in fact we have never before experienced such severe electrical disturbances as has been the case during the past two months * * *.

RAINFALL AT PORTO VELHO, BRAZIL.[1]

The monthly and annual precipitation at Porto Velho, Brazil, as recorded by the Madeira Mamore Railway Co. has been published;[2] we have now received the statistics for 1921 and the first 6 months of 1922, as in the table below.

Monthly and annual precipitation (inches) for Porto Velho, Brazil.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1921	24.52	11.30	18.83	12.13	10.22	2.63	0.51	4.37	2.52	8.67	14.67	20.36	130.73
1922	28.57	24.97	32.71	9.41	4.71	4.15	.....	.....	.....	.....	.....	.....	.....

[1] Communicated by Dr. F. L. Hoffman, Prudential Life Insurance Co.
[2] MO. WEATHER REV., Aug., 1922, 50: 416.

—*A. J. H.*

BIBLIOGRAPHY.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Meteorologist in Charge of Library.

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:

Baldit, Albert.
Études élémentaires de météorologie pratique. 2nd ed. Paris. 1922. xiii, 428 p. illus. 25½ cm.

Bombay. Meteorological office.
Rainfall of the Bombay presidency for years previous to 1891. v. 6. Bombay. 1922. 658, 6 p. map. 33 cm.

Carton, P.
La météorologie agricole dans les pays tropicaux, en Indochine en particulier. Saigon. 1921. 48 p. 27 cm.

Claxton, T. F.
Winds of Hongkong (appendix to Hongkong observations, 1921). Hongkong. 1921. 105 p. plates. 34½ cm.

Freybe, O.
Praktische Wetterkunde. Eine gemeinverständliche Anleitung zur Benutzung von Wetterkarten in Verbindung mit örtlichen Wetterbeobachtungen. 2te Aufl. Berlin. 1922. 82 p. 23½ cm.
Schulwetterkunde. Berlin. 1922. 60 p. illus. 19 cm.

Gautier, Raoul.
Nouvelles mesures des chutes de pluie et neige au Grand Saint-Bernard. Genève. 1922. p. 343–353. illus. 23 cm. (Extr.: Arch. sci. phys. et natur., 5me per. v. 4. Sept.–Oct., 1922.)

Granqvist, Gunnar.
Ström- och windobservationer vid fyrekeppen. 1921. Helsingfors. 1922. 40 p. fig. 24½ cm. (Ström- und Windbeobachtungen an den Leuchtschiffen 1921.) [Havsforskningsinstitutets skrift, no. 13.]

Great Britain. Medical research council.
Kata-thermometer in studies of body heat and efficiency. London. 1923. 196 p. illus. 24½ cm. (Privy council. Special report series, no. 73.)

Hall, Maxwell.
Rainfall of Jamaica from about 1870 to end of 1919. Jamaica. 1923. 21 p. map. 34 cm.

Mathias, E.
Rapport sur l'état actuel de l'électricité atmosphérique. Paris. 1922. p. 83–170. 23 cm. (Extr.: Annales de physique, 9e ser. T. 18. Juil.–août, 1922.)

Morize, Henrique.
Contribuição ao estudo do clima do Brasil. Rio de Janeiro. 1922. vii, 118 p. plates. 30½c m.

Negretti & Zambra.
Notes on temperature. [London.] n. d. unp. illus. 19 cm.

New York. State commission on ventilation.
Ventilation. Report of the . . . New York. [c1923.] xxvi, 620 p. illus. 26½ cm.

Nottingham. City engineer.
Meteorology of Nottingham. 1922. [Nottingham. 1922.] unp. charts. 38½ cm.

Östman, C. J.
Recherches sur les grands vents près de la côte suédoise du Golfe de Botnie. Stockholm. 1922. 47 p. diagr. plates. 32½ cm.

