vaguely, at the level where first signs of a marked cooling appeared. The next four chapters deal with existing glaciers and ice sheets, height of snow line, structure of firn and glaciers, rate and nature of flow including extrusion flow (which is by no means generally accepted), ablation, erratics and moraines. The maintenance of the Greenland ice sheet is attributed mainly to rime, with heavy snow in the relatively warm air of the occasional cyclones which are not deflected by the ice. An analysis of the Antarctic sheet leads to the conclusion that it is larger than is warranted by the present climate. Periglacial effects and the forms of glacial erosion are fully described and illustrated.

The remaining twelve chapters deal with the Quaternary Ice Age. First the various types of glacial and periglacial deposits are described and illustrated, including loess and dune formation. These are well done, but the treatment of interglacial and interstadial formations is disappointingly brief, as also is the chapter on duration and correlation. The biological history of the Quaternary is treated in some detail—fauna and flora, man and his cultures. In view of recent developments it is interesting to note that the author was obviously doubtful about the Piltdown skull. The chapter on movements of the Earth's crust is of considerable interest. The variations of sea level pose an interesting problem, the oscillations due to locking-up and freeing of water in the ice sheets being superposed on a steady fall of over 150 m. from the Calabrian to the present. As the melting of all existing ice would only raise sea level by 60 m. at most, this retreat can only have been due to deepening of the ocean basins.

The chapter on the climate of the Ice Age includes a useful review of recent German work on the Quaternary climate of Europe, which is beginning to lead to a real understanding of the meteorology of that difficult period. The problem of reconciling weakened solar radiation with the fact that the greatest cooling was in northern latitudes outside the tropics is met by invoking increased cyclonic activity in the early stages of the glaciations, due to oceanic temperatures relatively high compared with the land. The final chapter, however, on the causes of ice ages, merely describes some of the innumerable theories which have been put forward, without any attempt at a synthesis.

The reference value of the book is enhanced by the bibliography, which occupies 18 pages or roughly 500 entries. These are of course only a selection, made as a guide to further reading, but apart from the rather great preponderance of German works, the selection appears to have been made with good judgement.

C. E. P. BROOKS

SNOW CRYSTALS. UKICHIRO NAKAYA.

THIS book, noted in the last issue of this *Journal* as published by the Harvard University Press, is now also published in Great Britain by Geoffrey Cumberlege, Oxford University Press, at £4 net.

GLACIOLOGICAL LITERATURE

THIS bi-annual list of glaciological literature aims to cover the *scientific* aspects of snow and ice in all parts of the world. Attention is drawn to the bibliographies in each number of the *Polar Record* (Cambridge), which aim to cover the significant work dealing with expeditions, research, equipment and conditions of living in the Polar regions. Both journals, however, deal with Polar literature having specific glaciological interest and with general matters of a practical nature such as snowcraft.

Readers will greatly assist the Editor by notifying him of their own, or any other, publication of glaciological interest.

AHLMANN, H. W: SON. Glaciärer och klimat i Norden under de senaste tusentalen år. *Norsk Geografisk Tidsskrift*, Bd. 13, Ht. 3–8, 1951–52 [pub. 1953], p. 56–75. [Climate in northern regions during last thousands of years and its effects, especially on glaciers.]

ANTEVS, E. Climate of New Mexico during the last glacio-pluvial. *Journal of Geology*, Vol. 62, No. 2, 1954, p. 181–91. [Cary glaciation in New Mexico resulted from heavier snowfall with a lower mean June–September temperature.]

ARAKAWA, H. Fujiwhara on five centuries of freezing dates of Lake Suwa in central Japan. *Archiv für Meteorologie, Geophysik und Bioklimatologie*, Serie B, Bd. 6, Ht. 1–2, 1954, p. 152–66. [Description of Lake Suwa and table of freezing dates from 1443 A.D. to present day.]

BALL, F. K. Dirt polygons on snow. *Weather*, Vol. 9, No. 10, 1954, p. 322–23. [Polygons observed with no dirt: possible explanation.]

BERG, M. H., *and others*. Some aspects of snow, ice and frozen ground, by G. O. Guesmer, R. W. Gerdel, M. Diamond, and J. A. Bender, coordinated by M. H. Berg, final editing by H. Bader. *U.S. S[now,] I[ce and] P[ermafrost] R[esearch] E[stablishment]*. *Report* 10, 1953, 32 p. [Review of present knowledge and statement of research needs.]

