Tennessee.—The mean temperature was 49.5°, or about 2.0° above normal; the highest was 79°, at St. Joseph on the 14th and 15th, and at Union City on the 22d, and the lowest, 13°, at Rugby on the 30th. The average precipitation was 3.10, or about 0.75 below normal; the greatest monthly amount, 6.90, occurred at Hickory Withe, and the least, 0.69, at Bristol.—*H. C. Bate.*

Texas.—The mean temperature for the State during the month was 1.2° above the normal. There was a general excess throughout the State except over the western portion of west Texas and the central portion of north Texas, where there was a deficiency ranging from 0.3° to 1.9°, with the greatest deficit in the vicinity of Weatherford. The excess ranged from 0.3° to 3.1° over central Texas, the panhandle, the western portion of north Texas, and the eastern portions of north and west Texas, and from 0.1° to 3.9° over southwest Texas and the coast district. Temperature was generally normal over east Texas. The greatest excess was in the vicinity of Fort McIntosh. The highest was 96°, at Camp Eagle Pass on the 4th, and the lowest, 8°, at Tulia on the 29th. The precipitation on an average for the State during the month was 1.88 below the normal. There was a general deficiency in all localities except at Fort Ringgold and Fort Brown, where there was an excess. The deficiency ranged from 0.24 to 1.78 over central and west Texas and the panhandle, from 0.66 to 3.38 over southwest Texas and the coast district except in the vicinity of Fort Ringgold. The greatest monthly amount, 3.03, occurred at Fort Brown, while none fell at several stations.—*I. M. Cline.*

Utah.—The mean temperature was 39.3°; the highest was 78°, at Fillmore on the 2d, and the lowest, 1° below zero, at Loa on the 8th and at Soldier Summit on the 24th. The average precipitation was 0.96, or about 0.50 below normal; the greatest monthly amount, 2.44, occurred at Logan, and the least, 0.04, at Pahreah.—*J. H. Smith.*

Virginia.—The mean temperature was 46.5°, or slightly above normal; the highest was 80°, at Ashland on the 16th, and the lowest, 10°, at Burkes Garden on the 24th. The average precipitation was 2.49, or 0.01 above normal; the greatest monthly amount, 4.37, occurred at Bonair, and the least, 0.69, at Bristol.—*E. A. Evans.*

Washington.—The mean temperature was 39.4°, or 2.0° below normal; the highest was 75°, at Walla Walla on the 18th, and the lowest, 10° below zero, at Waterville on the 28th. The average precipitation was 9.13, or 2.90 above normal; the greatest monthly amount, 23.85, occurred at Clearwater, and the least, 0.75, at Loomis.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 45.0°, or 1.0° above normal; the highest was 76°, at Eastbank and Green Sulphur Springs on the 26th and at Uppertract on the 6th. The average precipitation was 4.45, or 1.50 above normal; the greatest monthly amount, 7.15, occurred at Kingwood, and the least, 0.30, at Beckly.—*H. L. Ball.*

Wisconsin.—The mean temperature was 30.4°, or 0.3° above normal; the highest was 79°, at Medford on the 3d, and the lowest, 25° below zero, at Osceola Mills on the 27th. The average precipitation was 1.32, or 0.46 below normal; the greatest monthly amount, 2.99, occurred at Oconto, and the least, 0.04, at Medford.—*W. M. Wilson.*

Wyoming.—The mean temperature was 33.4°, or 1.4° above normal; the highest was 76°, at Wheatland on the 2d, at Fort Laramie on the 3d, and at Sheridan on the 19th; the lowest was 16° below zero, at Sheridan on the 29th. The average precipitation was 0.88, or 0.08 below normal; the greatest monthly amount, 2.98, occurred at Fort Yellowstone, and the least, 0.12, at Carbon.—*W. S. Palmer.*

RIVER AND FLOOD SERVICE.

By PARK MORRILL, Forecast Official, in charge of River and Flood Service.

The period of low water has been unusually protracted this year. As a rule, the annual rise in all the rivers, except the upper Mississippi, the Missouri, and the Arkansas, is well underway by the first of November. This year the Ohio rose first, and that but slightly, the rise beginning on November 7. The lower Mississippi followed with a slow rise during the latter half of November, but the other rivers remain at low ebb. At all points the rivers are below their normal height. The Mississippi, at Keokuk, at the end of November was 1.5 foot below its normal stage; at St. Louis, 3.4 feet; at Cairo, 7.6 feet; at Memphis, 7.3 feet; and at Vicksburg, 14.2 feet. The Arkansas River, at Little Rock, at the same time was 4.7 feet below its normal stage; the Red, at Shreveport, 9.8 feet; and the Ohio, at Cincinnati, 1.5 below. The rising condition of the Ohio and the lower Mississippi and the stationary low stage of other rivers of the Mississippi system are seen in the hydrographs for the month.

The highest and lowest water, mean stage, and monthly range at 116 river stations are given in the accompanying table. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Cairo, Memphis, and Vicksburg, on the Mississippi; Cincinnati, 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.

The following résumé of river stages and conditions of navigation in the respective streams is compiled from reports by the officials of the Weather Bureau at various river stations and section centers:

Atlantic Coast Rivers. (Reported by A. F. Sims, Albany, N. Y.; E. R. Demain, Harrisburg, Pa.; E. A. Evans, Richmond, Va.; C. F. von Herrmann, Raleigh, N. C.; L. N. Jesunofsky, Charleston, S. C.; D. Fisher, Augusta, Ga.; and J. B. Marbury, Atlanta, Ga.)—The heavy rain of the 1st and 2d of November found its way to tide-water rapidly, so that by the 4th of the month the Hudson River at Albany was 4 feet above the normal. The stream flowing by the intake of the Albany City Waterworks was very turbid, and the city pumps were shut down in consequence. A dense fog, the heaviest thus far this season, prevailed along the Hudson on the 5th; one could not see objects across the river and buildings near by seemed mere shadows; the sun a dull red blot in the gray sky. At 10 a. m. the fog lifted and soon cleared away. Light snow fell on the upper watershed on the 13th.