Paris. Services techniques d'hygiène.
Météorologie. T. 3. Paris. 1922. 119 p. illus. 25½ cm. [Repaged reprint from Annales des Services techniques d'hygiène de la ville de Paris. Compte rendu des travaux de 1913 à 1919.]

Sievers, F. J., & Holtz, H. F.
Influence of precipitation on soil composition and on soil organic matter maintenance. Pullman, Wash. 1923. 32 p. map. 23 cm. (Washington. State coll. Agric. exp. sta. Bulletin no. 176. February, 1923.)

U. S. Department of agriculture.
Rain-making not feasible, says U. S. Weather bureau. [Washington.] 1923. 3 p. 36 cm. (U. S. Dept. agric. Office of sec. Press service. Released for publication March 21, 1923.)

U. S. Department of the interior.
. . . Wind cave, National park, South Dakota . . . Washington. 1922. 24 p. illus. 23½ cm. (National park service.)

Waibel, Leo.
Winterregen in Deutsch-Südwest-Afrika. Eine Schilderung der klimatischen Beziehungen zwischen atlantischem Ozean und Binnenland. Hamburg. 1922. vi, 112 p. illus. plates(part fold.) 29 cm. (Hamburg. Univ. Abhandl. Gebiet Auslandskunde. Bd. 9. Reihe C. Naturwissensch. Bd. 4.)

Wallén, Axel.
Rapport sur l'organisation de la météorologie agricole en Suède, présenté à la 6ème assemblée générale de l'Institut international d'agriculture à Rome, mai 1922. Rome. 1922. 6 p. 24 cm.

Ward, Robert DeC.
Tornadoes of the United States. Washington. 1920. p. 139–145. illus. plate. 24½ cm. (Smithsonian report, 1918. Pub. 2552.)

RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY.

C. F. TALMAN, Meteorologist in Charge of Library.

The following 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 and other communications bearing on meteorology and cognate branches of science. This is not a complete index 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.

Algeria. Service météorologique. Cahier, Alger. Année 1923. no. 1.
Lasserre, A. La formule psychrométrique de Regnault et celle de Mr. Angot devant le psychromètre du P. de Foucauld. p. 1–9.
Lasserre, A. Note sur la variation de la correction de gravité de la hauteur barométrique avec l'altitude aux latitudes de l'Afrique du Nord. p. 9–13.
Petitjean, L. Surfaces de discontinuité en Algérie et au Sahara. p. 13–16.

American meteorological society. Bulletin. Worcester, Mass. v. 4. March, 1923.
Bavendick, F. J. The blizzard of February 13–14, 1923, in the northern plains. p. 45.
Clayton, H. H. The use of observations of solar phenomena in weather forecasting in Argentina. p. 34–37. [Abstract.]
Clayton, H. H. Variations in solar radiation and the weather. p. 33–34. [Abstract.]
Eshleman, Cyrus H. The weather and epidemics. p. 48.
Fergusson, S. P., & Covert, R. N. The measurement of the wind. p. 41–44. [Abstract.]
McAdie, Alexander. Dampness indoors and out. p. 38–40. [Abstract.]

Annalen der Physik. Leipzig. Bd. 70. 20 März, 1923.
Werner, O. Über die Schwächung der sichtbaren Strahlung durch künstlichen, homogenen Nebel. p. 480–488.

Astrophysical journal. Chicago. v. 57. April, 1923.
Ramanathan. On the visual and photographic albedo of the earth. p. 177–184.

Aviation. New York. v. 14. April 23, 1923.
Winters, S. R. Lightning protector for balloons and airships. p. 446–447.

Cairo scientific journal. Cairo, Egypt. v. 11. 1923.
Hamed, Mahmud. Experiments with evaporimeters. p. 11–14. (January.)
Fox, H. Munro. Lunar periodicity in living organisms. p. 45–57. (March.)

Ciel et terre. Bruxelles. 39 année. Avril, 1923.
L., E. J. C. Houzeau, météorologiste. p. 95–96.
Navarro, Manuel M. S. Le synméteoroscope Hurtado. p. 74–75.