BLACK, R. F. Permafrost: a review. *Bulletin of the Geological Society of America*, Vol. 65, No. 9, 1954, p. 839–55.

BOSSOLASCO, M. Newly fallen snow and air temperature. *Nature*, Vol. 174, No. 4425, 1954, p. 362–63. [Density of newly fallen snow is function of air temperature.]

BOUT, P. Prismations et divisions polygonales régulières. *Revue de Géomorphologie Dynamique*, 4 An., No. 5, 1953, p. 205–24. [Theory of formation of polygons.]

BROOKS, C. E. P. The climatic changes of the past thousand years. *Experientia*, Vol. 10, Fasc. 4, 1954, p. 153–58. [Discussion of historical and natural data, including glacier fluctuations. Possible causes discussed.]

BURDECKI, F. The formation and the physical properties of snow and ice with particular reference to antarctic conditions. *Notos*, Vol. 3, No. 2, 1954, p. 112–21. [Review of formation of ice in atmosphere, physical properties of snow and ice, heat storage of antarctic firn.]

BUSK, D. Southern glaciers of the Stanley group of the Ruwenzori. *Geographical Journal*, Vol. 120, Pt. 2, 1954, p. 137–45. [Existence of previously unmapped glacier and peaks.]

CARRUTHERS, R. G. *Glacial drifts and the undermelt theory*. Newcastle upon Tyne, Harold Hill, 1953. 42 p. [All British tills and the accompanying glaciofluvial deposits an "undermelt" product of a single glaciation.]

CRARY, A. P. Seismic studies on Fletcher's ice island, T-3. *Transactions. American Geophysical Union*, Vol. 35, No. 2, 1954, p. 293–300. [Determination of thickness and elastic properties.]

DANSGAARD, W. The abundance of O^{18} in atmospheric water and water vapour. *Tellus*, Vol. 5, No. 4, 1953, p. 461–69. [Includes explanation of low O^{18} abundance in glacial waters.]

DAVYDOV, L. K. Zeravshanskiy lednik [Zeravshanskiy glacier]. *Uchenyye Zapiski Leningradskogo Gosudarstvennogo Ordena Lenina Universiteta imeni A. A. Zhdanova* [*Scientific Notes of the A. A. Zhdanov Order of Lenin State University at Leningrad*], No. 152, *Seriya Geograficheskikh Nauk* [*Geographical Sciences Series*], No. 8, 1952, p. 69–101. [Description, history of exploration and variations in this Central Asian glacier.]

DEAN, W. G. The drumlinoid landforms of the "Barren Grounds", N. W. T. *Canadian Geographer*, No. 3, 1953, p. 19–30. ["Drumlinoids" (drumlin-like landforms) are the most characteristic features of glacial origin in the Barren Grounds; description, and possible modes of formation.]

DEBENHAM, FRANK. The ice islands of the Arctic: a hypothesis. *Geographical Review*, Vol. 44, No. 4, 1954, p. 495–507. [Discussion of origin.]

DE HAAS, E. A method for measuring the movement of rocks and glaciers with simple equipment. *Arctic*, Vol. 6, No. 4, 1953, p. 260–62. [A. C. S. van Heel's precision alignment method.]

DIAMOND, M. Evaporation or melt of a snow cover. *U.S. Snow, Ice and Permafrost Research Establishment. Research Paper* 6, 1953, 6 p. [Calculation of relative rates of evaporation and melting for different atmospheric conditions.]

DORSEY, N. E. Spontaneous freezing of water. *Scientific Monthly*, Vol. 78, No. 5, 1954, p. 283–88. [Opinions generally held concerning factors operating in spontaneous freezing of super-cooled water revised.]

DUNKLE, R. V., *and* GIER, J. T. *Radiation in a diffusing medium with application to snow*. Berkeley, University of California, Institute of Engineering Research, 1953. [ii], 14 leaves. [The equations of diffusing radiation are used to relate albedo and transmission of light in snow cover.]