Observations of temperature of water were commenced on the morning of the 18th; the temperature of the water in the Hudson at Albany was 39.5° on that date. On the 19th the river temperature was 37.5° at top and bottom; thin ice, the first of the season, formed along the edges of the basin in the vicinity of Green Island. The fall in temperature on the 18th and 19th checked the flow of surface water on the upper watershed and caused the river to fall to its normal height at Albany. On the 23d thin ice formed in the Erie Canal slips; thin ice formed in the Albany basin during the night of the 23d and 24th. The cold wave of the 23d lowered the air temperature to 12.5° and the water temperature to 35.5°.

On the 28th there was a 4-foot freshet in the river and swift current conditions, not conducive to a freeze-up. The fall in temperature experienced during the night of the 28th checked the flow of surface water in the feeders and lowered the tide-water portion of the Hudson 1 foot. At the end of the month the Hudson was high for the season, very turbid, and the current abnormally swift.

All river interests have made preparation to go into winter quarters; the Albany basins have already taken on a winter aspect. Some of the International Dredging Company's boats, used on the Hudson River improvements, are now being dismantled, and other boats, requiring extensive overhauling, are now in winter berths. Forwarding agents have ceased to take cargoes for points along the upper portion of the Hudson on account of the risk involved in unloading boats in shallow water at this season of the year. The last decade of November was replete with calls for river information, and no small measure of reward for our work comes with the increased confidence manifested by all river interests in the work of the Weather Bureau.

As a result of the rain, averaging 1.75 inch, which began to fall early on the morning of November 1, and continued steadily until the night of the 2d, throughout the greater portion of the Susquehanna basin, the low stages of water prevailing in all streams of the system at the end of October were followed during the first few days of November by a general rise, ranging from a fraction of a foot to 4.5 feet at the different reporting stations. Frequent, well distributed rains during the rest of the month maintained and gradually increased the flow, and November closed with higher stages of water at most of the stations than have been reported since May. The average stage of water was about 0.5 foot lower than during the same period last year, notwithstanding the fact that there was an increase of about 50 per cent in the rainfall as compared with November, 1896. The rainfall at Harrisburg (4.09 inches) was, with two exceptions, the largest amount that has fallen in November during the past ten years, and exceeded the normal by 1.12 inch. It is believed Harrisburg represents, approximately, the conditions obtaining generally over the watershed. The apparent discrepancy between rainfall and river stages in the streams the past month is due to the fact that at the beginning of the month the streams were so much lower than at the same time last year that a large percentage of the rainfall was required to give the same flow as

obtained at the beginning of November, 1896. The increased rainfall and rising waters have carried a great quantity of coal culm into the Susquehanna, and the water at Harrisburg, and probably at all points below the coal fields, is black and almost unfit for use.

With the exception of a few days in the first and last decades the James River remained below the zero of the gauge at Richmond throughout the month. Showers over the river basin during the last day of October and the 1st and 2d of November caused a slight temporary rise, during which the water reached a maximum of 1.0 foot on the gauge on the 3d. The river then declined slowly and steadily to —0.3 foot, at which point it remained stationary until the 30th, when another slight rise occurred. No unusual conditions were present at any time, the stream remaining at about its normal November stage.

The general conditions which have made the present year so noteworthy in the hydrographic history of North Carolina continued during November, although all the rivers maintained slightly higher stages than last month. Heavy rains occurred on the 1st and 2d of November, chiefly over the basin of the Cape Fear River, which responded by a moderate rise on the 3d to a stage of nearly 10 feet. Then followed another period of extremely dry weather from the 3d to the 26th with practically no precipitation anywhere, during which the rivers declined to relatively low stages, but slightly modified by the light rains of the 26th to 29th. The northern rivers have hardly been influenced at all, the Dan, at Clarksville, remaining slightly above the zero of the gauge the entire month.

The month opened with general and moderate rainfall over the upper river basins of South Carolina, but owing to the unusually low gauge readings then prevailing the amount of drainage was scarcely sufficient to maintain navigable stages on some of the streams from the 1st to the 5th. Navigation on the Peedee above Gibson, 60 miles upstream from Smiths Mills, was suspended the entire month. At Cheraw the gauge registered 0.9 foot from the 14th to the 24th, this being the most prolonged stage of low water recorded in ten years, and within 0.9 foot of the extreme low water of August 27, 1866. Between Winyah Bay and Smiths Mills steamers made regular trips from the 1st to the 17th. After the 17th the water had receded to such a low stage (1 foot) that navigation became absolutely dangerous from snags, and the trips were discontinued. These conditions have not occurred on the lower Pedee since the establishment of the river service in 1890. The 4-foot rise at Cheraw on the 28th had not reached Smiths Mills by the 30th, and steamers could not reach the latter point. The Congaree, at and below Columbia, was unnavigable during the entire month.

Although very low water prevailed throughout the month, regular trips were made up the Waccamaw to Conway. The only rise of any note upon this stream was 1.2 foot, which occurred between the 27th and 30th. Owing to scant steamboat water there was but little merchandise carried up to the Edisto from the 1st to the 14th. Navigation was suspended between the 15th and 30th. The logging season has begun on the upper Edisto; there is at present considerable newly cut timber in readiness for booming in that locality. The Lynch River was open for navigation to small steamers of light draught from Smiths Mills to Effingham. This stream rose 1.9 foot from the 4th to the 9th; there was a rapid fall of 2.7 feet on the 10th and 11th. Practically no business at all was done upon the Lumber River. The Little Pedee showed corresponding fluctuations, with the exception of navigable water from Port Harrelson, at its confluence with the Pedee, up to Centenary from the 2d to the 9th. Traffic was quite brisk up the Black River from Winyah Bay to Harpers; beyond Harpers, and extending up to Kingstree, the low-water stages did not even admit of steamers of light draught plying.

The brackishness of the lower Black, the lower Pedee, and lower Waccamaw rivers, noted in the last report, continued unabated, and have been somewhat intensified, as there was less rain than in October. Many of the mill owners along the streams, whose boilers are fast corroding from the use of the intruding salt water, are drawing spring-water long distances to feed their boilers. Others have bored deep wells upon their mill property, and utilized the artesian water for boilers. The most successful in this respect is the Gardner & Lacey Lumber Company of Georgetown. After boring to a depth of 560 feet a vein was struck yielding a constant flow of 55 gallons to the minute. The water is clear, entirely free of sodium, which is so destructive to boilers, and pleasant to the taste. The success attained in this work of deep well borings has proved highly satisfactory. The constantly brackish condition of the river water over the upper Winyah Bay section during dry seasons has entailed much loss of labor and time to the sawmill and rice interests in past years.