Ecology. Brooklyn, N. Y. v. 10. January, 1923.
Gates, Frank C. Influence of moonlight on movements of leguminous leaflets. p. 37–39.
Visher, Stephen S[argent]. Tropical climates from an ecological viewpoint. p. 1–10.

Electrical world. New York. v. 81. May 19, 1923.
Peek, F. W. Production of lightning voltage and its significance. Impulse generator develops voltage at the rate of fifty million million volts per second—hazard of omitting shields. p. 1135–1136.

Engineering news-record. New York. v. 90. 1923.
Hayford, John F. Winds and barometric effects on the Great Lakes. p. 665–668. (Apr. 12.)
Lance, J. H. An unusual series of intense rainfalls. p. 798–799. (May 3.)
Danforth, George C. Disastrous Maine floods due to heavy snow storage. Record high water in several streams follows rain on deep lie of snow—Earth dams falls on Union River. p. 891–892. (May 17.)

France. Académie des sciences. Comptes rendus. Paris. t. 176. 1923.
Baldet, F. Contribution à l'étude des parasites atmosphériques. p. 912–914. (26 mars.)
Vegard, L. Sur le spectre de l'aurore boréale et les couches supérieures de l'atmosphère. p. 947–950. (3 avril.)
Besson, Louis. Observation d'un paranthélie dit de 90° p. 1079–1081. (16 avril.)

Geografiska annaler. Stockholm. Årg. 5. 1923. Häft 1.
Ahlmann, H. W., & Tveten, A. The recrystallization of snow into firm and the glaciation of the latter. p. 52–58.
Wallén, Axel. L'eau tombée dans la haute montagne de la Suède. p. 72–104.
Wallén, Axel. L'influence du climat sur les récoltes. p. 105–108.
Wallén, Axel. La sécheresse de l'année 1921. p. 108–109.

Geographical journal. London. v. 61. April, 1923.
Blake, W. T. Some difficulties in flying round the world. p. 273–279.

Great Britain. Meteorological office. Monthly meteorological charts, East Indian seas. London. June, 1923.
Smith, L. A. Brooke-. Steamship route from Colombo and the East to Perim during the S. W. monsoon, with a brief survey of currents, wind, cloud and conditions of visibility in the region of Sokotra and Cape Guardafui.

Great Britain. Meteorological office. Monthly meteorological charts, North Atlantic ocean. London. May, 1923.
Keeton, H. Fog.

India. Meteorological department. Memoirs. Calcutta. v. 24.
Mahalanobis, P. C. On the seat of activity in the upper air. (pt. 1. 1923.)
Mahalanobis, P. C. On errors of observation and upper air relationships. (pt. 2. 1923.)
Field, J. H. On exposures of thermometers in India. (pt. 3. 1922.)

International institute of agriculture. International review of the science and practice of agriculture. Rome. New series. v. 1. January–March, 1923.
Berlinck, E. L. Control of frost attack in San Paolo (Brazil). p. 81–82. [Abstract.]
Ferraz, Sampaio. Forecasting the cold wave in Brazil. p. 80–81. [Abstract.]
Hooker, R. H. The weather and crops in eastern England, 1885–1921. p. 75–78. [Abstract.]
Xavier, R. Effect of climatic conditions on the development and productivity of "Champagne" maize in S. Simão (S. Paolo), Brazil. p 78–80. [Abstract.]

Japanese journal of astronomy and geophysics. Transactions and abstracts. Tokyo. v. 1. no. 5. 1923.
Fujiwhara, Sakuhei. On the growth and decay of vortical systems and the mechanism of extratropical cyclones. p. 125–182. (With foreword by Sir Napier Shaw, p. i–ii.)

Journal de physique. Paris. 6e sér. t. 4. Mars, 1923.
Duclaux, J., & Jeantet, P. La limitation du spectre solaire ultraviolet. p. 115–120.