DUNOYER, J.-M. Expériences sur la vitesse de diffusion d'une vapeur dans un gaz. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences* (Paris), Tom. 235, No. 18, 1952, p. 1027–29. [Measurement of rate of evaporation of ice.]

DURY, G. Weather, climate and river erosion in the ice age. *Science News*, No. 33, 1954, p. 65–88. [Account of recen research and the bearing of valley windings on palaeo-meteorology.]

ELLIS, J. W., *and* VANDERBERG, R. M. L'absorption dans le proche infrarouge et la dispersion de la glace et d'autres cristaux. *Journal de Physique et le Radium*, Tom. 15, Nos. 7–8, 1954, p. 612–14. [An anomaly in the infra-red birefringence of ice.]

FARRINGTON, A. A note on the correlation of the Kerry–Cork glaciations with those of the rest of Ireland. *Irish Geography*, Vol. 3, No. 1, 1954, p. 47–53. [Discusses the still unsettled question of the contemporaneity of the northern and southern Irish glaciations.]

FÉNELON, P. Volcanisme et glaciation dans le Cézallier. *Bulletin du Groupe Poitevin d'Études Géographiques*, Tom. 6, No. 2, 1953, p. 12–27. [The last manifestations of volcanic activity in the Auvergne were associated with glaciation.]

FIELD, W. O., *jr., and* HEUSSER, C. J. Glacier and botanical studies in the Canadian Rockies, 1953. *Canadian Alpine Journal*, Vol. 37, 1954, p. 128–40. [Description of work done. Recession tabulated for 14 glaciers.]

FILLIOL, J. Influence des crues et de la végétation sur la mobilité du lit mineur de quelques rivières françaises. *Revue de Géographie Alpine*, Tom. 42, Fasc. 1, 1954, p. 163–69. [Includes effects of river ice on erosion of banks.]

FIREMAN, E. L., *and* SCHWARZER, D. Measurement of the tritium concentration in natural waters by a diffusion cloud chamber. *Physical Review*, Series 2, Vol. 94, No. 2, 1954, p. 385–88. [No tritium detectable in glacial waters.]

FISCHER-HJALMARS, I. Hybridization of atomic orbitals in formation of molecules. *Arkiv för Fysik*, Bd. 7, Nr. 15, 1953, Ht. 1–2, 1954, p. 165–83. [Paper discussing the factors influencing the shape of molecules such as H_2O.]

FLINT, R. F. Recent advances in North American Pleistocene stratigraphy. *Eiszeitalter und Gegenwart*, Bd. 3, 1953, p. 5–13.

GERDEL, R. W., *and others*. Nomographs for computation of radiation heat supply, by R. W. Gerdel, M. Diamond, and K. J. Walsh. *U.S. Snow, Ice and Permafrost Research Establishment. Research Paper* 8, 1954, 6 p. [Simple method of computing solar and sky radiation and heat balance of snow cover.]

GROSSWEINER, L. I., *and* MATHESON, M. S. Fluorescence and thermoluminescence of ice. *Journal of Chemical Physics*, Vol. 22, No. 9, 1954, p. 1514–26. [Experiments on X-ray excited fluorescence and thermoluminescence. Theoretical explanation suggested.]

HARRIS, F. E., *and* ALDER, B. J. Dielectric polarization in polar substances. *Journal of Chemical Physics*, Vol. 21, No. 6, 1953, p. 1031–38. [Theoretical calculations based on Pauling's model. Agreement with experiment to 3% over a range of frequencies and temperatures.]

HASSENTEUFEL, W. Eine neue Methode der Lawinenverbauung. *Allgemeine Forstzeitung*, Jahrg. 63, Folge Juli 13/14 1952. [2 p.] [Under certain conditions large wedge-shaped defences can steer an avalanche in a direction where it can do no damage.]

HAWKE, E. L. The Snow Survey of Great Britain. *Weather*, Vol. 9, No. 7, 1954, p. 216. [Account of work, and transfer to Meteorological Office.]

HIRSCH, F. W. P. Pfannkuchen-Eis auf der Elbe. *Natur und Volk*, Bd. 84, Ht. 2, 1954, p. 45–46. [Pancake ice on the Elbe.]

