lars, Pittsburg alone suffering to an amount variously estimated at from one to three millions.

Flood stages were first reached on the lower Mississippi on the 21st, but at the end of the month the flood line had not been reached at Greenville, Miss., while the crest had just past New Madrid, Mo.

Following are the flood and crest stages at the various stations of observation from Pittsburg to Cairo, with the dates of the crests:

Station.	Flood stage.	Crest stage.	Date.
	Feet.	*Feet.*	
Pittsburg, Pa.	22	30.7	16
Beaver Dam, Pa.	27	41.3	16
Wheeling, W. Va.	36	42.8	17
Parkersburg, W. Va.	36	41.2	18
Point Pleasant, W. Va.	39	45.7	19
Huntington, W. Va.	50	48.1	19
Catlettsburg, Ky.	50	49.2	19
Portsmouth, Ohio	50	50.9	19
Maysville, Ky.	50	48.9	20
Cincinnati, Ohio	50	51.3	20
Madison, Ind.	46	41.5	21
Louisville, Ky.	28	24.7	21
Evansville, Ind.	35	40.9	23, 24
Mount Vernon, Ind.	35	41.3	25
Paducah, Ky.	40	40.9	26
Cairo, Ill.	45	44.9	26

The Wabash River reached a stage of 18.9 feet at Terre Haute, Ind., on the 20th, 2.9 feet above flood stage, and 23.2 feet at Mount Carmel, Ill., on the 24th, 8.2 feet above flood stage. Excellent warnings were also issued for the interior rivers of Ohio, and they were of great value to all concerned.

No damage of consequence was caused by the flood in the Illinois River, altho the crest stages were from 3 to 7 feet above the flood line. Warnings were issued on the 13th and 14th.

Nearly all of the rivers of the Middle Atlantic States and New England were in flood on the 16th and 17th, accompanied by the breaking up of the ice, but as warnings had been given a few days in advance, the damage was reduced to a minimum.

Flood stages also occurred in most of the rivers of the South Atlantic and east Gulf States, but without unusual incident, as warnings were issued at the proper time. These warnings were of special value to the cattle and lumber interests. The greatest rises occurred in the rivers of Alabama.

By the end of the month normal conditions had been resumed, except in the lower Ohio, lower Mississippi, Illinois, and Wabash rivers, where high stages continued.

On February 4 the first warning was issued for the Gila River of Arizona, and altho no flood was anticipated, the warnings of a moderate rise in the lower river were of value.

ICE.

At the end of the month the Mississippi River was frozen over almost as far south as Davenport, Iowa, which was about the southern limit at the end of February, 1907. It had been frozen over as far as Hannibal, Mo., but opened on the 14th at Davenport, on the 25th at Muscatine, Iowa, and on the 12th at Hannibal. Floating ice was observed early in the month as far south as New Madrid, Mo.

The Missouri River remained closed as far down as Sioux City, Iowa, and for some distance below. It had been closed at Omaha, Nebr., but opened on the 12th. There were occasional gorges below early in the month, and navigation in and out of Hermann, Mo., was suspended from the 1st to the 10th inclusive.

The Ohio River remained open, altho floating ice was frequently observed during the first half of the month.

The middle Atlantic and New England rivers were generally frozen at the beginning of the month, but the thaw of the 13th and 14th broke up the ice except in eastern New England.

The southernmost point from which ice was reported was Weldon, N. C., on the Roanoke River, where floating ice was observed from the 3d to the 6th, inclusive.

SNOW.

The following information has been condensed from the snow bulletins issued in the Western States, where the water supply for irrigation purposes is dependent upon the amount of run-off from melted snow.

Arizona.—There was much more snow than the combined fall of the two previous months; the snow is well packed, and the prospects of a plentiful water supply are now very favorable.

Colorado.—Over the northern watersheds the snowfall was deficient, but over the southern portion it was, as a whole, in excess of the normal amount. Conditions appear to indicate an early flow of water, with a deficient supply over the central and northern portions of the State.

Idaho.—The greater portion of the snow fell over the northern end of the State, where the fall had hitherto been deficient. The snow is compact, and an average flow of water is indicated, except in the Wood, Boise, and Salmon River districts.

