

Attachment 3—National Weather Service Gauge Descriptions and River
Stage Data

Attachment 3—National Weather Service Gauge Description and
Corrigenda, Congaree at Columbia (Volume numbers appear on the copies)

The danger-line is at 12 feet.
 The lowest water is 1.0 foot.
 The highest water, 27 feet, occurred November 27, 1877.

CLINTON, TENN.

Clinton, Tenn., is on the Clinch River. The width of river at low water is 282 feet.
 The drainage area above the place is 2,750 square miles.
 The distance to next station below, Kingston, is 46 miles; to Chattanooga, 210 miles.
 The river gauge is attached to middle pier of the East Tennessee, Virginia, and Georgia Railroad bridge over the Clinch River. It is made of heart pine, 4 X 10-inch.
 The gauge extends 48 feet above the zero.
 The bench mark is base of rail on bridge. It is 57.65 feet above the zero of gauge.
 The zero of gauge is 782.3 feet above sea level.
 The depth of water in channel at a zero stage is 0.7 of a foot.
 The danger-line is at 25 feet.
 There are large mining and sawmill interests in vicinity. Floods are sudden. A knowledge of coming high water is of great importance.
 The lowest water is 0.3 foot.
 The highest known water, 45 feet, occurred March 31, 1886.

COLBERT, IND. T.

Colbert, Ind. T., is on the Red River. The width of the river at low water is 225 feet.
 The drainage area above it is 37,500 square miles.
 There is a bridge at the place.
 The distance to Arthur City, below, is 115 miles.
 The danger-line is at 14 feet.
 The base of rail on bridge is 44 feet above the zero of the gauge.
 The highest water known is 18 feet.

COLUMBIA, S. C.

Columbia, S. C., is at the junction of the Broad and Saluda rivers.
 The drainage area above it is 7,300 square miles.
 The distance to Wateree, below it, is 42 miles, about 5 miles up the Wateree.
 The lowest water is 1.4 feet.

COLUMBIA, TENN.

Columbia, Tenn., is on the Duck River. The width of the river at low water is 150 feet.
 The drainage area above it is 1,100 square miles.
 The distance to Johnsonville, below it, is 76 miles.
 The river gauge is on the down-stream end of the south pier of the Columbia and Nashville Turnpike Company's bridge over Duck River.
 The length of gauge above zero is 43 feet.
 The bench mark is top of step at south entrance to courthouse. It is 87.4 feet above the zero of the gauge.
 The zero of gauge is 519.4 feet above sea level.
 The depth of water below zero is 0.3 of a foot.
 The danger-line is at 28 feet.
 The lowest water is 0.4 foot below zero of gauge.
 The highest known water, 33.0 feet, occurred March 8, 1891.
 At Centerville, 30 miles below Columbia, the low water discharge is 1,270 cubic feet a second.

Columbia, Va., is on the James River.
 The width of the river at low water is at
 The distance to Richmond, below it, is f
 The drainage area above it is 5,800 squa
 The river gauge, 750 feet below the mouth
 ber, extending from 2 feet below the zero to
 the first, from 0 to 2 feet below, is on the slo
 the second, from 0 to 15 feet, is vertical, an
 the flow of water from the pump to the larg
 road; the third extends vertically from 15 to
 work of the pump; the fourth, from 17 to 34
 the fifth, from 30 to 42 feet, vertical, is loc
 tank, extending to the bottom of it.

The bench mark is a large spike driven i
 and is at the same level as the top of the rai
 depot.

The zero of gauge is 29.85 feet below the
 The zero of gauge is 223.151 feet above s
 At a zero stage the depth of water is 5 ft
 The danger-line is at 18 feet. At this s
 The highest known water, 40.02 feet (39
 tember 30, 1870.

The highest waters above low water, ac
 36; 1886, 30.3; and 1889, 32.5.
 The lowest water, 1.5 feet below the zero

Columbus, Ga., is on the Chattahoochee
 The distance to Eufaula, Ala., below it,
 The drainage area above it is 4,900 squa
 The river gauge is set in two sections:
 side of brick pier in river near the east bank
 to pier on east bank. Duplicate gauge, ren
 pile about midway of the wharf at Columbu
 The top of the stone foundation of pier
 zero of the gauge.

The top of capstone, under side of lower

Columbus, Miss., is on the Tombigbee R
 The drainage area above it is 4,300 squa
 There is a bridge at the place.
 The distance to Demopolis, below it, is
 The danger-line is at 33 feet.
 The lowest water is 0.0.
 The highest known water, 42 feet, occur

Colusa, Cal., is on the Sacramento Rive

CLARKSVILLE, VIRGINIA.