HOINKES, H. Beiträge zur Kenntnis der Gletscherwindes. *Archiv für Meteorologie, Geophysik und Bioklimatologie*, Serie B, Bd. 6, Ht. 1–2, 1954, p. 36–53. [Study of the thermal structure and velocity distribution of the air above glacier ice.]

HOLTZSCHERER, J.-J., *and* BAUER, A. *Contribution à la connaissance de l'inlandsis du Groenland. 1ère partie (no. N.III.2)*,

mesures séismiques, par Jean-Jacques Holtzscherer. 2e partie (no. N.II.3), synthèse glaciologique. Communications présentées à la 10e Assemblée Générale de l'Union Géodésique et Géophysique Internationale tenue à Rome en septembre 1954. Paris, Expéditions Polaires Françaises, 1954. 58 p.

HOLTZSCHERER, J.-J., *and* ROBIN, G. DE Q. Depth of polar ice caps. *Geographical Journal*, Vol. 120, Pt. 2, 1954, p. 193–201. [Results of seismic soundings in Greenland, 1948–52, and Dronning Maud Land (Antarctic), 1951–52. Comments by J. W. Glen, p. 201–02.]

HOPKINS, D. M., *and* SIGAFOOS, R. S. Role of frost thrusting in the formation of tussocks. *American Journal of Science*, Vol. 252, No. 1, 1954, p. 55–59.

INGELSTAM, E., *and others*. Precision concentration analysis of D_2O/H_2O by means of phase contrast refractometry, by E. Ingelstam, E. Djurle and L. Johansson. *Journal of the Optical Society of America*, Vol. 44, No. 6, 1954, p. 472–77. [An optical method for determining the D_2O content of a water sample to 0·002 mole % at all concentrations.]

JAYET, A. Quelques caractéristiques peu connues de dépots glaciaires pléistocènes et actuels. *Ecologae Geologicae Helvetiae*, Vol. 45, No. 2, 1952, p. 287–93.

JENNESS, J. L. Problem of glaciation in the western islands of arctic Canada. *Bulletin of the Geological Society of America*, Vol. 63, 1952, p. 939–51. [Extent and character of former glaciation of islands west of approximately 95° W.]

JONES, W. M. Luminescence behaviour in tritium oxide. *Journal of Chemical Physics*, Vol. 20, No. 12, 1952, p. 1974. [When a T_2O ice crystal is cooled to 76°, luminescence is observed.]

JONES, W. M. The triple-point temperature of tritium oxide. *Journal of the American Chemical Society*, Vol. 74, No. 23, 1952, p. 6065–66. [Triple point of T_2O is 4·49° C., that of D_2O is 3·81° C.]

KACHURIN, L. G. Veroyatnost' obrazovaniya ledyanykh zarodyshchey v pereokhlazhdennoy vode [Probability of formation of ice nuclei in supercooled water]. *Doklady Akademii Nauk SSSR* [*Reports of the Academy of Sciences of the U.S.S.R.*], Tom 93, No. 2, 1953, p. 307–10. [Probability of freezing of droplets measured and used to deduce nucleation probability and ice-water surface energy.]

KAHN, F. D. The formation of interstellar dust. *Monthly Notices of the Royal Astronomical Society*, Vol. 112, No. 5, 1952, p. 518–26. [Calculations on the assumption that interstellar dust consists primarily of ice crystals. Includes calculation of tensile strength of polarized ice crystal.]

KASSER, P. Ablation und Schwund am Grossen Aletschgletscher. *Verhandlungen der Schweizerischen Naturforschenden Gesellschaft*, 133 Sitzung, Lugano 1953, p. 73–75. [Shows sinking of the glacier surface from 1926 to 1947.]

KEINDL, J. Die Ursachen der Eiszeiten. *Petermanns Geographische Mitteilungen*, Jahrg. 98, 1 Quartalsheft, 1954, p. 26–27. [Chief cause of ice ages must be sought in cosmic processes awaiting explanation.]

KLÆBOE, H. The Hellstugu River: investigations concerning the run-off conditions. *Norsk Geografisk Tidsskrift*, Bd. 14, Ht. 1–4, 1953, p. 140–51. [Measurements on a glacier stream in Jotunheim, Norway, correlated with the processes of the glacier.]