Kolloid-Zeitschrift. Dresden. Bd. 31. November, 1922.
Schmauss, A. Kolloidchemie und Meteorologie. p. 266–269.

Literary digest. New York. v. 77. April 7, 1923.
Belden, W. S. How storms march. p. 28–29. [Abstract from School science and mathematics.]

Meteorologia pratica. Montecassino. Anno 4. Gennaio–Febbraio, 1923.
Agamennone, G. Sopra alcuni tipi di accelerometri sismici. p. 31–36.
Colombo, Gian Luigi. L'azione del freddo sull' occhio dell' aviatore. Danni e difese. p. 4–10.
Crestani, G. Le informazioni meteorologiche e la stampa cotidiana. p. 22–25.
Ferrara, G. La neve e l'uomo. p. 15–18.
Inverni eccezionali. p. 47–48.
Leonardi, Evelino. Il freddo, il caldo e la salute dell' uomo. Effetti sulle gestanti e sui neonati. p. 1–3.
Mendini, Giuseppe. La mortalità nelle diverse stagioni. p. 20–21.
Paoloni, B. A proposito della probabile riforma del calendario Gregoriano. Vantaggi per la meteorologia. p. 26–30.
Salvi, Vicenzo. Geografia e clima della tubercolosi. p. 11–14.
Zanon, F. S. Sulla priorità di un apparecchio preavvisatore dei temporali. p. 36–37.

Meteorological magazine. London. v. 58. 1923.
Bonacina, L. C. W. Solar radiation at South Kensington: 1913–1920. p. 27–30. (March.)
Chree, C. Solar radiation and the 27-day interval. p. 25–27. (March.)
Harries, Hy. Toy balloon "races" from Brighton. p. 30–32. (March.)
Mr. John Henry James. p. 43. (March.) [Obituary.]
Botley, Cicely M. Meteorology and folklore: More about the wind. p. 56. (April.)
Douglas, C. K. M. Winter thunderstorms. p. 51–52. (April.)
Whipple, F. J. W. The nature of atmospherics. p. 49–51. (April.)

Meteorological society of Japan. Journal. Tokyo. v. 42. March, 1923.
Misawa, Katue. [On the glaze storm of 22 and 23 Jan., 1923, in Nagano Prefecture.] p. 45–49. [In Japanese, with English abstract.]
Watanabe, Masayuki. [On the coldest and warmest seasons.] p. 49–55. [In Japanese, with English translation.]

Meteorologische Zeitschrift. Braunschweig. Bd. 40. April, 1923.
Defant, A. Bodentemperaturen am Radcliffe-Observatorium in Oxford, 1898 bis 1910. p. 119–120.
Eckardt, W. R. Das Rätsel der Nachtwinde am Kongo. p. 120–121.
Eckardt, W. R. Volkommene Lufttrockenheit auf dem Kahlen Asten. p. 121.
Georgii, Walter. Die Luftströmung über Gebirgen. p. 108–112.
Heidke, P. Quantitative Begriffsbestimmung homogener Temperatur- und Niederschlagsreihen. p. 114–115.
Kassner, C. B. Sresnewskij, Meteorologische Kennzeichen der Dürre in Kiew 1890 bis 1921. p. 123–125.
Loewe, Fritz. Nochmals: Historisches zum Lenard-Effekt. p. 115–116.
Milch, W. Über Bjerknes' Dynamik der Wirbel und Wellen. p. 104–108.
Seilkopf, Heinrich. Über die Windhose von Frankfurt a. d. Oder am 18 Juli, 1918, und die Beziehungen zwischen Wetterlage und Trombenbildung. p. 97–103.
Stade, H. Erich Barkow. p. 113–114. [Obituary.]
Wiese, W. Resultate der meteorologischen Beobachtungen der Sedoffschen Polarexpedition in der St. Phoka Bay auf Nowaja Semlja 1912 bis 1913. p. 116–118.