Montana.—Altho there was a material increase in the snowfall, the flow of water for navigation and mining purposes will be inadequate.

Nevada.—There was a general increase in the depth of accumulated snow, but without exceptionally favorable conditions in March, the flow of water will be deficient.

New Mexico.—Conditions on the whole are fairly favorable, except over the Canadian watershed, and the extreme southwestern portion of the territory.

Utah.—While the snowfall for February was deficient, yet that left on the ground is well packed and prospects of a good water supply are favorable. The lakes and streams are high for the season.

Oregon.—There is much less than the usual amount of snow on the ground, owing both to deficient supply and the excess of rain. The run-off will consequently be less than usual.

California.—A good supply of water is indicated.

Washington.—The winter snow has thus far been deficient, and the flow of water will probably fail to meet all requirements.

Wyoming.—The snowfall of the month was light, but what remains is well packed, and a good supply of water is indicated, except possibly over the eastern slope of the Big Horn Mountains, where more snow is needed.

The highest and lowest water, mean stage, and monthly range at 207 river stations are given in Table IV. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY.

H. H. KIMBALL, 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 aeronaut. St. Louis. v. 1. Feb.-Mch., 1908.
Clayton, Henry Helm. The use of air currents in ballooning. p. 111-115.

American philosophical society. Proceedings. Philadelphia. v. 46. Oct.-Dec., 1907.
See, T. J. J. The new theory of earthquakes and mountain formation, as illustrated by processes now at work in the depths of the sea. p. 369-416.

India. Meteorological department. Memoirs. Calcutta. v. 18, pt. 3.
Eliot, Sir John. A discussion of the anemographic observations recorded at Lucknow from July, 1878, to October, 1892. p. 373-430. [Includes description of the climate.]
Eliot, Sir John. Discussion of the anemographic observations recorded at Allahabad from September, 1890, to August, 1904. p. 283-371. [Includes description of the climate.]

Nature. London. v. 77. March 5, 1908.
Evans, J. W. The possibility of life on Mars. p. 413.

Popular astronomy. Northfield, Minn. v. 16. Mch., 1908.
Sperra, William E. A night mirage. p. 164-167.

Royal meteorological society. Quarterly journal. London. v. 34. Jan., 1908.
Dines, W. H., and others. The international balloon ascents, July 22-27, 1907. p. 1-14. [Contents: I. The registering balloon ascents in England of July 22-27, 1907; preliminary account. II. Results of the balloon ascents made from Manchester, July 22-28, 1907. III. Balloon experiments in Dublin, July 22-27, 1907.]
—— The dispersal of fog. p. 14. [Note on proposed experiments by Maggiora in London.]
White, Margaret, and others. Discussion of the meteorological observations at the British kite stations, 1906-1907. p. 15-25.
—— Audibility of clock bells. p. 26.
—— Influence of temperature on the iron railway viaduct at Crumlin. p. 26.
—— The Furness railway wind gage.
Ley, C. H. The possibility of a topography of the air based on balloon observations with special theodolites. p. 27-45.
—— Dust devil. p. 45-46.
Strachan, Richard. Indications of approaching frost. p. 47-50.

Science. New York. New series. Mch. 6, 1908.
Schaeberle, J. M. The earth as a heat-radiating planet. p. 392-393.

South African philosophical society. Transactions. Cape Town. v. 18, pt. 3, 1907.
Sutton, J. R. On the lunar cloud period. p. 313-320.

Symons's meteorological magazine. London. Feb., 1908.
Boeddicker, Otto. Black rain in Ireland, October 8-9, 1907. p. 2-4.

Terrestrial magnetism and atmospheric electricity. Baltimore. v. 12. Dec., 1907.
Keeling, B. F. E. Helwan magnetic observatory, Egypt. p. 149-152.
Tittman, O. H. Results of magnetic observations made by the United States coast and geodetic survey at the time of the total solar eclipse of August 30, 1905. p. 153-160.
Everdingen, E. van. The life and work of Maurits Snellen. p. 165-168. [With portrait.]
Schmidt, Adolf. Die magnetischen Observatorien des preussischen meteorologischen Instituts. p. 169-174.
Fleming, J. A. Mean values of the magnetic elements at observatories. p. 175-182. [Gives data for 60 stations.]