Clarksville, Va., is on the Roanoke River, 65 miles above Weldon, N. C. The width of river at low water is 1,260 feet. The drainage area above the station is 6,900 square miles.

The river gauge is on the south side of river; it is made of 2 by 10 inch plank, and graduated with copper tacks and figures. It is attached to a tree leaning over the river.

Graduation is from 3 feet below to 23 above zero. Tradition gives a high water of 27 feet on November 27, 1877. Highest water recorded was 13.5 feet on September 14, 1893; lowest, -0.2, on July 19, 1894. Danger line is at 12 feet.

CLINTON, TENNESSEE.

Clinton, Tenn., is on the Clinch River, 46 miles above its mouth at Kingston, Tenn. The width of river at low water is 282 feet. The drainage area above the station is 2,750 square miles.

The river gauge is attached to the middle pier of the Southern Railroad bridge over the Clinch River. It is made of heart pine, 4 by 10 inches, in two sections, the first from zero to 5 feet, and the second from 5 to 48 feet; it is painted white and graduated in copper tacks.

The base of rail on bridge is 57.66 feet above zero of gauge.

Graduation is from zero to 48 feet above zero. Highest water was 45 feet on March 31, 1886; lowest, 0.0, on December 4-8, 1883. Danger line is at 25 feet.

COLBERT, INDIAN TERRITORY.

Colbert, Ind. T., is on the Red River, 115 miles above Arthur City, Tex. The width of the river at low water is 225 feet. The drainage area above the station is 37,500 square miles.

The base of rail on bridge is 44 feet above zero of gauge.

Highest water was 18 feet, date unknown. Danger line is at 14 feet.

Station was discontinued September 15, 1893.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C., is at the head of the Congaree River, 37 miles above its confluence with the Wateree. The distance to St. Stephens, on the Santee, is 102 miles. The drainage area above the station is 7,300 square miles.

The river gauge is painted on the first stone pier (from the eastern shore) of the Gervais street toll bridge.

Bench mark is track of the South Carolina and Georgia Railroad at Union depot. Its elevation is 102.59 feet above zero of gauge.

Graduation is from zero to 26.6 feet above zero. Highest water was 34.4 feet in September, 1852; lowest, -0.4, on January 20, 1893. Danger line is at 15 feet.

COLUMBIA, TENNESSEE.

Columbia, Tenn., is on the Duck River, 66 miles above its mouth and 76 miles above Johnsonville, Tenn., on the Tennessee River. The width of river at low water is 150 feet.

The drainage area above the station is 1,100 square miles.

The river gauge is on the downstream end of the south pier of the Columbia and Nashville Turnpike Company's bridge over Duck River. It was rebuilt in 1891 by the Weather Bureau, and consists of a 10-inch board bolted to the pier.

Bench mark is top of step at south entrance of courthouse, and is 87.4 feet above zero of gauge.

Graduation extends 43 feet above zero. Highest water was 33.1 feet on March 9, 1891; lowest, -0.4, date unknown. Danger line is at 28 feet.

CLARION, PENNSYLVANIA. VI

Clarion, Pa., is on the Clarion River, 21 miles above its mouth, and 24 miles above Parker, Pa., on the Allegheny. The width of river at low water is 162 feet. The drainage area above the station is 865 square miles.

The river gage is on the north abutment of the Clarion County bridge over Clarion River. The gage is partly on the abutment and partly on a natural rock (the foundation of the abutment), and has a stone, 4.5 feet in length, planted at the foot of the natural rock, sunk flush with the water line as it stood when the gage was put up, the top surface of the planted stone being the zero of gage. Graduation is painted on the stone. Bridge was rebuilt in 1894, and the gage partially destroyed thereby. Zero of gage is 25.6 feet below top line of the abutment, and about 1,052 feet above mean sea level.

Graduation is from 3 feet below to 22 feet above zero. Highest water was 15.2 feet on May 21, 1894; lowest, -1.4 feet on September 4, 5, 1894. Danger line is at 10 feet.

CLARKSVILLE, VIRGINIA.

Clarksville, Va., is on the Roanoke River, 155 miles from its mouth, and 65 miles above Weldon, N. C. The drainage area above the station is 7,344 square miles.