Nature. London. v. 111. 1923.
D[avison], C[harles]. Count Fernand de Montessus de Ballore. p. 506. (Apr. 14.) [Obituary.]
Dines, W. H. The cause of anticyclones. p. 495. (Apr. 14.)
Simpson, G. C. The water in the atmosphere. Suppl. p. v–xii. (Apr. 14.)
Bonacina, L. C. W. Climatic continentality and oceanity. p. 549. (Apr. 21.)
Low, A. R. Use of the millibar in aerodynamics. p. 535. (Apr. 21.)
D[avidson], C. Depth of earthquake foci. p. 585. (Apr. 28.)
Saleeby, C. W. Sunlight and disease. p. 574–576. (Apr. 28.)
Duffield, W. G. A meteorological disturbance of an oscillatory character. p. 598–599. (May 5.)
B[onacina], L. C. W. Sunshine-recording. p. 650. (May 12.)
Goldie, A. H. R. The cause of anticyclones. p. 634–635. (May 12.)
Swann, W. F. G. The earth's electric and magnetic fields. p. 640–642. (May 12.) [Repr. J. Frank. inst.]

Nature. Paris. 51 année. 1923.
Haret, Michel. Le rayon vert. suppl. p. 113–114. (7 avril.)
Bellair, Georges. Les facteurs climatériques de la fructification des arbres. suppl. p. 129–130. (21 avril.)
Lévine, Joseph. La climatologie comparée des années 1921 et 1922. p. 245–248. (21 avril.)
Montessus de Ballore, M. de. suppl. p. 18. (5 mai.) [Obituary.] [With portrait.]

Naturwissenschaften. Berlin. 11 Jahrg. 30 März. 1923.
Schmidt, F. Neue Beiträge zur Zodiakallichtforschung. p. 259–260. [Abstract.]

Paris. Services techniques d'hygiène. Annales. t. 3. 1922.
Besson, Louis. Les halos à Paris d'après vingt années d'observations. p. 23–29.
Besson, Louis. La neige à Paris d'après cinquante années d'observations. p. 1–15.
Besson, Louis. Remarques sur la sécheresse de 1920–1921. p. 112–119.
Hauteur et vitesse des cumulus à Paris. p. 16–22.

Philosophical mazazine. London. v. 45. April, 1923.
Whipple, F. J. W. The disturbance of the uniform temperature of the stratosphere by the vertical displacement associated with horizontal motion governed by the "geostrophic law." p. 778–782.

Physical review. Lancaster, Pa. v. 21. 1923.
McAdie, Alexander. Velocity of sound in free air and type of air structure. p. 377–378. (March.)
Van Dyke, Karl Skillman. The coefficients of viscosity and of slip of air and of carbon dioxide by the rotating cylinder method. p. 250–265. (March.)
Mackell, James F. The influence of the earth's potential-gradient upon measurements of the mean ionic density of the atmosphere by the Ebert ion-counter. p. 436–448. (April.)
Swann, W. F. G. The theory of the action of the earth's potential-gradient in measurements with the Ebert ion-counter. p. 449–455. (April.)

Physical society of London. Proceedings. London. v. 32. April 15, 1923.
Chree, C. A supposed relationship between sunspot frequency and the potential gradient of atmospheric electricity. p. 129–136. [Abstract.]

Popular astronomy. Northfield, Minn. v. 31. May, 1923.
Marvin, Charles F. Leap year rules and calendar accuracy. p. 298–308.

Reale accademia dei Lincei. Atti. Roma. (5) Rendiconti. v. 31, fasc. 11. 1922.
Eredia, Filippo. Sul massimo notturno della temperatura dell' aria all' Etna. p. 508–513.

Royal astronomical society. Monthly notices. Geophysical supplement. London. v. 1. May, 1923.
Dyson, Frank, & Furner, H. The earth's magnetic potential. p. 76–88.
Turner, H. H. Revision of the Jamaica earthquakes (1880–1919) for a corrected value of the suggested period near 21 minutes. p. 88–89.