Ciel et terre. Bruxelles. 28 année. 16 fév. 1908.
L., E. La trombe du lac de Zug et les trombes. p. 590-599. [Abstract of paper by Früh.]
Rahir, E. Étude des crues et de la température à l'intérieur de la nouvelle grotte de Dinant. p. 590-599.
—— Discours prononcés aux funérailles de M. A. Lancaster, par MM. Mourlon, membre de la Classe des sciences de l'Académie royale; Goedseels, administrateur-inspecteur de l'Observatoire royal; J. Vincent, météorologiste à l'Observatoire royal; G. Lecointe, directeur du Service astronomique, et E. Lagrange. p. 577-589.

France. Académie des sciences. Comptes rendus. Paris. Tome 146.
Bigourdan, G. Sur les principaux centres de tremblements de terre du sol de la France, et sur le réseau des stations sismiques qu'il conviendrait d'établir. (20 jan. 1908.) p. 97-98.
Féry, C., and Millochau, G. Contribution à l'étude du rayonnement calorifique solaire. (3 fév. 1908.) p. 252-254.
Rozet, Cl. Sur la relation entre les ombres volantes et la scintillation. (17 fév. 1908.) p. 325-327.

Nature. Paris. 36 année. 8 fév. 1908.
Troller, A. La résistance de l'air. p. 145-147. [Account of Eiffel's experiments.]

Société belge d'astronomie. Bulletin. Bruxelles. 13 année. Jan., 1908.
L., E. Tremblements de terre et phénomènes météorologiques. p. 44-45. [Note on rain following earthquakes in Chili.]

Annalen der Hydrographie und maritimen Meteorologie. Berlin. 36 Jahrgang. 1908.
Köppen, W. Die Windrichtung in 800 Drachenaufstiegen und 44 "Abreissern" bei Hamburg, 1903-1906. p. 49-63.
Schlenzka, S. Fesselballonaufstiege für meteorologische Höhenforschung an Bord S. M. S. "Planet." p. 63-66.
Schneider, J. Ueber die Änderungen der meteorologischen Elemente zu Hamburg unter dem Einfluss des Mondes. p. 66-71.
K., E. Der Batticaloa-Orkan vom 9. März 1907. p. 83-85.
Lütgens, Rudolf. Die Erklärung der Mistpoeffers oder Nebelknalle. p. 87-88.

Beiträge zur Geophysik. Leipzig. 8. Bd.
Davison, Charles. The relative velocities of earthquake waves and earthquake-sound waves. p. 1-6.
Davison, Charles. The effects of an observer's condition on his perception of an earthquake. p. 68-78.
Rudolph, E. Ostasiatischer Erdbebenkatalog. Verzeichnis der im Jahr 1904 auf den Erdbebenstationem in Japan, Formosa, Manila und Batavia registrierten Störungen. p. 113-218.
Hobbs, William Herbert. On some principles of seismic geology. p. 219-292.
Hobbs, William Herbert. The geotectonic and geodynamic aspects of Calabria and northeastern Sicily. A study in orientation. p. 293-362.
Kövesligethy, R. v. Seismischer Stärkegrad und Intensität der Beben. p. 364-366.
Kövesligethy, R. v. Vorläufige Elementenbestimmung des Cerambebens. p. 400-451.
Fuchs, Karl. Freie Schwingungen der Erde. p. 486-493.
Baumgärtel, Bruno. Ueber eine in der Gegenwart andauernde Erdbewegung. p. 494-498.
Kühl, Wilhelm. Der jährliche Gang der Bodentemperatur in verschiedenen Klimaten. p. 499-564.
Spitaler, Rudolph. Die jährlichen und periodischen Änderung der Wärmeverteilung auf der Erdoberfläche und die Eiszeiten. p. 565-602.

