during a Martian day. Thus, while it is possible that under a noonday sun the temperature of the air and, perhaps, of the solid rock may rise above the freezing point of water, all the heat received must be completely lost when the sun sinks in the west. The most careful calculation shows that if there are any considerable bodies of water on our neighboring planet they exist in the form of ice, and can never be liquid to a depth of more than 1 or 2 inches, and that only within the torrid zone and during a few hours each day. We may claim with certainty that in the polar regions of Mars the temperature can never rise to anything near the freezing point of water.

Here a difficulty may at once occur to the critical reader. Are not the snow caps of Mars actually seen to melt away under the influence of the sun's rays? I reply in the negative. There is no evidence that snow like ours ever forms around the poles of Mars. It does not seem possible that any considerable fall of such snow could ever take place, nor is there any necesity of supposing actual snow or ice to account for the white caps. At a temperature vastly below any ever felt in Siberia, the smallest particles of moisture will be condensed into what we call hoarfrost, and will glisten with as much whiteness as actual snow. This is a familiar fact which requires no elucidation. We should expect hoarfrost to form around the poles of Mars if there is the slightest tinge of vapor in its thin invisible atmosphere. We do actually see this white formation.

But why does this hoarfrost disappear under the sun's rays if the temperature remains below the freezing-point? The reply is that, as physicists and meteorologists well know, snow and ice slowly evaporate even at the lowest temperature that can be produced. The rate of evaporation is so slow as to be unnoticed, except when very exact observations are made. We should, therefore, expect that in the absence of a perceptible atmosphere, when this thin coating of frost crystals, perhaps a millimeter in thickness, is exposed to the sun, it will gradually evaporate day after day, leaving the darker surface under it exposed. This is precisely what we see to take place. Thus, so far as the ordinary facts are concerned, there is nothing to surprise us in what we see going on upon Mars at so low a temperature. The higher elevations in the temperate and torrid zones of the planet would naturally now and then be covered by frost during the night, which might continue during the following day, or for a number of days. Thus we have a kind of Martian meteorological changes, very slight indeed and seemingly very different from those of our earth, but yet following similar lines on their small scale. For snowfall substitute frostfall; instead of feet or inches say fractions of a millimeter, and instead of storms or wind substitute little motions of an air thinner than that on the top of the Himalayas, and we shall have a general description of Martian meteorology.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Librarian.

The following have been selected from among the titles of books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be lent for a limited time to officials and employees who make application for them. Anonymous publications are indicated by a ——.

Apia. Samoa-Observatorium.
Bericht über das Samoa-Observatorium für 1907. (Aus den Nachrichten der K. Gesellschaft der Wissenschaften zu Göttingen geschäftliche Mitteilungen. 1908. Heft 1.)
...Ergebnisse der Arbeiten des Samoa-Observatorium. I. Das Samoa-Observatorium von Hermann Wagner. Berlin. 1908. 70 p. 4°. (Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen. Mathematisch-physikalische Klasse. Neue Folge. Band 7. Nro. 1.)

Association international de sismologie.
Comptes rendus des séances de la deuxième réunion de la Commission permanente et de la première assemblée générale de l'Association internationale de sismologie réunie à la Haye du 21 au 25 septembre 1907. n. p. n. d. 283 p. f°.

Baden. Zentralbureau für Meteorologie und Hydrographie.
Deutsches meteorologisches Jahrbuch. 1907. Karlsruhe. 1908. 77 p. f°.
Jahres-Bericht... 1907. Karlsruhe. 1908. 116 p. f°.

Besson, Louis.
Variations diurne et annuelle de la fréquence des cirrus a Paris. (Extrait des Annales de Montsouris, t. 8, 4me trim., 1907.)

Bibliotheca geographica.
Band 13. Jahrgang 1904. Berlin. 1908. xvi, 560 p. 8°.

Catania. R. Osservatorio.
Osservazioni meteorologiche del 1907. n. p. n. d. 7 p. f°.

Ceylon. Surveyor-general.
Administration reports, 1907. Part 4. Education, science, and art. Meteorology. [Colombo. 1908.] F 58. 9 pl.

Commission permanente internationale d'aéronautique.
Procès verbaux et comptes rendus des travaux de la session extraordinaire tenue à Bruxelles du 12 au 15 Septembre 1907. Paris. 1908. 198 p. 4°.