The United States Geological Survey gage on the Dan River is now used as the official gage. The graduation rod is fastened to the guard rail of the third span west of the Southern Railway bridge. The distance from the zero of the rod to the outside of the pulley wheel is 3 feet; the length of the wire rope about 33 feet.

Tradition gives a height of 27 feet on November 27, 1877; the highest water recorded was 17 feet on March 21, 1899; lowest, -0.4 foot on September 13-17, and 21, 1897. Danger line is at 12 feet.

CLINTON, TENNESSEE.

Clinton, Tenn., is on the Clinch River, 46 miles above its mouth at Kingston, Tenn. The width of river at low water is 282 feet. The drainage area above the station is 2,750 square miles.

The river gage is attached to the middle pier of the Southern Railway bridge over the Clinch River. It is made of heart pine, 4 by 10 inches, in two sections, the first from zero to 5 feet, and the second from 5 to 48 feet; it is painted white and graduated in copper tacks. The base of rail on bridge is 57.7 feet above zero of gage and 840 feet above mean sea level.

Graduation is from zero to 48 feet above. Highest water was 45 feet on March 31, 1886; lowest; 0.0, on December 4-8, 1883. Danger line is at 25 feet.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C., is on the Congaree River, 37 miles above its confluence with the Wateree. The distance to St. Stephens, on the Santee, is 102 miles. The drainage area above the station is 7,300 square miles.

The river gage is located on the southwest corner of the third granite pier from the eastern end of the Gervais street bridge over the Congaree River, 425 feet from the eastern bank. The last 7 feet of the supporting structure is of wood, securely fastened to the top of the granite pier. It is a standard Weather Bureau brass gage, and the face of the gage is flush with the surface of the pier.

The bench mark is the top of the rail of the South Carolina and Georgia Railroad at the union depot on Gervais street. It is 102.6 feet above the zero of the gage and 336 feet above mean sea level.

The graduations in feet are painted on the granite pier from zero to 28 feet; from 29 to 35 feet they are painted on the gage. The graduations extend from 0.4 foot below to 34.7 feet above zero. Highest water was 34.4 feet in September, 1852; lowest, -0.4 foot on January 20, 1893. Danger line is at 15 feet.

COLUMBIA, TENNESSEE.

Columbia, Tenn., is on the Duck River, 66 miles above its mouth, and 76 miles above Johnsonville, Tenn. The width of river at low water is 150 feet. The drainage area above the station is 1,100 square miles.

The river gage is on the north side of the Columbia and Nashville Turnpike Company's bridge over Duck River. It belongs to the Weather Bureau, and consists of 1½ by 2 inch oak timber and is attached to the pier. It is painted white with black graduations.

The bench mark is the top of step at south entrance of court-house, and is 87.4 feet above the zero of gage and 606.8 feet above mean sea level.

Graduation is from zero to 38 feet above. Highest water was 33.2 feet on March 9, 1891; lowest, -0.4 foot, date unknown. Danger line is at 28 feet.

COLUMBIA, VIRGINIA.

Columbia, Va., is on the James River, 167 miles from its mouth, and 57 miles above Richmond, Va. The width of river at low water is about 1,000 feet. The drainage area above the station is 5,800 square miles.

The river gage, 750 feet below the mouth of the Rivanna River, is built in five sections; the first, from zero to 2 feet below zero, is on the sloping bank in front of the Chesapeake and Ohio depot; the second, from zero to 15 feet, is vertical, and is located in the mouth of the small ravine formed by the flow of water from the pump to the large supply water tank of the Chesapeake and Ohio Railroad; the third extends vertically from 15 to 17 feet, and is located on the south side of the framework of the pump; the fourth, from 17 to 30 feet, is vertical and located on the north side of the framework; the fifth, from 30 to 42 feet, vertical, is located against the framework of the large supply water tank, extending to the bottom of it. The gage is built of 2 by 12 inch wood with galvanized iron facing, and is the property of the railroad company.

The bench mark is a large spike driven in the west side of a large sycamore tree in front of depot, and is at the same level as the top of the rail of the Chesapeake and Ohio Railroad in front of the depot. Elevation is 29.8 feet above zero of gage and 206 feet above mean sea level.

Graduation is from 2 feet below to 42 feet above zero. Highest water was 40 feet on September 30, 1870; lowest, -1.5 feet on October 25, 1892. Danger line is at 18 feet.

COLUMBUS, GEORGIA.

Columbus, Ga., is on the Chattahoochee River, 140 miles from its mouth, and 50 miles above Eufaula, Ala. The drainage area above the station is 4,900 square miles.

