v Arktike [Systemization of crystal structure of Arctic ice]. *Problemy Arktiki i Antarktiki*, Vyp. 40, 1972, p. 78–83. [Describes basic types of ice structure in the Arctic Basin.]

DIONNE, J.-C., *and* LAVERDIÈRE, C. Ice formed beach features from Lake St. Jean, Quebec. *Canadian Journal of Earth Sciences*, Vol. 9, No. 8, 1972, p. 979–90. [Describes many features characteristic of polar beaches which also occur on Val Jalbert beach, showing that these are not restricted to Arctic and Antarctic environments.]

DUNBAR, MOIRA. *Winter ice reconnaissance in Nares Strait, 1970–71.* Ottawa, Defence Research Board. Defence Research Establishment Ottawa, 1971. ix, [48] p.+separate page of references. (DREO Technical Note No. 71-34.) [Results suggest that date of consolidation of ice cover in this strait is later than in most channels of the Canadian Arctic Archipelago.]

EDGERTON, A. T., *and* POE, G. Microwave emission characteristics of sea ice. (*In 4th annual earth resources program review. Vol. 4. National Oceanic and Atmospheric Administration programs and U.S. Naval Research Laboratory programs. Presented at the Manned Spacecraft Center, Houston, Texas, January 17 to 21, 1972.* Houston, Texas, NASA Manned Spacecraft Center, 1972, p. 89-1–89-22.) [Describes progress in numerical modelling of sea ice emission, and analysis of recently acquired multi-frequency airborne passive microwave measurements.]

FOSS, S. D., *and* FAN, S. S. T. Approximate solution to the freezing of the ice–water system. *Water Resources Research*, Vol. 8, No. 4, 1972, p. 1083–86. [Describes the movement of the ice–water interface as a function of time dependent on ambient air temperature fluctuations above the surface of the ice and freezing water.]

FUJINO, K., *and others.* Ryūhyō rēdā nobunkainō no sokutei. II. Kōri oyobi yuki no taishanō no sokutei [Measurement of the analysing power of sea ice radar. II. Measurement of echoes from ice and snow]. [By] K. Fujino, M. Aota [and] M. Ōi. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 191–98.

[As targets, reflectors were used which were covered with plates of snow, ice or styrene foam. Dielectric properties affected the intensity of the radar echo obtained. English summary, p. 198.]

GLOERSEN, P., *and others*. Microwave emission measurements of sea surface roughness, soil moisture, and sea ice structure, by P. Gloersen, T. Wilheit and T. Schmugge. (*In 4th annual earth resources program review. Vol. 1. National Aeronautics and Space Administration programs. Presented at the Manned Spacecraft Center, Houston, Texas, January 17 to 21, 1972*. Houston, Texas, NASA Manned Spacecraft Center, 1972, p. 8-1–8-19.) [Usefulness demonstrated of microwave radiometers to be carried aboard "Nimbus" satellites.]

GUSHCHENKOV, YE. M., *and others*. Eksperimental'noye opredeleniye nekotorykh fizicheskikh kharateristik dvizhushchikhysa l'din [Experimental study of certain physical characteristics of drifting ice floes]. [By] Ye. M. Gushchenkov, I. D. Karelin, G. V. Parkhomov, L. A. Timokhov. *Problemy Arktiki i Antarktiki*, Vyp. 40, 1972, p. 128–30. [Measurement of speed and acceleration.]

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naturvårdssyften. *Stockholms Universitet. Naturgeografiska Institutionen. Forskningsrapport* 11, 1971, vii, 130 leaves+errata slip. [Geomorphological mapping of north-western Dalarna, Sweden, by air photo interpretation. Several landforms are described and their genesis discussed. English summary, l. 109–12.]

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KINOSITA, S., *and others*. Ryōjō to chiki-suii to no kankei. III [Relation between water level and frost heaving. III]. [By] S. Kinosita, Y. Suzuki, K. Horiguchi [and] K. Tanuma. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 245–56. [Observations of frost heaving in two water-resistant basins, one containing sandy clayish loam and the other containing clay. English summary, p. 255–56.]

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MORRIS, E. C., *and others*. Mars analog studies in Wright and Victoria valleys, Antarctica, [by] E. C. Morris and H. E. Holt, T. A. Mutch, J. F. Lindsay. *Antarctic Journal of the United States*, Vol. 7, No. 4, 1972, p. 113–14. [Photographs of geomorphic features caused by cold and wind in these valleys will be compared with photographs returned from the "Viking" Mars mission in 1976.]