The quantity of rainfall throughout the Savannah Valley during November was below the normal over the central and lower basin, and in consequence the river was barely at a navigable stage for the greater portion of the month; the difficulties in boating that were encountered in the previous month were again repeated, and but few trips were made with even approximately full cargoes. Cotton, which forms the chief commodity of river traffic at this season of the year, was mostly shipped by rail from points along the water route, entailing an additional expense to the planter and a consequent loss to the boating interests.

Abnormally dry weather prevailed throughout the drainage area of the other rivers of Georgia, and as a consequence very low water continued, rendering navigation impossible. At Columbus, Ga., there are several steamboats resting on sandbars and unable to move until a sufficient rise comes to float them.

Mobile River and branches. (Reported by F. P. Chaffee, Montgomery, Ala., and W. M. Dudley, Mobile, Ala.)—The rainfall over the watershed of the Alabama River was so light and scattered during this month as to have little effect on the rivers of this system. Low waters prevailed in all the tributaries, and stages below zero of gauge ruled in Alabama during the entire month, during which steamboat traffic was suspended on account of low water. Many of the creeks and smaller streams were entirely dry during the greater portion of the month.

Heavy rains on the 1st caused general but slight rises in the Tombigbee and its tributaries on the 1st and 2d. The rivers showed but slight variation until the 9th, when the general rain on that date caused slight rises in the rivers, extending to the 11th, when they began falling, and so continued until the 27th. The light rain reported on the morning of the 29th caused a slight rise to the close of the month. The rivers remained below the zero of gauge during the entire month. Boats ran regularly during the month, but low stages prevented them going so high as Demopolis.

Ohio River and branches. (Reported by F. Ridgway, Pittsburg, Pa.; H. L. Ball, Parkersburg, W. Va.; S. S. Bassler, Cincinnati, Ohio; F. Burke, Louisville, Ky.; P. H. Smyth, Cairo, Ill.; L. M. Pindell, Chattanooga, Tenn.; and H. C. Bate, Nashville, Tenn.) —Owing to the fact that navigation has been practically closed since the last week of September, and was not reopened until the rains of the first decade of the month, greater activity in boating interests than is usually displayed at this season of the year characterized this month. The long continued drought had so parched the valleys at the headwaters of the Ohio that considerable rainfall occurred before the rivers were materially affected, but after the first ten days of the month the valleys of the smaller tributaries had become so saturated that a moderate amount of rainfall would sustain uninterrupted navigation for "packet" boats. The rains of the 15th, 16th, and 17th were sufficient to cause a rise in the Ohio river to the "barge" stage on the 18th and 19th, while the rainfall on the 23d and 27th swelled the Monongahela and Alleghany rivers to such an extent as to cause a "coal-boating" stage in the Ohio on the 28th and 29th. This rise, being quickly taken advantage of, continued long enough to permit of the shipping of the entire supply of coal that had been stored in the harbor here for the down-river markets. During the first five days of this rise 13,929,000 bushels of coal passed Davis Island on its way to southern ports.

The recent general rise in the Alleghany and its tributaries, where open navigation obtains, has enabled timber operators and others to ship into the Pittsburg markets their entire season's product of timber, lumber, barges, boats, etc., from all points within 200 miles of this port. Necessarily this month's increase in the stage of the rivers will interfere with all construction work that may be in progress in the streams; but, on the other hand, it has proven of inestimable value to the general public depending on the Ohio River for its coal supply.

The Ohio at Parkersburg at the opening of the month showed a stage of 0.9 foot, the lowest of the month. Moderately heavy rains fell over West Virginia on the 1st, 2d, and 3d, and these caused a slow rise in all the rivers. Rains were frequent during the first half of the month, and the rise in the rivers, though light, was steady and continuous. On the 9th light craft began running on the Ohio, and by the 15th boats of moderate draught were plying. A stage of 10 feet was reached at Parkersburg on the 18th, and navigation was then open to all craft. After the 21st the river fell slowly to a stage of 6 feet on the 26th, but general rain occurred about that time and started the third rise of the month. At Parkersburg a maximum stage of 13.7 feet was reached on the 30th. The tributary rivers of West Virginia were very low at the opening of the month, but the frequent rains brought a change, and by the 15th all the navigable rivers were running freely. After a long period of dullness business was quickly resumed, and at the close of the month was reported as brisk and increasing in volume.

The low stage of water at Cincinnati and consequent suspension of river business, which characterized the months of September and October, continued during the first week of November, after which a sudden rise in the Licking caused a rise in the Ohio, which was reinforced by a rise from the upper Ohio. On this rise the *Telegraph* left for Louisville, the first sidewheel steamer to leave port in thirty-seven days. The latter part of the month the river had a rising tendency and reached a stage sufficient to float a big fleet of Pittsburg coal boats, bringing coal to this and lower markets, on the 23d. This rise was opportune, since the supply of coal on hand was rapidly being exhausted. In the latter part of the month navigation was more or less active, though a better stage of water is necessary to meet the requirements of the river business that has been delayed by reason of the prevailing low water.

The river at Louisville maintained too low a stage during the first eight days of the month to permit navigation of any other than very light boats. The rains of the 8th and 9th caused a sharp rise, however, which lasted but a few days, the river then relapsing into its former state. On the 17th a rise began, which continued gradually and almost

without cessation to the close of the month. The water was sufficiently high to permit of the running of some of the heavier class of boats, and, also, to cause the suspension of the operations of the United States engineers on the falls.

At Evansville, from the 1st until the morning of the 10th, the river stage changed but little, with a general rising tendency. On the 10th a more marked rise began which continued until the 14th. The river then fell for four days, when another rise set in which continued until the end of the month.