KORFF, S. A. Effect of the melting of polar ice on the length of the day. *Physical Review*, Ser. 2, Vol. 95, No. 1, 1954, p. 296–97. [The length of the day would increase by 26 microseconds if 1000 cubic Km. of ice melted—e.g. if the surface of Antarctica dropped 3 cm.]

KREEB, K. Die Schneeschmelze als phänologischer Factor. *Meteorologische Rundschau*, 7 Jahrg., Ht. 3–4, 1954, p. 48–49. [Advocates use of maps of snow cover as well as of plant development as indication of climatic conditions during spring.]

KUHN, W. Statistische Ergebnisse von Firnzuwachsmessungen. *Verhandlungen der Schweizerischen Naturforschenden Gesellschaft*, 133 Sitzung, Lugano 1953, p. 71–73. [Correlation between firn accumulation and meteorological conditions.]

LAGEMANN, R. T., *and others*. The ultrasonic velocity, density and compressibility of supercooled H_2O and D_2O, [by] R. T. Lagemann, L. W. Gilley and E. G. McLeroy. *Journal of Chemical Physics*, Vol. 21, No. 5, 1953, p. 819–21. [Results of experiments imply no partial ordering of the supercooled liquid.]

LAUSCHER, F. Klimatologische Probleme des festen Niederschlags. *Archiv für Meteorologie, Geophysik und Bioklimatologie*, Serie B, Bd. 6, Ht. 1–2, 1954, p. 60–65. [On basis of alpine, Norwegian and arctic observations, relation derived between percentage of precipitation in solid form and monthly and annual mean temperature. Different relation found in pack-ice zone.]

LAUSCHER, F. Schneedichten in Norwegen. *Wetter und Leben*, Jahrg. 6, Ht. 3–4, 1954, p. 60–61. [Density of snow cover in Norway during twentieth century.]

LIESTØL, O. Et forsøk på måling av breforandring i Antarktis. *Norsk Geografisk Tidsskrift*, Bd. 14, Ht. 1–4, 1953, p. 152–57. [Air photographs used to estimate increase of glaciers in Dronning Maud Land and Australian Antarctic Territory.]

LLIBOUTRY, L. Le Massif du Nevado Juncal (Andes de Santiago); ses pénitents et ses glaciers. *Revue de Géographie Alpine*, Tom. 42, Fasc. 3, 1954, p. 465–95. [Cartography of the Nevado Juncal Massif, its climate especially with regard to penitente formation; the regime of the glaciers, and their recent fluctuations.]

MANLEY, G. Changes in world glaciation. *Nature*, Vol. 173, No. 4417, 1954, p. 1206–08. [Report of discussion of the Royal Astronomical Society and British Glaciological Society.]

MARSHALL, J. S., *and* LANGLEBEN, M. P. A theory of snow-crystal habit and growth. *Journal of Meteorology*, Vol. 11, No. 2, 1954, p. 104–20. [Theory of why snow crystals show the dependence on vapour density supersaturation.]

MARTIN, S. Observations sur le relief glaciaire en Irlande du sud. *Chronique Géographique des Pays Celtes*, An. 1953, p. 125–32. [Of the two great Irish glaciations, the Eastern General and Midland General, the latter is only represented in the south by the independent local Cork–Kerry glacier.]

NAGINSKIY, N. A. O mekhanizme rosta chetvertichnykh lednikovykh pokrovov Zapadno-Sibirskoy nizmennosti [On the mechanism of growth of the Quaternary glaciers on the west Siberian Lowlands]. *Doklady Akademii Nauk SSSR* [*Reports of the Academy of Sciences of the U.S.S.R.*], Tom 91, No. 3, 1953, p. 625–28. [Theory of development of glaciation in West Siberia. Uses extrusion flow.]

NAKAYA, U., *and* MATSUMOTO, A. Evidence of the existence of a liquidlike film on ice surfaces. *U.S. Snow, Ice and Permafrost Research Establishment. Research Paper* 4, 1953, 6 p. [In regelation the surface of ice behaves as though it had a liquid surface film.]

NAKAYA, U., *and* MATSUMOTO, A. Simple experiment showing the existence of "liquid water" film on the ice surface. *Journal of Colloid Science*, Vol. 9, No. 1, 1954, p. 41–49. [Ice spheres show cohesion when brought into contact, and sometimes rotate before separating.]