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POTTER, N., *jr.* Ice-cored rock glacier, Galena Creek, northern Absaroka Mountains, Wyoming. *Geological Society of America. Bulletin*, Vol. 83, No. 10, 1972, p. 3025–57. [Describes features, considers origin of surficial features, infers internal composition from pit studies and from mechanisms by which ice and debris are supplied to it, and examines problem of mass balance of both ice and debris.]

PUSTOVOYTOV, N. D. *Sezonno-merzlotnyye pochvy i ikh melioratsiya* [*Seasonally frozen soils and their improvement*]. Moscow, Izdatel'stvo "Nauka", 1971. 231 p. [Detailed study of seasonally frozen soils, particularly in Soviet Far East, with indications of their potential value.]

RAMPTON, V. N., *and* MACKAY, J. R. Massive ice and icy sediments throughout the Tuktoyaktuk peninsula, Richards Island, and nearby areas, District of Mackenzie. *Canada. Geological Survey. Paper* 71-21, 1971, vi, 16 p. [Describes extent of these features and where examples that are easily accessible for examination may be found.]

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TANUMA, K. Dannetsuzai maisetsu ga ryōketsu shinkō ni oyobosu eikyō. II [Effect of thermal insulating on frost penetration. II]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 239–44. [Though the effect of thermal insulators was evident, the relative effectiveness of their various depths and thicknesses was not clear. English summary, p. 244.]

TANUMA, K. Ryōjō no sai no suibun idō to chichū netsu ryūryō no suketei [Measurements of water displacement and heat flow during frost heaving]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 231–37. [Presents results of a study of the heat balance in a soil layer between 20 and 100 cm depth for a given time interval. English summary, p. 236–37.]

TOMIRDIARO, S. V. Podzemnoye oledeneniye Vostochnoy Sibiri [Eastern Siberia's underground glaciation]. *Priroda*, 1972, No. 7, p. 84–91. [Describes occurrence of permafrost in the lowlands.]

TRICART, J., *and others*. Cônes rocheux, pédiments, glacis, par J. Tricart, R. Raynal, J. Besançon. *Annales de Géographie*, 81e An., No. 443, 1972, p. 1–24. [Discusses terminology and formation of these features.]

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VOLKOVA, V. P., *and* ROMANOVSKIY, N. N. Nekotoryye osobennosti khimicheskogo sostava podzemnykh l'dov Uyandinskoy vpadiny i prilegayushchikh chastey Selennyakhskogo khrebta [Some features of the chemical composition of underground ice in the Uyandina lowland and adjoining parts of the Selennyakh mountain range]. *Merzlotnyye Issledovaniya*, Vyp. 10, 1970, p. 114–28. [Yano-Indigirka interfluve, Yakutskaya A.S.S.R.]

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METEOROLOGICAL AND CLIMATOLOGICAL GLACIOLOGY

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CHARLTON, R. B., *and* LIST, R. Hail size distributions and accumulation zones. *Journal of the Atmospheric Sciences*, Vol. 29, No. 6, 1972, p. 1182–93. [Theory of growth of hail in a cloud.]

FRIEDMAN, I., *and* SMITH, G. I. Deuterium content of snow as an index to winter climate in the Sierra Nevada area. *Science*, Vol. 176, No. 4036, 1972, p. 790–93. [Higher snowfall in 1968–69 had depleted D content. This is associated with changed air-mass trajectory.]

ISHIKAWA, N. Tōki ni okeru bonchi-reikyaku no kansoku [Observations of basin cooling in winter]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 115–23. [Meteorological measurements at two stations in Teshio mountainous region, north Hokkaido, one on mountain top, the other in a basin, show lower station to have lower temperatures. Reasons discussed. English summary, p. 122–23.]

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MORAN, J. M. An analysis of periglacial climatic indicators of late Glacial time in North America. *Dissertation Abstracts International*, B, Vol. 32, No. 12, Pt. 1, 1972, p. 7231-B. [Winters were probably milder than at present and summers cooler. Abstract of Ph.D. thesis, University of Wisconsin, 1972. University Microfilms order no. 72-15373.]

MURTY, A. S. RAMACHANDRA, *and* MURTY, BH. V. RAMANA. Freezing characteristics of rain water drops with different solutes and their implication on anomalous ice crystal concentrations in clouds. *Tellus*, Vol. 24, No. 2, 1972, p. 150–60. [Sulphates found to accelerate and chlorides to slow down natural ice formation in drops.]