Royal society of Edinburgh. Proceedings. Edinburgh. v. 42, pt. 3 session 1921–1922.
Mill, Hugh Robert. Henry Newton Dickson, M. A., S. C. (Oxon.) p. 386–389. [Obituary.]

Royal society of London. Proceedings. London. Series A. v. 103.
Watt, R. A. On the nature of atmospherics. p. 84–102.
Womersley, W. D. The specific heats of air, steam, and carbon dioxide. p. 183–184.

Royal society of South Africa. Cape Town. v. 11, pt. 1. 1923.
Sutton, J. R. The control of evaporation by the temperature of the air. p. 5–13.

Science. New York. v. 57. May 18, 1923.
Abbot, C. G., & colleagues. The solar prelude of an unusual winter. p. 594–595. [Abstract.]

Scientific monthly. New York. v. 16. May, 1923.
Ward, Robert De C. Cold waves, northers, and blizzards in the United States. p. 449–470.

Seismological society of America. Bulletin. Stanford university. v. 12. December, 1922.
McComb, H. E. An investigation of the Milne-Shaw seismograph. p. 220–226.
Taber, Stephen. The seismic belt of the greater Antilles. p. 199–219.
Willis, Bailey. The Chinese earthquake of December, 1920. p. 227–230.

Sociedad científica "Antonio Alzate." Memorias y revista. México. Tomo 40.
Uribe, David M. Breves apuntes sobre la climatología dell valle de Tulancingo. p. 485–496. (núms. 7–9.)
Compañia Méxicana de Luz y Fuerza Motriz. Datos pluviométricos recogidos en la region de Necaxa. Anotados en milimetros y fracción. opp. p. 696. (núms. 10–12.)
Lépez, Elpidio. Influencia de la desecación del Lago del Texcoco sobre el clima dell Valle de México. p. 631–642. (núms. 10–12.)

U. S. air service. Washington, D. C. v. 8. May, 1923.
Meisinger, C. LeRoy. The aviator and the meteorologist. p. 31–32.
Sherry, B. J. Wind conditions at time of airplane accidents. p. 44.

Zeitschrift für angewandte Geophysik. Berlin. Bd. 1. Februar, 1923.
Gutenburg, B. Neue Methoden zur Bestimmung der Herdtiefe von Erdbeben aus Aufzeichnungen an herdnahe gelegenen Stationen. p. 65–75.

Zeitschrift für Gletscherkunde. Leipzig. Band 13. Februar, 1923.
Paschinger, V. Die Eiszeit ein meteorologischer Zyklus. p. 29–65.

Zeitschrift für Instrumentenkunde. Berlin. 40 Jahrgang. 1920.
Schmidt, Wilhelm. Das Aufzeichnen rascher Luftdruckwellen durch Aneroidbarographen. p. 153–156. (August.)
Mainka, C. Über die Registrierung mit Hilfe eines Gasstrahles bei Seismometern. p. 195–199. (Oktober.)

SOLAR OBSERVATIONS.

SOLAR AND SKY RADIATION MEASUREMENTS DURING APRIL, 1923.

By HERBERT H. KIMBALL, In Charge, Solar Radiation Investigations.

For a description of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to this REVIEW for April, 1920, **48**:225, and a note in the REVIEW for November, 1922, **50**:595.

From Table 1 it is seen that direct solar-radiation intensities averaged slightly below the normal values for April at Lincoln, Nebr., and close to normal at Washington, D. C., and Madison, Wis.

Table 2 shows for all three stations only unimportant departures from the average total amount of solar and sky radiation received on a horizontal surface during April.

Skylight-polarization measurements obtained at Washington on 12 days, give a mean of 52 per cent, with a maximum of 64 per cent on the 24th. At Madison, measurements obtained on four days during the last half of the month give a mean of 58 per cent, with a maximum of 65 per cent on the 18th. These are slightly below average values for April at the respective stations.