At Paducah and Cairo the river was very nearly at a stand from the 1st to the 9th, but during the 2d and 3d decades material improvement was in progress, except for a slight fall covering a period of three or four days. A fair stage of water obtained at Cairo and Paducah at the close of the month. The Paducah and Cairo Packet Company resumed trips between Paducah and Cairo on the 22d, and the Tennessee Packet Company extended their trips up the Ohio to Paducah on the 26th. The steamer *Buckeye State*, from the upper Ohio, arrived at Cairo on the 28th, resuming her regular trips between Cincinnati and Memphis. This steamer has, on account of low water, been laid up at Cincinnati since last August. A second steamer from the upper Ohio is expected to reach Cairo by December 1. River business has materially improved since the first evidence of a better stage of water, and with continued improvement in the river a general revival of business is expected. Freight offerings are reported to be very free.

At Riverton, Ala., Speers Ferry, Va., and Florence, Ala., the river was below the zero of the gauge the entire month. At Chattanooga the lowest stage was 0.7 foot on the 17th and from the 21st to 29th; the river reached the same stage in 1894. The lowest stage recorded since 1879 was 0.6 of a foot on December 17, 1894. Practically speaking navigation was closed to all but very light-draught boats during the entire month from Riverton to the headwaters. Once or twice during the month the small boat *Ocoee* attempted to go to Kingston, but abandoned the trip and was forced to confine her operations to this section, between Chattanooga and Pinhook. The rainfall ranged from 0.35 inch to 2.66 inches below the normal over the entire system, except at Riverton, Ala., where the rainfall was 2.58 inches in excess. The continued low stage of the river has proven disastrous to river traffic on the Tennessee.

During the month of November, 1897, navigation was closed on the Cumberland River all the month, but the river was rising on December 1, and gave promise of a favorable stage of water in the next few days.

Mississippi River and branches, except the Ohio. (Reported by P. F. Lyons, St. Paul, Minn.; M. J. Wright, Jr., La Crosse, Wis.; G. E. Hunt, Davenport, Iowa; F. Z. Gosewisch, Keokuk, Iowa; H. C. Frankenfield, St. Louis, Mo.; P. H. Smyth, Cairo, Ill.; S. C. Emery, Memphis, Tenn.; R. J. Hyatt, Vicksburg, Miss.; R. E. Kerkam, New Orleans, La.; L. A. Welsh, Omaha, Nebr.; P. Connor, Kansas City, Mo.; F. H. Clarke, Little Rock, Ark.; J. J. O'Donnell, Fort Smith, Ark.; and C. Davis, Shreveport, La.)—Aside from a better stage of water than that for any other November since 1894, as indicated by the extreme gauge readings of 3.9 and 2.3 feet at St. Paul, there is scarcely anything to be said about the rivers of Minnesota for this month. Running ice, the first of the season, appeared on the 23d; and on the 27th, during a sharp cold wave, the Mississippi was nearly choked up with it, and on the succeeding morning was gorged and frozen so that gauge readings could not be made accurately. No sign of river craft of any kind was seen during the month, except in the vicinity of Hastings, Minn., where work on river improvements in charge of the Government engineers was prosecuted to the 10th, when it was suspended for the winter, and the boats put in winter quarters at that place.

The stage of water in the Mississippi River at La Crosse ranged from 3.8 feet on the 1st to 2.3 feet on the 28th. The average stage of water for the month was 2.9 feet. Navigation closed on the 17th. The steamer *Linehan* was the last boat to pass through the drawbridge this season. She went up the river with the *Ethel Howard* at 5 p. m. of the 17th. From the 23d to the 28th the river was covered with floating ice. On the 27th Root River and all sloughs in this vicinity were frozen over, and on the 29th the Mississippi was frozen from both shores nearly to the channel, and in consequence the gauge readings were discontinued on that date. Rafting and Government improvements were discontinued about the middle of the month. The rafting season just closed has been a very successful one.

The water fell rapidly at Dubuque during the last few days of the month, owing to accumulating ice above. The same is true, in a less degree, of several other stations. The river was reported frozen at North McGregor on the 27th and at Leclaire on the 29th. The freezing of the river at Leclaire stopped navigation above Davenport, but the ferryboat was still running at the latter place on the 30th. The rainfall for the month was generally deficient throughout the upper Mississippi Valley.

The river at Keokuk has been at a low stage throughout the month, and the month closes with the lowest stage of the year. Navigation, which has been confined to a few light-draught boats, closed on the 20th, the Des Moines Rapids Canal closing for the season on that date. The first running ice appeared on the 29th, and, at the close of the month, the river is covered with floating ice from 3 to 4 inches in thickness.

Thin ice appeared along the banks of the Mississippi at Burlington on the 28th; it commenced to run on the 29th, and by the 30th the whole river at that point was filled with floating ice, which came to a standstill during the day on account of the cold weather, and commenced to knit into a firm bridge. Ice commenced running past Quincy and Hannibal on the 29th and past Louisiana on the 30th, but none was observed farther south. Light-draught boats continued to ply on the rivers during the greater portion of the month. On the 26th the steamers *D. H. Pike* and *Spread Eagle* were withdrawn from the Illinois River and Alton-Grafton trades, respectively, and left for their winter quarters at Paducah.

Between St. Louis and the mouth of the Ohio the Mississippi continued practically stationary during the month, the greatest 24-hour change being a rise of 0.3 foot at Chester, Ill. The stage of water at the close of the month was 0.2 to 0.5 foot higher than at the opening. A rise out of the Ohio commenced passing Cairo on the 9th, and by the 12th the river was rising from Cairo to Memphis. This rise continued at Cairo until the 18th. A second rise started in at Cairo on the 22d, and was still in progress at the close of the month.

Several towboats, that have been laid up at St. Louis during the extreme low water, came out to Cairo between the 17th and 21st. The Anchor Line steamers plying between St. Louis and New Orleans, but laid up at Cairo on account of low water, will probably resume trips to the south during the first week in December.

The unusually low stages prevailing during October from Cairo to Helena practically continued up to November 15, as the rise over the greater portion of this territory up to that time had been only one-half of a foot. During the last half of the month the river, responding to a good rise in the Ohio, came up more rapidly, and by the end of November a total rise of about 4 feet had occurred at Cairo and Helena, and a little less than 3 feet been added to the Memphis stage, the maximum at the latter place being 2.8 feet, which was reached on the 30th. The monthly average at Memphis was 6.5 feet below the normal for November and 3.3 feet below the recorded stage of 1896. The rise during the month, though slight, was sufficient to cause a very perceptible improvement in navigation throughout this section; accidents became less frequent, and with the general and heavy rains the outlook at the close of the month is favorable for good boating stages in all the rivers in this section. The large shipments which have been delayed on account of the quarantine regulations are now being made, and these, added to the natural volume of business common to this season of the year, together with the large amount of cotton to be moved, is causing unusual activity on the river, and every available boat is brought into service. A large amount of coal is on its way to this section, there being now sufficient water for the movement of a good sized fleet. A large number of snags have been removed by the Government during the month.