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SNOW

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BOUTRON, C., *and others*. Chemistry of polar snows. Estimation of rates of deposition in Antarctica, [by] C. Boutron, M. Echevin and C. Lorius. *Geochimica et Cosmochimica Acta*, Vol. 36, No. 9, 1972, p. 1029–41.

[Reports analyses of impurities in surface firn sampled along the Mirny–"Vostok" profile. Cl and Na concentrations decreased as the distance from the coast increased, but then increased towards the central areas.]

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CHERNIKIN, YE. M. Rol' kukhty v zhizni taygy [Effect of clumps of snow on branches on life of the taiga]. *Priroda*, 1971, No. 11, p. 122–23. [Discusses damage to trees and effect on food supply of animals.]

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FUJINO, K. Sekisetsu-naibu ni okeru yūsetsusui no ryūkasokudo no sokutei. II—shamen-sekisetsu-nai de no yūsetsusui no idō [Measurement of flow-down speed of melt water in snow cover. II—flow of melt water in snow cover on a slope]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 151–58. [Speed and path studied by means of NaCl solution as a tracer, detected by pre-set electrodes. Results discussed. English summary, p. 158.]

GALBALLY, I., *and* ALLISON, I. Ozone fluxes over snow surfaces. *Journal of Geophysical Research*, Vol. 77, No. 21, 1972, p. 3946–49. [Old snow surfaces have an ozone destruction rate which is much slower than that for a soil or vegetation rate. More complicated ozone exchange processes are observed above fresh snow surfaces.]

GIORGI, M., *and others*. Misura della temperatura superficiale di un manto nevoso mediante radiometro all'infrarossa, [by] M. Giorgi, M. Colacino, F. M. Vivona. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 241–50. [Describes method and results of measuring snow temperature with an infra-red radiometer in the Val Formazza. Discussion, p. 249–50.]

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HUZIOKA, T., *and others*. Seppō kansoku jikken shitsu jikken syamen no sesshitsu chōsa hōkoku. V (Shōwa 45–46 nen, fuyu) [Report of investigations of snow character at the avalanche research station, Toikanbetsu, northern Hokkaido. V (1970–71)]. [By] T. Huzioka, H. Shimizu, E. Akitaya, H. Narita and K. Kawada. *Teion-kagaku: Low Temperature Science*, Ser. A, [Supplement to No.] 29, *Shiryō Shū: Data Report*, 1971, p. 21–27.

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JÓNSSON, O., *and* RIST, S. Snjóflóð og snjóflóðahætta á Íslandi. *Jökull*, Ár 21, 1971, [pub. 1972], p. 24–44. [Lists snow avalanches in Iceland during the period 1958–71. Four maps show locations of recorded avalanches up to 1700, 1700–99, 1800–99, 1900–71. English summary, p. 40.]

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KOBAYASHI, D., *and others*. Teshio chihō sanchi no seppi chōsa. II [Observations of cornices in Teshio mountainous district. II]. [By] D. Kobayashi, N. Ishikawa, F. Nishio, R. Naruse, S. Kobayashi [and] T. Ishida. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 103–14. [The effect of snow drifting on the development of a cornice, the growth and deformation of a cornice, and the distribution of cornices in relation to prevailing winds were studied. English summary, p. 113–14.]

KOBAYASHI, S. Jifubuki ni okeru setsumen no hajō-moyō no seisei to undō [Development and movement of wavy features on the snow surface during snow drifting]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29,

1971, p. 81–92. [Classifies and describes microreliefs formed during drifting by depositional and/or erosional patterns. English summary, p. 92.]

Kojima, K. Sapporo-shi no heichi sekisetsu no ondo. I. 1963–64—1968–69 nen no sekisetsu danmen sokutei shiryō yori [Snow cover temperatures on the plain in Sapporo. I. From the data of pit-wall observations of snow cover in Sapporo, 1963–64–1968–69]. *Teion-kagaku: Low Temperature Science*, Ser. A, [Supplement to No.] 29, *Shiryō Shū: Data Report*, 1971, p. 15–20.

Kojima, K., *and others*. Moshiri no koryūiki ni okeru yūsetsu, ryūshitsu oyobi netsu-shūshi no kenkyū. II [Studies of snow melt, run-off, and heat balance in a small drainage area in Moshiri, Hokkaido. II]. [By] K. Kojima, D. Kobayashi, H. Aburakawa, R. Naruse, K. Ishimoto, N. Ishikawa [and] S. Takahashi. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 159–76. [Particular attention was paid to the difference between melting rates at the highest (547 m) and the lowest (290 m) sites. English summary, p. 175–76.]