Costanzo, G., & Negro, C.
Sopra alcuni fenomeni di ionizazione provocata delle nevi. (Estratto dagli Atti della Pontificia accademia Romana dei nuovi Lincei. Anno 41. Sessione 6 del 17 maggio 1908. 5 p. f°.)

Cyclopedia of American agriculture.
A popular survey of agricultural conditions, practises, and ideals in the United States and Canada. Edited by L. H. Bailey. v. 1-3, New York. 1907-1908. 4°.

Cyclopedia of American horticulture.
By L. H. Bailey. Assisted by Wilhelm Miller... Fifth edition. New York. 1906. 4 v. f°.

Ekholm, Nils.
...Spannkraft des gesättigten Wasserdampfes und Eisdampfes. Upsala. 1908. 75 p. 8°. (Arkiv for matematik, astronomi och fysik... Band 4. N:o 29.)

Fitzner, Rudolf.
Meteorologische Beobachtungen in Kleinasien 1903. Berlin. 1907. 37 p. f°. (Beiträge zur Klimakunde des Osmanischen Reiches und seiner Nachbargebiete. II.)

Ghent. Université. Station de géographie mathématique.
Annuaire météorologique. Mars 1907-février 1908. Roulers. 1908. 87 p. 12°.

Hamburg. Deutsche Seewarte.
Tabellarische Reiseberichte nach den meteorologischen Schiffstagebüchern. 5. Band 1907. Berlin. 1908. x, 236 p. 4°.

Hanzlik, Stanislav.
Die räumliche Verteilung der meteorologischen Elemente in den Antizyklonen.) Wien. 1908. 94 p. f°. (Besonders abgedruckt aus dem 84. Bande der Denkschriften der mathematisch-naturwissenschaftlichen Klasse der kaiserlichen Akademie der Wissenschaften.)

Hildebrandt, A.
Airships past and present, together with chapters on the use of balloons in connection with meteorology, photography, and the carrier pigeon. Translated by W. H. Story. London. 1908. xvi, 364 p. 8°.

India. Meteorological office.
Rainfall of India. 1906. Calcutta. 1908. v. p. f°.

Kerner v. Marilaun, Fritz.
Untersuchungen über die Veränderlichkeit der jährlichen Niederschlagsperiode im Gebiete zwischen der Donau und nördlichen Adria. Wien. 1908. 59 p. f°. (Besonders abgedruckt aus dem 84. Bande der Denkschriften der mathematisch-naturwissenschaftlichen Klasse der kaiserlichen Akademie der Wissenschaften.)

Millot, C.
La pluie à Nancy de 1878 à 1907 (30 années). Nancy. 1908. 11 p. 8°.

Mysore. Meteorological department.
Report on rainfall registration... 1907. Bangalore. 1908. 47 p. f°.

Prussia. Königliches preussisches meteorologisches Institut.
...Anleitung zur Messung und Aufzeichnung der Niederschläge. 7. Auflage. (Veröffentlichungen des Königlich preussischen meteorologischen Instituts. Nr. 194.)
Aspirations-psychrometer-Tafeln. Braunschweig. 1908. xiv, 87 p. f°.

Rawson, H. E.
...Anticyclones and their influence on South African weather. Cape Town. 1907. (From the Report of the South African association for the advancement of science, 1906. p. 49-68. 8°.)

Ricco, Annibale.
Anomalie della gravità e del magnetisimo terrestre in Calabria e Sicilia in relazione alla costituzione del suolo. Modena. 1908. 17 p. 8°.

Sabadell. Observatorio.
Resumen de las principales observaciones verificadas en esta estación meteorológica durante el quinquenio 1902-1906. Sabadell. 1908. 69 p. 8°.

St. Petersburg. Institut impériale forestier. Observatoire météorologique.
Observations. 1906. St. Pétersbourg. 1908. xii, 65 p. 12°.

Szirtes, Sigismond.
...Coordonées des stations sismiques du globe et tableaux auxiliaires pour les calculs sismiques. Strassbourg. 1908. 23 p. 4°. (Publications du Bureau central de l'Association internationale de sismologie. Sér. A. Mémoires.)
...Éléments sismiques de quelques tremblements de terre japonais. 1 partie. Strassbourg. 1908. 34 p. 4°. (Publications du Bureau central de l'Association internationale de sismologie. Sér. A. Mémoires.)