Below Memphis the Mississippi and its tributaries were low but navigable during the month, except the Yazoo, which continued closed by the sandbar at its mouth. The rise of the Mississippi toward the close of the month gave assurance of sufficient water at an early date for boats to cross the bar at the mouth of the Yazoo, opening the navigation of that river to the Mississippi. The end of the quarantine on account of the yellow fever about the middle of the month opened up river business with a rush. All boats commenced carrying full cargoes, with good passenger traffic; much cotton was ready for market and awaiting transportation. A new line of steamers has been organized for traffic on the Yazoo and its tributaries by the Vicksburg and Yazoo Transportation Company. The steamer *Memphis*, a recent purchase of the company, will make the first trip from Vicksburg on the 7th of December, by which time there will be ample water for navigation in the Yazoo and its branches.

The Mississippi, below Vicksburg, continued at a low stage during the entire month, the range near Vicksburg being less than 3 feet, and at New Orleans slightly less than a foot and a half. Quarantine regulations in force during the greater part of the month prohibited river navigation to any great extent until its close, when traffic was resumed.

A remarkable feature in connection with the lower Red and Ouachita rivers was that no station on these rivers reported an extreme monthly fluctuation of even as much as 1 foot. There was but little rainfall and the stages continued low, the lower Red readings being below the zero of gauge, and those of the lower Ouachita less than a foot above. Quarantine regulations and the low stages prohibited navigation to any extent, although during the latter part of the month freight was carried on the Ouachita to Harrisonburg, La., on light-draught boats.

The Arkansas River continued at a remarkably low stage during the entire month, averaging 0.8 foot at Fort Smith, —0.5 foot at Dardanelle, and 1.2 foot at Little Rock. The river remained almost stationary at all stations, the extreme fluctuation being 0.3 foot at Fort Smith and 0.2 foot at Dardanelle and Little Rock. Navigation was entirely suspended between Fort Smith and Little Rock, and nearly so on the lower river, the only actual navigation being carried on for a distance of 60 miles up the river from its mouth.

On and after November 10 ice was reported running in the Missouri River above Yankton. By the 17th ice was running so heavily at Fort Pierre as to make the crossing of the river in small boats dangerous. The ferryboat stopped running at Pierre on the 18th, stopping all cattle

shipments until the ice is strong enough to cross on. Ice began running at Sioux City on the 23d, and continued at intervals until the afternoon of the 27th, when the channel became blocked and the ice froze fast, effectually closing navigation at that point.

At Omaha the river continued to fall slowly until the 28th, reaching the lowest point, 3.0 feet above the zero of gauge, on that date. Ice began running on the 22d, and continued until the morning of the 28th, when the river became frozen from bank to bank. On the 29th pedestrians were crossing on the ice. At St. Joseph ice began running on the 27th. On the 29th a gorge formed at the Burlington and Missouri river railroad bridge, and continued at the close of the month.

There was a rise at Kansas City of 1.2 foot during the first decade on account of rain, and a very slow fall afterwards to the end of the month. The range was from 5.0 to 6.2 feet. There was a little shore ice at the end of the month.

Rivers on the Pacific Coast. (Reported by W. H. Hammon, San Francisco, Cal.; J. A. Barwick, Sacramento, Cal.; and B. S. Pague, Portland, Oreg.)—The Sacramento river at Sacramento stood at 8.8 feet on the 1st, and remained stationary until the 20th, when, owing to the general rains from the 20th to 24th, it began to rise on the 21st, and attained a crest of 13.3 feet on the 25th. From the 25th to the end of the month the river fell slowly to a stage of 10.2 feet on the 30th. The other rivers in the northern portion of California showed similar conditions to those in the Sacramento, that is, a stationary stage until the 20th, then a slight rise until the 25th, and then a fall until the last of the month.

Low but not unusual stages of the rivers of Oregon and Washington prevailed during the fore part of the month, but the later rains caused a rise from the 5th. The rises in the Columbia and Snake were not as marked as in the Willamette and the small rivers of western Washington. The height was normal until the 18th, when, owing to heavy rains and snow in the mountains, and chinook winds on the 18th, the rivers and streams west of the Cascades, in Oregon and Washington, had a rapid rise. In the twenty-four hours to 11 a. m. of the 19th the Willamette rose 4.5 feet, and during the succeeding twenty-four hours, 1.4 foot. In western Washington, in the deep, narrow streams, the rise was more marked, and considerable damage was done along streams emptying into Puget Sound from the east. The rise in the Columbia and Snake was beneficial to navigation. During the month large quantities of wheat were carried on steamers from Lewiston, Idaho, to rail shipment at Riparia, and many ships left their docks in Portland, Oreg., loaded with wheat and flour. The wheat shipments by water for China, Japan, England, and France during November amounted to more than 2,000,000 bushels.