The river gage is set in two sections; the first, from -2 to 20 feet, is nailed on downstream side of brick pier in river, near the east bank; the second, from 20 feet upward, is fastened to pier on east bank. Duplicate gage, reading from -1 to 9 feet, is fastened to the face of a pile about midway of the wharf.

The top of the stone foundation of pier in river at its southeast corner is 18.6 feet above zero of gage. The top capstone, under side of lower chord of bridge, is 44.7 feet above zero of gage.

Graduation is from 2 feet below zero. Highest water was 60 feet in March, 1886; lowest, -1.5 feet on October 10-16, 18, 1897. Danger line is at 20 feet.

Station was discontinued on October 31, 1898.

Graduation extends from zero to 30 feet above. Highest water was 24 feet, on April 21, 1874; lowest, 4 feet, on June 1, 1904. Danger line is at 14 feet.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C. River observations began October 1, 1891. Is on the Congaree River, 52 miles above its confluence with the Wateree. The distance to St. Stephens, S. C., on the Santee River, is 102 miles. The width of the river at average low water is 1,112 feet. The drainage area above the station is 7,815 square miles.

A new chain and weight river gage of the United States Geological Survey pattern was installed by the Weather Bureau on October 1, 1904. It is located on the Gervais street highway bridge, near the fourth pier from the east side. The Weather Bureau brass gage is still attached to the third pier, the new gage being used more particularly for low-water readings.

Top of rail at main line crossing of Atlantic Coast Line at Gervais street is 102.6 feet above zero of the gage, and 222 feet above mean sea level.

Graduation on the brass gage extends from 0.4 foot below to 34.7 feet above zero, and on the chain and weight gage from 3 feet below zero to as many feet above as may be necessary. Highest water was 34.4 feet, in September, 1852; lowest, -3 feet, on October 5-11, 1904. Danger line is at 15 feet.

COLUMBIA, TENNESSEE.

Columbia, Tenn. Established November 1, 1886. Is on the Duck River, 66 miles from its mouth and 76 miles above Johnsonville, Tenn., on the Tennessee River. The width of the river at average low water is 150 feet. The drainage area above the station is 1,207 square miles.

The river gage, which belongs to the Weather Bureau, is attached to the north side of the pier of the Columbia and Nashville turnpike bridge over Duck River, and is in two sections. The first section (0 to 42 feet) is made of 2 by 14 inch oak timber and is bolted to the stone pier. The second section (42 to 46 feet) is made of 2 by 8 inch white-oak timber. It is extended above and is fastened to the pier with a brace rod. Both sections are painted white with black graduations.

Top of stone step at south entrance to court-house is 87.4 feet above zero of the gage, and 606.8 feet above mean sea level.

Graduation extends from zero to 46 feet above. Highest water was 45.6 feet, on March 30, 1902; lowest, -0.4 foot, date unknown. Danger line is at 28 feet.

COLUMBIA, VIRGINIA.

Columbia, Va. Established July 1, 1898. Daily observations were commenced on July 1, 1904. Is on the James River, 167 miles from its mouth and 56 miles above Richmond, Va. The width of the river at average low water is 1,000 feet. The drainage area above the station is 5,800 square miles.

The river gage, which belongs to the Weather Bureau, is located about 750 feet below the mouth of the Rivanna River. It is made of 2 by 12 inch oak timber, and is in four sections. The first section (0 to 15 feet) is fastened by a cross-tie to a tree at the mouth of the gully, about 100 feet west of the Chesapeake and Ohio Railway depot, and the second section (15 to 17 feet) to the south side of the wooden framework, about 50 feet north of the first section. The third section (17 to 30 feet) is attached to the opposite side of the framework to which the second section is attached. The fourth section (30 to 42 feet) is attached to the southeast wooden upright support of the railroad water tank. Graduations are in brass figures and copper tacks.

Top of rail in front of Chesapeake and Ohio Railway depot is 29.8 feet above zero of the gage, and 206 feet above mean sea level.

The river gage is in two sections. The first section (0 to 8.2 feet) is screwed to a 4-inch plank bolted to the breakwater wall in the north end of the forebay of the works of the Cohoes Water Company. The second section (8.2 to 12 feet) is set on the gatehouse, over the arches to the gates in the south end of the forebay elevator. Both sections are made of 1 by 7 inch pine timber, painted white with black graduations.

U. S. W. B. B. M. No. 11, bronze tablet set in top course of end stone of retaining wall at southwest corner of gatehouse of Cohoes Water Company, is 9 feet above zero of the gage, and 162.5 feet above mean sea level.