Vincent, J.
Nouvelles recherches sur la température climatologique. Bruxelles. 1906. 120 p. f°. (Annales de l'Observatoire royal de Belgique. Nouvelle série. Annales météorologiques.)
Atlas des nuages. Bruxelles. 1907. 29 p. 7 pl. f°.

Württemberg. Königliches württembergisches meteorologisches Zentral-station.
Deutsches meteorologisches Jahrbuch. 1907. Stuttgart. 1908. 60 p. 4°.

RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY.

C. FITZHUGH TALMAN, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

American society civil engineers. Proceedings. New York. v. 24. October, 1908.
Murphy, E. C. and others. Rain and run-off near San Francisco, California. p. 640-660. [Discussion of paper by Grunsky.]
Engineering news. New York. v. 60. October 29, 1908.
Chittenden, H. M. Forests and floods: Extracts from an Austrian report on floods of the Danube, with applications to American conditions. p. 467-471.
—— The relations of forests to stream flow. p. 478-479.
Nature. London. v. 78. October 1, 1908.
—— The isothermal layer of the atmosphere. p. 550-551. (Oct. 1.)
Armitage, E. A red rainbow at sunset. p. 305. (Oct. 15.)
Science. New York. New series. v. 28. 1908.
Wallis, Wm. F. Clouds over a fire. p. 565. (Oct. 23.)
Ramaley, Francis. Some inversions of temperature in Colorado. p. 695-696. (Nov. 13.)
Scientific American. New York. v. 99. October 17, 1908.
Riggs, Henry S. A home-made seismograph. p. 263-264.
Scientific American supplement. New York. v. 66. October 17, 1908.
Macdougal, D. T. The seasonal activities of plants. p. 251.
Terrestrial magnetism and atmospheric electricity. Baltimore. v. 13. September, 1908.
Dike, P. H. Report on the atmospheric electricity observations made on the magnetic survey yacht "Galilee," 1907-08. p. 119-128.
Tokyo mathematico-physical society. Proceedings. Tokyo. 2d ser. v. 4. 1908.
Okada, T. Geometrical constructions for determination of the center of a cyclone. p. 326-329. (May.)
Hirayama, S. Effect of color upon the constant of astronomical refraction. p. 340-344. (June.)
Okada, T. On the diurnal heat exchange in a layer of snow on the ground. p. 358-367. (July.)
Symons's meteorological magazine. London. v. 43. October, 1908.
—— The German meteorological society. p. 169.
Archives des sciences physiques et naturelles. Genève. Tome 26. 15 October, 1908.
Maurer, Julius. Nouvelle carte de la répartition des pluies en Suisse. p. 333-334. [Abstract.]
Forel, F. A. Les relations qui relient les variations périodiques de grandeur des glaciers avec certains faits météorologiques. p. 334-334.
Quervain, A. Les courants atmosphériques correspondant à notre bise dans les couches supérieures, d'après des mesures aérologiques. [Abstract.] p. 337-338.
Ciel et terre. Bruxelles. 29me année. 1908.
Köppen, W. L'orientation des prismes tombant dans l'air. [Translated from Met. Zeit.] (1 octobre.) p. 359-365.
L., V. D. La composition de l'air dans la haute atmosphère. (1 octobre.) p. 370-371.
—— L'action du vent sur le feuillage. [Note.] (1 octobre.) p. 371-372.
—— La découverte de l'Amérique et ses facteurs météorologiques. (16 octobre.) p. 390-394.
France. Académie des sciences. Comptes rendus. Paris. Tome 147. 1908.
Curie (Mme. S.). Sur la formation de brouillards en présence de l'émanation du radium. (17 août.) p. 379-382.
Birkeland, K. Sur la cause des orages magnétiques. (21 septembre.) p. 530-543.
Galitzine, B. Sur un seismographe à enregistrement galvanométrique à distance. (28 septembre.) p. 575-578.
Bordas, F., & Touplain. Analyse des gas de l'atmosphère non liquéfiables dans l'air liquide. (5 octobre.) p. 591-534.
Claude, Georges. Sur l'extraction des gaz rares de l'atmosphère. (12 octobre.) p. 624-627.