Heights of rivers above zeros of gauges, November, 1897.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River.	*Miles*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn.	1,957	14	3.9	2-4	2.3	27	3.4	1.6
Reeds Landing, Minn.	1,887	12	2.6	1,2	1.0	30	1.8	1.6
La Crosse, Wis.	1,822	10	3.8	1	2.3	30	2.9	1.5
North McGregor, Iowa	1,762	18	3.4	1	1.5	28	2.5	1.9
Dubuque, Iowa	1,702	15	3.4	1,2	0.2	30	2.4	3.2
Leclaire, Iowa	1,612	10	1.9	2,3	0.2	30	1.3	1.7
Davenport, Iowa	1,596	15	2.9	3	0.5	30	2.3	1.4
Keokuk, Iowa	1,466	14	1.8	7-10	0.9	29,30	1.3	0.9
Hannibal, Mo	1,405	17	2.6	8,10	1.4	30	2.1	1.2
Grafton, Ill	1,307	23	3.7	9	2.8	1	3.2	0.9
St. Louis, Mo.	1,264	30	4.1	12,16	3.1	1,4,5	3.6	1.0
Chester, Ill.	1,189	30	2.4	17	1.7	1-7	2.0	0.7
Cairo, Ill	1,073	40	7.0	30	2.6	9	4.3	4.4
Memphis, Tenn	843	33	2.8	29,30	0.4	1,2	1.3	2.4
Helena, Ark	767	44	2.9	30	— 0.6	1	0.7	3.5
Arkansas City, Ark.	635	42	0.9	30	— 2.3	1	—1.2	3.2
Greenville, Miss	595	40	1.1	30	— 1.1	2-4	—0.4	2.2
Vicksburg, Miss	474	41	— 0.5	30	— 3.4	5-12	—2.5	2.9
New Orleans, La	108	16	3.8	28-30	2.4	7	3.0	1.4
Arkansas River.								
Fort Smith, Ark.	345	22	0.9	17-22	0.6	1	0.8	0.3
Dardanelle, Ark.	250	21	— 0.5	5-12, 17-21, 25-29	— 0.7	1-3	—0.5	0.2
Little Rock, Ark.	170	23	1.3	1,25-28	1.1	3-15, 19-23	1.2	0.2
Wichita, Kans.	720	10	0.9	25-30	0.7	21-22	0.8	0.2
White River.								
Newport, Ark	150	26	0.5	20-23	0.3	13-19	0.4	0.2
Des Moines River.								
Des Moines, Iowa	150	19	3.9	9-28	3.7	1-4	3.9	0.2
Illinois River.								
Peoria, Ill	135	14	4.9	27	3.8	1-5	4.2	1.1
Missouri River.								
Bismarck, N. Dak.	1,201	14	3.4	21-23	1.7	17	2.5	1.7
Pierre, S. Dak.	1,006	14	1.5	8	— 1.1	27	0.9	2.6
Sioux City, Iowa	676	19	5.6	1	4.1	25	4.7	1.5
Omaha, Nebr.	561	18	5.3	1,19-27	5.1	6-12	5.2	0.2
St. Joseph, Mo.	373	10	1.4	5,6	— 1.3	30	1.0	2.7
Kansas City, Mo.	280	21	6.2	7,8	5.0	1	5.7	1.2
Boonville, Mo.	191	20	5.2	9-10	4.1	2-4	4.7	1.1
Hermann, Mo.	95	21	— 0.4	27-28	— 1.4	4,5	—0.6	1.0
Ohio River.								
Pittsburg, Pa	966	22	10.7	29	2.8	23	6.0	7.9
Davis Island Dam, Pa.	960	25	11.3	29	1.4	1	4.8	9.9
Wheeling, W. Va.	875	36	13.6	29	0.5	1	5.1	13.1
Parkersburg, W. Va.	785	35	13.7	30	0.9	1	5.7	12.8

Heights of rivers above zeros of gauges—Continued.