Kravtsova, V. Map of snow depth in Norway. *Norsk Geografisk Tidsskrift*, Bd. 26, Ht. 1–2, 1972, p. 17–26. [Based on data from meteorological stations and on measurements of snow accumulation on glaciers in order to analyse dependence of snow depth on height in different climatic regions.]

Leaf, C. F., *and* Kovner, J. L. Sampling requirements for areal water equivalent estimates in forested subalpine watersheds. *Water Resources Research*, Vol. 8, No. 3, 1972, p. 713–16. [Sampling zones should be stratified by elevation, the sampling in each zone being proportional, and sampling points should be widely spaced over each zone.]

Lee, C. W. On the crystallographic orientation of spatial branches on natural polycrystalline snow crystals. *Journal of the Meteorological Society of Japan*, Vol. 50, No. 3, 1972, p. 171–80. [Angles between spatial branches were mostly about 70°; other small maxima occurred near 56° and 39°.]

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Parkin, D. W., *and* Phillips, D. R. Particulate matter in Antarctic snow. *Geophysical Journal of the Royal Astronomical Society*, Vol. 27, No. 1, 1972, p. 15–22. [Description of dust particles settled out of melt water from a 30-year-old site at the base of the ice cliff at Halley Bay. Details of the sampling technique are given.]

Rossi, G. Apporto del manto nevoso al deflussi superficiali del torrente Lumiei. *Bollettino del Comitato Glaciologico Italiano*, Ser. 2, No. 19, 1971, p. 215–39. [During 1965–71, 48% of the snow cover of the Lumiei river basin (a medium-altitude catchment basin free of glaciers or permanent snow-fields) yielded melt water.]

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Runich, A. V., *ed. Rasprostraneniye i rezhim lavin na territorii SSSR. (Kratkiy katalog izvestnykh svedeniy) [Distribution and regimes of avalanches in the territory of the U.S.S.R. (Short catalogue of known information)]*. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1970. 92 p. [Nineteen regions.]

Schmidt, R. A., *jr*. Sublimation of wind-transported snow—a model. *U.S. Dept. of Agriculture. Forest Service. Research Paper* RM-90, 1972, [ii], 24 p. [Sublimation from blowing snow is estimated from the balance of heat and mass transfer on a volume of air and non-uniform ice particles.]

Tushinskiy, G. K., *ed*. Voprosy prikladnoy glyatsiologii. Snezhnyye laviny i seli [Questions of applied glaciology. Snow avalanches and mud avalanches]. *Informatsionnyy Sbornik o Rabotakh po Mezhdunarodnomu Geofizicheskomu Godu*, No. 15, 1970, 167 p. [Includes the following papers: I. R. Zaitov and V. I. Kravtsova, "Issledovaniye vozmozhnostey deshifrirovaniya vysokogornogo landshafta pri s"yemke v razlichnykh zonakh spektra [The interpretation of mountainous landscapes from photographs in various zones of the spectrum]", p. 7–14; V. I. Kravtsova and N. A. Raspolozhenskiy, "Izucheniye spektral'noy yarkosti ob"yektov vysokogornogo lavinno-lednikovogo landshafta [Study of the spectral luminance of objects of an avalanche and glacier landscape]", p. 15–24; R. A. Alekseyev and I. R. Zaitov, "O vozmozhnosti primeneniya s"yemki v infrakrasnoy zone spektra pri izuchenii vysokogornogo landshafta [On the possibility of using photographs in the infra-red zone of the spectrum in the study of mountain landscapes]", p. 25–33; K. V. Akif'yeva, V. I. Kravtsova and V. I. Turmanina, "Krupnomasshtabnyye kompleksnyye issledovaniya lavinnykh konusov kak ob"yekta deshifrirovaniya na tsvetograficheskikh materialakh [Large-scale complex research of avalanche cones as the object of interpretation in colour photography]", p. 34–69; V. I. Turmanina, "Priyemy fitoindikatsiy pri glyatsiologicheskikh issledovaniyakh [Methods of using phyto-indicators in glaciology]", p. 70–77; S. M. Myagkov, "Nekotoryye perspektivy izucheniya vidimykh granits lavinoopasnykh zon [Prospects of the study of visible limits of regions where there is danger of avalanches]", p. 78–93; N. L. Kondakova, "Snezhnost' gornykh rayonov SSSR i voprosy lavinnoy opasnosti [Snow cover in mountain regions of the U.S.S.R. and problems of danger from avalanches]", p. 94–112; N. A. Volodicheva, "Snezhnyy pokrov Kamchatki [The snow cover of Kamchatka]", p. 113–31; K. M. Shanshiyev, "Snezhnyy pokrov i vozmozhnosti organizatsii zimnego otdykha v tsentral'noy chasti Vostochnykh Karpat [Snow cover and the possibility of organizing winter holidays in the central part of the eastern Carpathians]", p. 132–42; V. Ya. Farber, "Opyt aktivnogo vozdeystviya na snezhnyy pokrov s tsel'yu predotvrashcheniya vnezapnogo skhoda lavin [Experience of using ballistic methods on snow covering as a warning of unexpected avalanches]", p. 143–50; Yu. F. Knizhnikov, "Sovremennyye sposoby opredeleniya poverkhnostnoy skorosti dvizheniya l'da v lednike [Present-day methods of determining the surface speed of ice movement in a glacier]", p. 150–65.]