Beiträge zur Geophysik. Leipzig. 9. Band.
Strassburg, K. Haupstation für Erdbebenforschung. Jahresbericht des Direktors der Kaiserl. Haupstation für Erdbebenforschung für das Jahr 1906. p. 140.
Harboe, E. G. Das Erdbeben von Belluno am 29. Juni 1873. p. 96-104.
Harboe, E. G. Das Erdbeben von Charleston am 31. August 1886. p. 105-110.

Berliner Zweigverein der Deutschen meteorologischen Gesellschaft. Jahresbericht. 1907.
Kassner, C. Die Lufttemperatur bei Schnee- und Graupelfall in und um Berlin. p. 13-34.

Gaea. Leipzig. 44. Jahrgang. 1908. März.
—— Die moderne Seenforschung in ihrer Beziehung zu klimatologischen Problemen. p. 155-163. [Abstract of paper by Halbfass.]
—— Die Verteilung der Temperatur in der Atmosphäre am nördlichen Polarkreis und in Trappes. p. 166-169.
—— Die Wasserhose auf dem Zugersee am 19. Juni 1905. p. 169-170.

Meteorologische Zeitschrift. Braunschweig. Band 25. Feb., 1908.
Kassner, C. Meteorologische Erdgloben. p. 49-52.
Kähler, Karl. Flächenhelligkeit des Himmels und Beleuchtungsstärke in Räumen. p. 52-57.
Exner, Felix M. Ueber eine erste Annäherung zur Vorausberechnung synoptischer Wetterkarten. p. 57-67.
Wegener, Kurt. Ueber die zweite Fahrt des Ballons "Ziegler" nach England vom 1. bis 3. November 1907, in 40 Stunden. p. 67-73.
Börnstein, R. Zur Geschichte der hundertteiligen Thermometerskala. p. 73-76. [Repr. Physik. Zeit.]
Liznar, J. Ueber eine Abänderung des Fortinschen Barometers. p. 76-78.
—— Bodenbewegungen und Barometerschwankung. p. 79.
Bauer, L. A. Die Beziehungen zwischen potentieller Temperatur und Entropie. p. 79-82.
Defant, A. T. Okada über den täglichen Wärmeaustausch in einer Schneedecke. p. 82-85.
Exner, F. M. Messungen der Intensität der Sonnenstrahlung in Warschau von Ladislaus Gorczynski. p. 85-87. [Abstract.]
—— Resultate der meteorologischen Beobachtungen zu Cuyabá im Jahre 1906. p. 87.
D., A. T. Okada: Föhnwinde zu Wosan in Korea. p. 88.
Woeikow, A. Klima von La Paz, Bolivien. p. 91. [Abstract of paper by Rudaux.]

Wetter. Berlin. 45. Jahrgang. Jan., 1908.
Börnstein, R. Die Förderung der Wettervorhersagung durch das Beobachten kleiner Luftballons. p. 2-6.
Schulze, Paul. Ludwig Friedrich Kämtz. p. 6-9.
Meissner, Otto. Der Einfluss der Windrichtung auf die Bewölkung in Potsdam (1894-1900). p. 9-13.
Klengel, Friedrich. Die Niederschlagsverhältnisse von Deutsch-Südwestafrika. III. Die aperiodischen Schwankungen des Niederschlages. p. 13-17.

Wiener Luftschiffer-Zeitung. Wien. 7. Jahrgang. Jan., 1908.
König, Roman. Zum "Windschlag." p. 16-17.

Reale accademia dei Lincei. Atti. Roma. v. 17. 1. sem. Fasc. 3.
Trabacchi, C. C. La dispersione elettrica in un luogo sotterraneo chiuso. p. 106-107.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

H. H. KIMBALL, Librarian.

The following titles have been selected from among the 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 loaned for a limited time to officials and employees who make application for them. Anonymous publications are indicated by a ——.

Akerblom, F.
Recherches sur les courants les plus bas de l'atmosphère au dessus de Paris. Upsala. 1908. 45 p. 4° (Nova acta Regiae societatis scientiarum Upsaliensis. Ser. 4. Vol. 2. N. 2.)