Stations.	Distance to mouth of river.	Danger-line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Ohio River—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Point Pleasant, W. Va.	703	36	9.5	20	0.9	2-5	4.4	8.6
Catlettsburg, Ky	651	50	11.8	21	1.7	6	5.3	10.1
Portsmouth, Ohio	612	50	12.5	21	1.8	3-7	6.2	10.7
Cincinnati, Ohio	499	45	13.6	23	3.2	6,7	8.0	10.4
Louisville, Ky.	367	24	6.9	28	3.9	16	5.4	3.0
Evansville, Ind	184	30	9.3	30	0.7	1-4	4.3	8.6
Paducah, Ky.	47	40	4.8	30	0.0	7-9	1.7	4.8
Alleghany River.								
Warren, Pa	177	7	4.2	28	0.0	1,10	0.9	4.2
Oil City, Pa	123	13	5.2	28	0.0	1	1.4	5.2
Parkers Landing, Pa.	73	20	6.5	28	— 0.4	1	1.7	6.9
Freeport, Pa.	26	20	9.8	28,29	0.4	1	3.5	9.4
Conemaugh River.								
Johnstown, Pa.	64	7	3.8	16	0.5	1	2.1	3.3
Red Bank Creek.								
Brookville, Pa.	35	8	2.8	27	— 0.2	1,2	0.8	3.0
Beaver River.								
Ellwood Junction, Pa.	10	14	1.4	17,18	— 1.3	1,2	0.0	2.7
Cumberland River.								
Burnside, Ky	434	50	0.3	29	— 0.7	1	—0.2	1.0
Carthage, Tenn	257	30	0.9	27,30	0.1	1,2,5	0.4	0.8
Nashville, Tenn	175	40	1.4	30	0.2	1,4	0.6	1.2
Great Kanawha River.								
Charleston, W. Va.	61	30	6.9	29,30	6.2	8	6.5	0.7
New River.								
Hinton, W. Va.	95	14	1.5	4,5	1.0	1,2,12-29	1.1	0.5
Licking River.								
Falmouth, Ky.	30	25	13.4	9	0.2	1	2.4	13.2
Miami River.								
Dayton, Ohio	69	18	4.8	17	0.8	1	2.2	4.0
Monongahela River.								
Weston, W. Va.	161	18	5.0	27	— 2.5	1-8	0.2	7.5
Fairmont, W. Va	119	25	6.0	28	— 0.7	1-9	1.1	6.7
Greensboro, Pa.	81	18	11.6	28	4.5	1	7.4	7.1
Lock No. 4, Pa.	40	28	13.5	28	4.4	7,8	8.2	9.1
Cheat River.								
Rowlesburg, W. Va.	36	14	7.2	10	— 0.7	1	2.8	7.9
Youghiogheny River.								
Confluence, Pa.	59	10	3.5	15	0.1	1	1.9	3.4
West Newton, Pa.	15	23	3.9	28	— 0.2	1,2	1.4	4.1
Muskingum River.								
Zanesville, Ohio	70	20	11.0	18	5.3	1	7.2	5.7
Tennessee River.								
Knoxville, Tenn.	614	29	0.8	20,21	0.1	1-3	0.5	0.7
Kingston, Tenn	534	25	0.1	4	0.0	1-3,5-30	0.0	0.1
Chattanooga, Tenn	430	33	1.4	8	0.7	21-29	0.9	0.7
Bridgeport, Ala	390	24	0.4	9	— 0.1	25-27	0.1	0.5
Florence, Ala	220	16	0.2	11	— 0.2	22-30	0.0	0.4
Johnsonville, Tenn.	94	21	0.6	1,2	— 0.1	29,30	0.3	0.7
Clinch River.								
Speers Ferry, Va.	156	20	— 0.5	1,2,9,10	— 0.8	16,17,20,21,25,26	—0.7	0.3
Clinton, Tenn	46	25	3.2	16-19	2.2	30	2.8	1.0
Wabash River.								
Mount Carmel, Ill	50	15	4.1	21-22	0.5	1	2.2	3.6
Red River.								
Arthur City, Tex.	688	27	2.5	1	2.1	18-20, 27-30	2.2	0.4
Fulton, Ark	565	28	1.4	1-9,17	1.0	24-30	1.2	0.4
Shreveport, La.	449	29	— 1.5	1,2	— 2.0	23-30	—1.8	0.5
Alexandria, La	139	33	— 2.3	4-8	— 3.1	24-28	—2.7	0.8
Atchafalaya Bayou.								
Melville, La	100*	31	2.4	1,30	1.3	19	1.8	1.1
Ouachita River.								
Camden, Ark.	340	39	3.4	28-30	2.7	1	3.0	0.7
Monroe, La	100	40	0.9	11-13	0.2	1,22,23	0.5	0.7
Yazoo River.								
Yazoo City, Miss.	80	25	— 1.7	7,8	— 2.4	15,16,19,20	—2.2	0.7
Chattahoochee River.								
Columbus, Ga.	140	20	1.4	30	— 1.4	2	—0.4	2.8
Flint River.								
Albany, Ga.	80	20	1.5	5	0.9	1-3,28,29	1.1	0.6
Cape Fear River.								
Fayetteville, N. C.	100	38	9.3	4	1.4	25	3.0	7.9
Columbia River.								
Umatilla, Oreg	270	25	6.2	23	1.5	12	3.7	4.7
The Dalles, Oreg	166	40	9.8	23	2.4	5	5.4	7.4
Willamette River.								
Albany, Oreg	99	20	14.2	21	1.0	1-4	5.7	13.2
Portland, Oreg	10	15	12.9	20	0.4	3	6.0	12.5
Edisto River.								
Edisto, S. C	75	6	3.5	1,2	2.4	27,28	2.8	1.1
James River.								
Lynchburg, Va.	257	18	0.9	2	— 0.2	19-28	0.0	1.1
Richmond, Va	110	12	1.0	3	— 0.3	24-27	0.0	1.3
Alabama River.								
Montgomery, Ala	265	35	— 0.4	10,11	— 0.1	1,4,5, 20-26	—0.8	0.6
Selma, Ala.	212	35	— 0.7	13	— 1.8	18-26	—1.5	1.1
Coosa River.								
Gadsden, Ala	144	18	0.0	28,29	— 0.4	1,13-26	—0.3	0.4
Tombigbee River.								
Columbus, Miss.	285	33	— 3.0	2	— 3.7	24-28	—3.5	0.7
Demopolis, Ala.	155	35	— 1.9	10-13	— 2.5	1	—3.2	0.6
Black Warrior River.								
Tuscaloosa, Ala.	90	38	— 1.1	10-12	— 1.4	1,19-27	—1.3	0.3
Pedee River.								
Cheraw, S. C.	145	27	4.5	29	0.8	16-18, 23,24,28	1.4	3.7
Black River.								
Kingstree, S. C.	60	12	5.0	6	3.4	29-30	4.2	1.6

Heights of rivers above zeros of gauges—Continued.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Lumber River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Fairbluff, N. C	10	6	1.7	13	0.1	22,24,29	0.8	1.6
Lynch Creek.								
Effingham, S. C	35	12	6.4	9	2.7	24	3.8	3.7
Potomac River.								
Harpers Ferry, W. Va	170	16	2.0	12,18	0.3	1	1.2	1.7
Roanoke River.								
Clarksville, Va	155	12	0.5	29	0.1	1,2,5-27	0.1	0.4
Sacramento River.								
Redbluff, Cal	241	23	1.4	22	0.3	1,2,7-15	0.5	1.1
Sacramento, Cal	70	25	13.3	24	8.7	1-20	9.6	4.6
Santee River.								
St. Stephens, S. C	50	12	3.3	7	— 0.3	26,27	0.9	3.6
Congaree River.								
Columbia, S. C	37	15	3.0	28	1.5	1-26	1.6	1.5

Heights of rivers above zeros of gauges—Continued.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Wateree River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Camden, S. C	45	24	7.7	29	2.2	24,25	3.2	5.5
Savannah River.								
Augusta, Ga	130	32	9.4	29	4.8	24	5.7	4.6
Susquehanna River.								
Wilkesbarre, Pa	178	14	6.0	29	0.0	1-3	2.0	6.0
Harrisburg, Pa	70	17	4.9	30	0.7	1	2.8	4.2
Juniata River.								
Huntingdon, Pa	80	24	4.2	3,10	2.8	1	3.5	1.4
W. Br. of Susquehanna.								
Williamsport, Pa	35	20	5.7	29	0.4	1	2.9	5.3
Waccamaw River.								
Conway, S. C	40	7	2.1	1,2	0.2	19-22	0.8	1.9

*Distance to Gulf of Mexico.

SPECIAL CONTRIBUTIONS.

RECENT PUBLICATIONS.

By HERMAN W. SMITH, Librarian, Weather Bureau.

Argentine Republic—Oficina Meteorologica. Ligeros apuntes sobre el clima de la República Argentina. Buenos Aires, 1889. 4to. xv, 254 pp.

Austria-Hungary—Hydrographischer Dienst in Œsterreich. Jahrbuch des K. k. hydrographischen Central-Bureau, 1895. Wien, 1897. F.

Austria-Hungary—Naturhistorisches Landesmuseum von Kärten. Diagramme der magnetischen und meteorologischen Beobachtungen zu Klagenfurt, 1895-96. Klagenfurt, 1895-1896. F.

Canada—Ontario—Bureau of Industries. Annual report, 1896. Toronto, 1897. 8vo. 159 pp.

Chicago—Department of Health. Biennial report, 1895-1896. Chicago, 1897. 8vo.