Graduation extends from zero to 12 feet above. Highest water since establishment of station was 7.8 feet, on August 18, 1904; lowest, -0.2 foot, on September 27, 1908. Flood stage is at 5 feet.

COLGATE (P. O., DOBBINS), CALIFORNIA.

Colgate, Cal. Established October 1, 1904. Is on the Yuba River, near the junction of the Middle and North forks, and 28 miles above Marysville, Cal., at the mouth of the river. The width of the river at average low water is 200 feet. The drainage area above the station is 2,372 square miles.

The river gage consists of two vertical sections. The first section (0 to 5 feet) is anchored to rocks on the right bank of the river, opposite the power house of the California Gas and Electric Company. The second section (5 to 25 feet) is attached with steel expansion bolts to the concrete wall of the power house, opposite the first section. The first section is made of heavy pine timber, and the second is a 2-by-10 inch hard-pine plank. Both sections are painted white with graduations cut into the wood and painted black.

B. M., mark cut in southwest wall of power house of California Gas and Electric Company, is 18 feet above zero of the gage.

Graduation extends from zero to 25 feet above. Highest water was 23 feet, on March 18, 1907; lowest, -1.6 feet, on September 12-14 and 24-26, 1908. Flood stage is at 14 feet.

COLUMBIA, MISSISSIPPI.

Columbia, Miss. Established October 1, 1904. Is on the Pearl River, 110 miles from its mouth. The width of the river at average low water is 250 feet. The drainage area above the station is 5,339 square miles.

The river gage is attached to the downstream side of the log boom of the Marion Lumber Company, 25 feet from the left bank of the river. It is made of 2 by 12 inch timber, painted white with graduations of brass figures and copper tacks.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. Top of steel casing on southeast side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above mean sea level.

Graduation extends from zero to 30 feet above. Highest water was 24 feet, on April 21, 1874; lowest, 2.8 feet, from October 25 to November 7 and November 16 to 26, all inclusive, 1908. Flood stage is at 18 feet.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C. River observations began October 1, 1891. Is on the Congaree River, 52 miles above its confluence with the Wateree. The distance to Rimini, S. C., on the Santee River, is 63 miles. The width of the river at average low water is 1,112 feet. The drainage area above the station is 7,972 square miles.

The river gage is a chain and weight gage of the United States Geological Survey pattern, and is located on the Gervais Street highway bridge, near the fourth pier from the east side. There is also a brass gage of the Weather Bureau pattern attached to the third pier from the east side.

B. M., top of rail at main line crossing of Atlantic Coast Line at Gervais street, is 102.6 feet above zero of the gage and 222 feet above mean sea level.

Graduation of the chain and weight gage extends from 3 feet below to as many feet above zero as may be necessary, and on the brass gage from 0.4 foot below to 34.7 feet above zero. Highest water was 35.8 feet, at 8.30 p. m. August 27, 1908; lowest, -3 feet, on October 5-11, 1904. Flood stage is at 15 feet.

The river gage consists of two vertical sections. The first section (-2 to 5 feet) was removed on October 22, 1910, to a rock near the left bank of the river in order to secure a better anchorage and for convenience of reading. It is made of 4 by 6 inch black-oak timber, painted white, with graduations cut into the wood and painted black.

The second section (5 to 20 feet) is attached with steel expansion bolts to the concrete wall of the power house, opposite the first section. The first section is made of heavy pine timber and the second is a 2 by 10 inch hard-pine plank. Both sections are painted white with graduations cut into the wood and painted black.

B. M., mark cut in southwest wall of power house of California Gas & Electric Co., is 18 feet above zero of the gage.

Graduation extends from 2 feet below to 20 feet above zero. Highest water was 23 feet, on March 18, 1907; lowest, -1.6 feet, on September 12-14 and 24-26, 1908. Flood stage is at 14 feet.

COLUMBIA, MISSISSIPPI.

Columbia, Miss. Established October 1, 1904. Is on the Pearl River, 110 miles from its mouth. The width of the river at average low water is 250 feet. The drainage area above the station is 5,339 square miles.

The river gage is attached to the downstream side of the log boom of the Marion Lumber Co., 25 feet from the left bank of the river. It is made of 2 by 12 inch timber, painted white with graduations of brass figures and copper tacks.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. B. M., top of steel casing on southeast side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above mean sea level.