Villard, P. Sur l'induction et la cause probable des aurores polaires. (26 octobre.) p. 740-742.
Nature. Paris. 36. année. 31 octobre 1908.
Cordemoy, C. de. Une nouvelle théorie des cyclones. p. 346.
Revue néphologique. Mons. No. 32. Octobre, 1908.
Besson, Louis. Variation diurne et annuelle de la fréquence des cirrus à Paris. p. 265-267.
—— Dans le brouillard de Londres. [Account of balloon ascension in a fog. Abstract from Knowledge.] p. 267-269.
Bracke, A. Classification des nuages. [As to utility of a detailed classification.] p. 269-270.
Annalen der Hydrographie und maritimen Meteorologie. Berlin. 36. Jahrgang. Octobre 1908.
Schlötz, O. E. Bemerkungen über die durch den Wind erzeugten Meeresströmungen. p. 429-446.
Annalen der Physik. Leipzig. Band 26. 1908.
Koch, Peter Paul. Ueber das Verhältnis der spezifischen Wärmen $c_p / c_v = k$ in trockener kohlensäurefreier atmosphärischer Luft als Funktion des Druckes bei den Temperaturen 0° und —79.3° C. p. 551-579.
Annalen der Physik. Leipzig. Band 27. 1908.
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Schmidt, Wilhelm. Ein Apparat zur Aufsuchung regelmässiger Wellen in Luftdruck. p. 356-358.
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Rudzki, M. P. Ueber die Bestimmung dynamischer Elastizitätskonstanten. p. 1-6.
Messerschmidt, J. B. Ueber die Reflexion der Erdbebenwellen. p. 6-9.
Meissner, Otto. Ueber die Geschwindigkeit der sogenannten W_2- und W_3-Wellen. p. 9-11.
Belar, A. Die tätigen Vulkane der Erde. [Review of a work by Mercalli]. p. 11-15.
Mihailovitsch, Jelenko. Die Erdbeben in Serbien im Jahre 1906. p. 15-21.
Belar, A. Was erzählen uns die Erdbebenmesser von den Erdbeben. p. 29-41.
—— Die Erdbebenkatastrophe von Kalabrien im Jahre 1783. p. 42-50.
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—— Die Beziehung zwischen den Temperaturen des nordatlantischen Ozeans und derjenigen von Nordwest- und Mitteleuropa. p. 659-670.
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Linke, Franz. Samoanische Bezeichnung für Wind und Wetter. p. 229-232.
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Wundt, W. Der tägliche Gang der Temperatur in der freien Atmosphäre. p. 337-341.
Hann, J. R. C. Mossman über das Klima von Edinburgh. [Abstract.] p. 341-348.
Kassner, C. Die Lufttemperatur bei Schnee- und Graupelfall in und um Berlin. p. 348-357.
Voeikov, A[leksandr Ivanovich]. Die Isonephen und die Bewölkung nach Breitenzonen. p. 351-360.
—— Arthur Stanhope Eyre. [Obituary notice.] p. 360.
—— Paul la Cour. [Obituary notice.] p. 360.
—— Prinz Yamashina. [Obituary notice.] p. 360.
Staikoff, St. D. Ueber die Natur der Gewittercirren. p. 361-363.
Hann, J. Klima der Insel Pelagosa. p. 363-365.
D., A. T. Okada über den Unterschied im täglichen Luftdruckgang bei verschiedenen Bewölkungsverhältnissen zu Tokio. p. 366-367.
Maurer, J. Der aneroid-Wagebarograph. p. 367-469.
Shenrok, A. Dämmerungserscheinungen am 30. Juni 1908 in Russland. p. 369-371.
Schmidt, Wilhelm. Einfluss von Seeflächen auf die Bewölkung. p. 372-372.
Schmidt, Wilhelm. Beobachtungen über die Orientierung der Eiskristalle in den Wolken. p. 372-374.
Ficker, H. von. Niederschlag in zentralasiatischen Gebirgen. p. 378-380.
Süring, R. Beziehungen zwischen Gewitterzügen und stärkeren Niederschlägen. p. 380-381.
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—— Regenversuche zu Oamaru (Neuseeland). p. 454-456.
Barkow, E. Zur Entstehung der Graupeln. p. 456-458.
Henriet, H. and Bonyssy, W. Ueber die Bildung der atmosphärischen Ozons und die Ursachen der Variation der Kohlensäuregehaltes der Luft. p. 460-461.
Okada, T. K. Abe, über die Dichte der Schneedecke. p. 461.
—— Monatsmittel der Intensität der Sonnenstrahlung zu Montpellier, 1883 bis 1900. p. 461.