Comité International des Poids et Mesures. Procès-verbaux des séances de 1897. Paris, 1897. 8vo. 179 pp.

France—Département de l'Hérault. Bulletin météorologique, 1896. Montpellier, 1897. 4to. 112 pp.

France—Département des Bouches-du-Rhône, Commission de Météorologie. Bulletin Annuel, 1896. Marseille, 1897. 4to. 105 pp.

Germany—Hamburg—Deutsche Seewarte. Segel-handbuch für den Stillen Ozean. Hamburg, 1897. 4to. 916 pp. Beilage zum Segelhandbuch für den Stillen Ozean. Ein Atlas von 31 Karten.

Great Britain—Devon—Rousdon Observatory. Meteorological observations, 1896. London, 1897. 4to. 35 pp.

Imperial Russian Geographical Society. Annual report. St. Petersburg, 1897. 8vo. (262) pp.

Italy—Ufficio Centrale Meteorologico e Geodinamico Italiano. Annali dell' Serie Seconda, Vol. XIV, Parte II, 1892, and Vol. XVI, Parte I, 1894. Rome, 1896. F.

Java—Meteorological and Magnetical Observatory. Wind and weather, currents, tides, and tidal streams of the East Indian Archipelago. By J. P. Van Der Stok. Batavia, 1897. 18 by 23.5 iv, 208 pp. 55 ch.

Pfannschmidt, Victor. Klimaunterschiede gleicher Breitengrade. Hamburg, 1892. 8vo. 42 pp.

Servus, Hermann. Neue Grundlagen der Meteorologie. Berlin, 1897. 8vo. 24 pp.

United States—Department of the Interior, Geological Survey. Water supply and irrigation papers. Washington, 1897. 8vo.

No. 2, Irrigation near Phœnix, Ariz., by A. P. Davis. No. 4, A reconnoissance in southeastern Washington, by I. C. Russell. No. 5, Irrigation practice on the Great Plains, by E. B. Cowgill. No. 6, Underground waters of southwestern Kansas, by E. Haworth. No. 7, Seepage water of northern Utah, by S. Fortier. No. 8, Windmills for irrigation, by E. C. Murphy. No. 9, Irrigation near Greely, Colo., by D. Boyd. No 11, River heights, 1896, by A. P. Davis.

United States—Department of Agriculture, Weather Bureau. The equations of hydrodynamics in a form suitable for application to problems connected with the movements of the earth's atmosphere. By Joseph Cottier. Washington, 1897. F. 8 pp. Reprinted from MONTHLY WEATHER REVIEW, July, 1897.

CLIMATOLOGICAL DATA FOR JAMAICA, W. I.

Through the kindness of Mr. Maxwell Hall, of Montego Bay, Jamaica, the meteorological service of that colony has acceded to the request of the Editor for the prompt communication of an abstract of the very interesting climatological records of that highly important West Indian service. The climatological summary for November, 1897, furnished by Mr. Hall, through his assistant, Mr. Robert Johnstone, of the Meteorological Office, is reproduced in the following table. For descriptive details of the stations and instruments see pages 308 and 356.

Jamaica, W. I., climatological data, November, 1897.

	Morant Point Lighthouse.	Negril Point Lighthouse.	Kingston.	Kings House.	Castleton Gardens.	Hope Gardens.	Stony Hill Reformatory.	Hill Gardens (Ch. Plant.)
Latitude	17°56′	18° 16′	17° 58′	.....	18° 12′	.....	.....	18°05′
Longitude	76°10′	78° 23′	76° 48′	.....	76° 50′	.....	.....	76°39′
Elevation (feet)	8	33	50	400	580	600	1,400	4,907
Mean barometer, 7 a. m.	29.918	29.925	29.931	.....	29.588	.....	.....	25.355
Mean barometer, 3 p. m	29.862	28.861	29.862	.....	29.563	.....	.....	25.331
Mean temperature, 7 a. m.	81.5	75.3	72.7	.....	70.7	.....	.....	60.5
Mean temperature, 3 p. m.	83.9	83.1	83.8	.....	80.2	.....	.....	65.8
Mean of maxima	.....	86.1	88.6	.....	84.3	.....	.....	69.8
Mean of minima	.....	71.4	71.2	.....	66.3	.....	.....	57.3
Highest maximum	.....	89	90.7	.....	88	.....	.....	75
Lowest minimum	.....	67	68.7	.....	62	.....	.....	54
Mean dew-point, 7 a. m.	.....	72.1	68.5	.....	68.0	.....	.....	56.3
Mean dew-point, 3 p. m.	.....	72.3	71.0	.....	72.4	.....	.....	61.5
Mean relative humidity, 7 a. m.	.....	90	87	.....	90	.....	.....	83
Mean relative humidity, 3 p. m.	.....	71	66	.....	76	.....	.....	85
Monthly rainfall (inches)	4.10	4.32	0.48	.....	12.68	.....	.....	11.09
Average daily wind movement	.....	189.0	34.5	.....	.....	.....	.....	30.8
Average wind direction, 7 a. m.	*	ne.	n.	.....	.....	.....	.....	e.
Average wind direction, 3 p. m.	ne.	var.	var.	.....	.....	.....	.....	se.
Average hourly velocity, 7 a. m.	8.1	6.3	1.3	.....	.....	.....	.....	.....
Average hourly velocity, 3 p. m	11.0	11.5	3.0	.....	.....	.....	.....	.....
Average cloudiness (tenths):								
7 a. m. Lower clouds	3.0	0.5	0.1	.....	.....	.....	.....	.....
7 a. m. Middle clouds	2.4	1.9	0.1	.....	.....	.....	.....	.....
7 a. m. Upper clouds	1.1	4.1	2.8	.....	.....	.....	.....	.....
3 p. m. Lower clouds	3.0	4.2	1.5	.....	.....	.....	.....	.....
3 p. m. Middle clouds	1.4	2.6	1.4	.....	.....	.....	.....	.....
3 p. m. Upper clouds	0.9	1.0	2.3	.....	.....	.....	.....	.....

*ne. by n.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Mariano Bárcena, Director, and Señor José Zendejas, vice-director, of the Central Meteorologico-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the *Boletin Mensual;* an abstract translated into English measures is here given in continuation of the similar tables published in the MONTHLY WEATHER REVIEW during 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.