Tusima, K. Ondo ni yoru sekisetsu no kōdo henka [Hardness of snow as dependent on its temperature]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 51–55. [Quantitative examination of relationship between hardness of snow and temperature. English summary, p. 54–55.]

Tusima, K. Taisekisa-hō ni yoru sekisetsu gansui-ryōkei no shisaku [Trial measurements of the free water content of deposited snow by the volume difference method]. *Teion-kagaku: Low Temperature Science*, Ser. A, [No.] 29, 1971, p. 57–67. [Describes method, using dilatometer. English summary, p. 66–67.]

VILENSKIY, V. D. Sovremennoye otlozheniye sfericheskikh mikrochastits v snezhnom pokrove Antarktidy [Recent deposition of spherical microparticles in the snow cover of Antarctica]. *Geokhimiya*, 1972, No. 5, p. 592–99. [Distribution studied in regions around U.S.S.R. stations. Intensity appears to decrease from coast to Pole. English abstract, p. 599.]

VINOGRADOV, O. N., *and* LORIUS, K. [i.e. C.] Otsenka rezul'tatov izmereniy akkumulyatsii snega na profile observatoriya Mirnyy–stantsiya Vostok na osnovanii sovetsko-frantsuzskikh issledovaniy 1964 i 1966 gg. [An evaluation of the results of snow accumulation measurements on the traverse between Mirny observatory and "Vostok" station on the basis of Soviet and French research in 1964 and 1969]. *Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii*, No. 83, 1972, p. 5–11.

VOYTKOVSKIY, K. F., *and* BARABASH, V. YE., *ed. Laviny Sakhalina i Kuril'skiye Ostrova. Sbornik statey* [*Avalanches of Sakhalin and Kuril'skiye Ostrova. Collected articles*]. Leningrad, Gidrometeorologicheskoye Izdatel'stvo, 1971. 180 p. [Fourteen articles on the formation and distribution of avalanches on these islands.]

WAKABAYASHI, R. Beitrag zur Untersuchung von Lawinen im Waldgebiet Hokkaidos. *Hokkaidō Daigaku Nōgakubu Enshūrin Kenkyū Hōkoku: Research Bulletins of the College Experiment Forests, College of Agriculture, Hokkaido University*, Vol. 28, No. 2, 1971, p. 259–323. [Snow avalanches in the forests of Hokkaido are described and classified by topographical features. Information about avalanches may be obtained by studying tree-ring growth. Japanese summary, p. 321–23.]

WIESNET, D. R., *and* MCGINNIS, D. F. Determination of thawing snow and ice surfaces using earth satellite data. (*In 4th annual earth resources program review. Vol. 4. National Oceanic and Atmospheric Administration programs and U.S. Naval Research Laboratory programs. Presented at the Manned Spacecraft Center, Houston, Texas, January 17 to 21, 1972.* Houston, Texas, NASA Manned Spacecraft Center, 1972, p. 94-1–94-9.) [Discusses apparent differential spectral reflectance sensed by the imaging dissector camera system and the high resolution infra-red radiometer in the visible and the near-infra-red portions, respectively, of the electromagnetic spectrum.]

ERRATA

Vol. 12, No. 64, p. 153. In the eighteenth entry the second author's name should read MURTY, BH. V. RAMANA.

Vol. 12, No. 64, p. 154. In the thirteenth entry the title of the paper should read ". . . in the eastern Canadian Arctic".

Vol. 12, No. 64, p. 163. In the tenth entry the name KAPLINAT should read KAPLINA.