Batavia. Royal magnetical and meteorological observatory.
Observations made at the . . . Vol. 28, 1905. Batavia. 1907. xxxvii, 198 p. f°.
Appendices 1-3. Batavia. 1907.

Brendel, Bruno.
Die meteorologischen Elemente der Ostsee-Insel Poel auf Grund 25-jähriger Beobachtungen. Ein Beitrag zur Klimatologie von Mecklenburg-Schwerin. 1906. 56 p. f°. (Beiträge zur Statistik Mecklenburgs. Vom Grossherzoglichen statistischen Amt zu Schwerin. 15 Bd. 1 Heft.)

Costanzo, G. and Negro, C.
Dispersione electrica in giornate temporalesche. (Estratto dagli Atti della Pontificia accademia Romana dei nuovi Lincei. Anno 61. Sessione 1 del 15 dicembre 1907) 6 p. 4°.

Dewar, Daniel.
Atmospheric movements for 1907-8. [London.] 3 p. 24°.

Eiffel, G.
Recherches expérimentales sur la résistance de l'air, exécutés à la Tour Eiffel. Paris. 1907. vi, 98 p. f°.

Eredia, Filippo.
Il regime pluviometrica sulle coste italiane. Roma. 1907. 7 p. 4°. (Estratto dalla Rivista agraria della 1 decade di Novembre 1907.)

Eredia, Filippo.
L'umidità relativa dell'aria sulla riviera Ligure. Roma. 1907. 6 p. 4°.

Fischer, Alfred.
Die Hurricanes oder Drehstürme Westindiens. Gotha. 1908. 70 p. 4°. (Petermann's Mitteilungen Ergänzungsheft Nr. 159.)

Fitzner, Rudolf.
Niederschlag und Bewölkung in Kleinasien. Gotha. 1902. 90 p. 4°. (Petermann's Mitteilungen Ergänzungsheft Nr. 140.)

Gilbert, Otto.
Die meteorologischen Theorien des griechischen Altertums. Leipzig. 1907. iv, 746 p. 8°.

Gregory, J. W.
Climatic variations; their extent and causes. México. 1906. 24 p. 4°.

Hildebrandt, A.
Die Luftschiffahrt nach ihrer geschichtlichen und gegenwärtigen Entwicklung. München. 1907. v, 426 p. 8°. [Contains a chapter on upper air research, with illustrations, including several portraits.]

Hoffmann, Immanuel.
Die Anschauungen der Kirchenväter über Meteorologie. Ein Beitrag zur Geschichte der Meteorologie. München. 1907. viii, 96 p. 8°. (Münchener geographische Studien. 22. Stück.)

India. Meteorological department. Calcutta.
Memorandum on the meteorology of India during Oct. and Nov. 1907... Calcutta. 1908. 5 p. f°.

International meteorological committee.
Règlement de l'organisation météorologique internationale [with lists of members of the International committee and subcommittees]. Berlin. 1908. n. p. 4°. (Circ. n. s. Nr. 2.)

Internationale seismologische Assoziation.
Verhandlungen der vom 16 bis 20 Oktober 1906 in Rom abgehaltenen ersten Tagung der permanenten Kommission der Internationalen seismologischen Assoziation. 207 p. f°.

Japan. Central meteorological observatory.
Results of the meteorological observations made in Japan for each period of five years since 1876 and for the 10, 15, 20, 25, 30 years ending 1905. Tokio. 1906. 159 p. 4°.

Jersey. Observatoire St. Louis.
Bulletin des observations magnétiques et météorologiques. 14. année 1907. Jersey. 1907-8. 34 p. 4°.

Juiz de Fora. Serviço meteorologico.
Boletin do anno de 1907. [Juiz de Fóra. 1908.] 8°.

Krause, —.
Kurze Anleitung zum Verständnis des öffentlichen Wetternachrichtendienstes und der Wetterkarten. Pless. 1907.

Krisch, —.
Barometrische Höhenmessungen und Reduzierungen zum praktischen Gebrauche von Jelineks Tafeln. Wien. 1907. 44 p. 4°.