NANGERONI, G. *Neve–acqua–ghiaccio–fenomeni crionivali delle regioni periglaciali nelle alpi Italiane*. Como, Antonio Noseda, 1954. 42 p. [General account of periglacial features in the Italian Alps.]

NERSESOVA, Z. A. O tayanii l'da v gruntakh pri otritsatel'nykh temperaturakh [On the melting of ice in the earth at negative temperatures]. *Doklady Akademii Nauk SSSR* [*Reports of the Academy of Sciences of the U.S.S.R.*], Tom 79, No. 3, 1951, p. 507–08. [Data on the temperature at which ice melts in various soils.]

OECHSLIN, M. Die urnerischen Gletscher und die Schnee- und Firngrenze in den Jahren 1948–1953. *Berichte der Natur-*

forschenden Gesellschaft Uri, Ht. 7, 1948–54, p. 39–41. [Fluctuations of the glaciers of Uri and of the snow and firn lines.]

OGURA, Y. A supplementary note on the problem of ice formation. *Journal of the Meteorological Society of Japan*, Ser. 2, Vol. 30, No. 7, 1952, p. 231–39. [Theory of formation of ice on a water surface.]

OLIVER, J., *and others*. Elastic waves in arctic pack ice, by J. Oliver, A. P. Crary and R. Cotell. *Transactions. American Geophysical Union*, Vol. 35, No. 2, 1954, p. 282–92. [Study of propagation of elastic waves in thin lake ice and fast ice and pack ice in Beaufort Sea and Arctic Ocean. Theory allows deduction of ice thickness from the measurements.]

OMDAL, K. Drivisen ved Svalbard 1924–1939. *Norsk Polarinstitutt. Meddelelser*, Nr. 72, 1953, 21 p. [Drift ice in the Svalbard area, 1924–39; enquiry into factors determining position of ice masses.]

PAL'GOV, N. N. Nekotorye itogi noveyshikh issledovaniy lednikov Kazakhstana [Some results of recent investigations of the glaciers of Kazakhstan]. *Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya* [*News of the Academy of Sciences of the U.S.S.R., Geographical Series*], 1954, No. 4, p. 47–51. [Run-off of glaciers in Zaitiyskiy Alatau and Dzhungarskiy Alatau.]

PASCHINGER, HERBERT. Nachmessungen am Pasterzenkees (Glocknergruppe) in den Jahren 1951 und 1952. *Zeitschrift für Gletscherkunde und Glazialgeologie*, Bd. 2, Ht. 2, 1953, p. 343–52. [Detailed measurements on the Pasterzenkees, Eastern Alps, in 1951 and 1952.]

PÉGUY, C.-P. Neiges persistantes et équilibre glaciaire. (In *Université de Rennes. Cinquantième anniversaire du Laboratoire de Géographie* (1902–1952), *volume jubilaire*. Rennes, 1952, p. 268–77.) [Would identify the topographical snow line as the level of persistent snow and the climatic snow line as the level of glacial equilibrium.]

PERUTZ, M. F. Glaciers. *Proceedings of the Royal Institution*, Vol. 35, No. 160, 1953, p. 571–82. [Review of recent work on glacier flow.]

PLANHOL, X. DE. Les formes glaciaires du Sandras dag et la limite des neiges éternelles quaternaires dans le SW de l'Anatolie. *Société Géologique de France, Compte Rendu Sommaire des Séances*, No. 13, Séance du 9 novembre, 1953, p. 262–64. [Evidence of glaciation in Anatolia, Asia Minor; height of snow line about 2000 m.]

POWLES, J. G. A calculation of the static dielectric constant of ice. *Journal of Chemical Physics*, Vol. 20, No. 8, 1952, p. 1302–09. [Results do not agree well with experiment but have the right temperature dependence.]

PROHASKA, F. Bemerkungen zum säkularen Gang der Temperatur im Südpolargebiet. *Archiv für Meteorologie, Geophysik und Bioklimatologie*, Serie B, Bd. 5, Ht. 3–4, 1954, p. 327–30. [There is no clear evidence of a secular temperature change in the Antarctic in the past decades.]

QUERVAIN, M. DE. Zur Lawinenklassifikation. *Die Alpen*, 30 Jahrg., No. 6, 1954, Varia p. 97. [Nomenclature of avalanches.]