Livingston, Burton Edward.
The relation of desert plants to soil moisture and to evaporation. Washington. 1906. 78 p. 8°.

Longstaff, T. G.
Mountain sickness and its probable causes. London. 1906. 56°. 8°.

Macnab, John.
Catechism of the laws of storms for the use of sea officers... London. 1907. 5th ed. 70 p. 12°.

Madrid. Observatorio.
Resumen de las observaciones meteorológicas efectuadas en la Peninsula y algunas de sus islas adyacentes durante los años 1899 y 1900. Madrid. 1906. xvi, 356 p. 8°.

Moscow. Imperial university. Meteorological observatory.
Beobachtungen... 1903. Moscow. 1907. 108 p. 8°.
Same. 1904. Moscow. 1907. 109 p. 8°.

Oddone, Emilio.
Les tremblements de terre ressentis pendant l'année 1904. Strassburg. 1907. xi, 361 p. 4°. (Publications du Bureau central de l'Association internationale de sismologie. Série B. Catalogues.)

Oklahoma agricultural experiment station.
Sixteenth annual report, 1906-7. Stillwater, Okla. [1907.] 63 p. 8°. [Includes data of precipitation, by years, 1889-1906.]

Rosenthal, Elmar.
Katalog der im Jahre 1904 registrierten seismischen Störungen. Strassburg. 1907. xii, 145 p. 4°. (Publications du Bureau central de l'Association internationale de sismologie. Série B. Catalogues.)

Schultheiss, Chr.
Die Niederschlags-Verhältnisse des Rheingebietes. Karlsruhe. 1890. 28 p. 4°.

Scottish national antarctic expedition.
Report on the scientific results of the voyage of S. Y. *Scotia* during the years 1902, 1903, and 1904, under the leadership of William S. Bruce. v. 2. -Physics. Pt. 1. -Meteorology, by R. C. Mossman. Pt. 2. -Magnetism, by Charles Chree. Pt. 3. -Tides, by Sir George H. Darwin. Edinburgh. 1907. v, 324 p. 4°.

Stevens, James Stacy.
Meteorological conditions at Orono, Me. Orono, 1907. 52 p. 8°. (The University of Maine studies. No. 7.) [Includes collected data from 1869; describes experiments on evaporation of liquids, and of snow and ice.]

Stormer, Carl.
On the trajectories of electric corpuscles in space under the influence of terrestrial magnetism . . . Kristiania. 1907. 47 p. 8°. (Archiv for mathematik og naturvidensk. Bd. 28. Nr. 2.)

Vincent, J.
Nouvelles recherches sur la température climatologique. Bruxelles. 1907. 120 p. f°. (Extrait des Annales météorologique de l'Observatoire royal de Belgique, année 1907, nouvelle série.)

Zi-ka-wei. Observatoire magnétique, météorologique et sismologique.
Bulletin des observations. Tome 31. Année 1905. Fascicule A. Magnétisme terrestre. Chang-hai. 1907. 64 p. f°.

NOTES FROM THE WEATHER BUREAU LIBRARY.

By C. FITZHUGH TALMAN, Assistant Librarian.

THE KITE STATION ON LAKE CONSTANCE.

Das Weltall for February 15, 1908, contains an illustrated description of the kite station at Friedrichshafen, on Lake Constance, which is to be opened April 1 of this year. This station was established and is to be maintained at the joint expense of the German Empire and the States of Bavaria, Württemberg, Baden, and Alsace-Lorraine, but will be attached especially to the meteorological service of Württemberg. An important part of its equipment is a small steamboat, the *Gna*, which will be used to lift the kites in calm or stormy weather. In the latter case the steamer will run with the wind, thus moderating its effect upon the kite. As Lake Constance is not far from the first-order meteorological station at the top of the Säntis, a good opportunity will be afforded to compare observations at a mountain station with those made in the free air at a similar altitude.

The establishment of this new station is a fresh proof of the great interest taken in upper air research by the German imperial and state governments, which already maintain the most complete aeronautical observatory of the world, at Lindenberg, Prussia, the kite station of the Deutsche Seewarte

METEOROLOGICA