RAFFO, J. M., *and others*. Glaciar Moreno, por J. M. Raffo, B. S. Colqui y M. E. Madejski. *Meteoros*, Año 3, No. 4, 1953, p. 293–341. [Patagonia. One of the few glaciers advancing at the present time, the cause being attributed to morphological factors.]

REGENER, E. Eine Variante des Leidenfrost'schen Phänomens. *Zeitschrift für Naturforschung*, Bd. 9a, Ht. 4, 1954, p. 276–78. [An air free glass vessel containing ice can be heated without melting the ice.]

RIKHTER, G. D. Snezhnyy pokrov i yego rol' v narodnom khozyaystve [Snow cover and its part in the national economy]. *Izvestiya Akademii Nauk SSSR., Seriya Geograficheskaya* [*News of the Academy of Sciences of the U.S.S.R., Geographical Series*], 1954, No. 3, p. 42–49. [Snow in agriculture, road and rail transport, building design, and avalanches.]

SATŌ, M. Der Mittelwert der durch die Gefrierung des in einem fest geschlossenen Wassers verursachten Drucke. *Journal of the Scientific Research Institute* (Tokyo), Vol. 48, No. 1349, 1954, p. 65–70. [Calculation of the mean pressure developed by freezing water.]

SCHAFER, J. P. Scott glacier notes, 1953. *Canadian Alpine Journal*, Vol. 37, 1954, p. 124–26. [Retreat of this glacier described.]

SCHUSTER, R. L. *Travel and rescue in crevassed areas*. Wilmette, U.S. Snow, Ice and Permafrost Research Establishment, 1954. 14 p. (Instruction manual 2.) [Description of crevasses; precautions; rescue techniques and equipment.]

SCHWARZBACH, M. Orogenesen und Eiszeiten; zur Ursache des Klimawechsels in der Erdgeschichte. *Naturwissenschaften*, Jahrg. 40, Ht. 17, 1953, p. 452–55. [Glacierization, although associated with mountain building, must be initiated by other causes, e.g. changes of solar radiation.]

SEIFERT, G. Das mikroskopische Korngefüge des Geschiebemergels als Abbild der Eisbewegung, zugleich Geschichte des Eisabbaues in Fehmarn, Ost-Wagrien und dem dänischen Wohld. *Meyniana: Veröffentlichungen aus dem Geologischen Institut der Universität Kiel*, Bd. 2, 1954, p. 126–84. [Ice movement determined from microscopic structure of till.]

[SELIGMAN, G., *and* OECHSLIN, M.] Zur Lawinenklassifikation. *Die Alpen*, 30 Jahrg., No. 8, 1954, p. 164. [Letter from G. Seligman criticising proposed new nomenclature for avalanches, and reply by M. Oechslin.]

SHARP, ROBERT P. Glacier flow: a review. *Bulletin of the Geological Society of America*, Vol. 65, No. 9, 1954, p. 821–38. [Review, with many references, of the theory of glacier flow.]

SHCHITOV, A. S. "Kayushchiysya sneg" ["Penitent snow"]. *Priroda* [*Nature*] (Moscow), 1953, No. 8, p. 110–11. [Curious formation of snow reminiscent of South American penitentes, in street of Stavropol', Caucasus.]

SHNITNIKOV, A. V. Izmenchivost' gornogo oledeniya Yevrazii v pozdne- i posledlednikovogo epokhu i absolyutnaya khronologiya [Variation of mountain glaciation of Eurasia in late and post glacial times and absolute chronology]. *Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva* [*News of the All-Union Geographical Society*], Tom 85, No. 5, 1953, p. 559–76. [Cyclic theory of retreat and advance with phase of 1850 years, based on observations in Alps, Caucasus and Central Asia.]

SHUMSKIY, P. A. Stroyeniye prirodnykh l'dov [Structure of natural ice]. *Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva* [*News of the All-Union Geographical Society*], Tom 86, No. 1, 1954, p. 20–33. [Mineralogy and petrology of natural fresh-water ice.]

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MADE AND PRINTED IN GREAT BRITAIN BY WILLIAM CLOWES AND SONS, LIMITED, LONDON AND BECCLES