Graduation extends from zero to 30 feet above. Highest water was 27.6 feet, on June 5, 1909; lowest, 2.7 feet, on October 31-November 5, 1910. Flood stage is at 18 feet.

COLUMBIA, SOUTH CAROLINA.

Columbia, S. C. River observations began October 1, 1891. Is on the Congaree River, 52 miles above its confluence with the Wateree. The distance to Rimini, S. C., on the Santee River, is 63 miles. The width of the river at average low water is 1,112 feet. The drainage area above the station is 7,972 square miles.

The river gage is a chain and weight gage, and is located on the Gervais Street highway bridge, near the fourth pier from the east side. There is also a brass gage of the Weather Bureau pattern attached to the third pier from the east side.

B. M., top of rail at main line crossing of Atlantic Coast Line at Gervais Street, is 102.6 feet above zero of the gage and 222 feet above mean sea level.

Graduation of the chain and weight gage extends from 3 feet below to as many feet above zero as may be necessary, and on the brass gage from 0.4 foot below to 34.7 feet above zero. Highest water was 35.8 feet, at 8.30 p. m., August 27, 1908; lowest, -3 feet, on October 5-11, 1904. Flood stage is at 15 feet.

COLUMBIA, TENNESSEE.

Columbia, Tenn. Established November 1, 1886. Is on the Duck River, 66 miles from its mouth and 76 miles above Johnsonville, Tenn., on the Tennessee River. The width of the river at average low water is 150 feet. The drainage area above the station is 1,207 square miles.

The river gage is attached to the north side of the pier of the Columbia & Nashville Turnpike bridge over Duck River, and is in two sections. The first section (0 to 42 feet) is made of 2 by 14 inch oak timber and is bolted to the stone pier. The second section (42 to 46 feet) is made of 2 by 8 inch white-oak timber. It is extended above and is fastened to the pier with a brace rod. Both sections are painted white with black graduations.

B. M., top of stone step at south entrance to courthouse, is 87.4 feet above zero of the gage and 606.8 feet above mean sea level.

Graduation extends from zero to 46 feet above. Highest water was 45.6 feet, on March 30, 1902; lowest, -1 foot, on October 6, 1910. Flood stage is at 28 feet.

CLINTON, TENN.

The river gage is attached to the south side of the middle pier of the Southern Railway bridge over the Clinch River. It is made of 4 by 10 inch heart pine, painted white, and graduated with copper tacks. Graduation extends from zero to 48 feet above.

B. M., top of rail in front of Southern Railway depot, is 62.6 feet above zero of the gage and 833.2 feet above mean sea level. B. M., base of rail on bridge above gage, is 57.7 feet above zero of the gage and 828.3 feet above mean sea level.

B. M., on Southern Railway bridge over Clinch River, on north bridge head on east side, on top surface of large stone supporting trestle work, 5 inches from south and 5 inches from east edge of stone; bottom of square hole cut in stone, lettered "U. S. B. M." (C. & G. S. Q.), is 61.1 feet above zero of the gage and 831.7 feet above mean sea level.

COCHRANE, ALA.

The river gage is located on the piers of the bridge of the Alabama, Tennessee & Northern Railroad Co. over the Tombigbee River, and is in two sections. The first section (-1 to 8 feet) is bolted to the southeast side of the iron cofferdam of the middle pier, and is made of 2 by 10 inch heart pine, painted white, with graduations burnt into the wood and painted black. The second section (8 to 47 feet) consists of black graduations painted on a 12-inch white surface on the southwest side of the south concrete pier. Graduation extends from 1 foot below to 47 feet above zero.

B. M., top surface of middle pier and top surface of projection at upper end of south pier of above-mentioned bridge, are 47 feet above zero of the gage and 146.8 feet above mean sea level.

COLFAX, CAL.

The river gage, which belongs to the United States Geological Survey, is located on the left bank of the river, 50 feet above the Pacific Gas & Electric Co.'s dam, and is in three sections. It is made of 1 by 4 inch lumber, smoothed on one side, and bolted to 4 by 4 inch redwood supports. The first section (0.0 to 6.4 feet) is bolted to a rock; the second section (6.4 to 12.4 feet) is driven into the ground and supported by a tree; and the third section (12.4 to 16.0 feet) is bolted to a tree. The smoothed surface is painted white, with graduations and figures cut into the wood and painted black. Graduation extends from zero to 16 feet above.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of the gage, and 1,965 feet above mean sea level.

COLGATE (P. O., DOBBINS), CAL.

The river gage consists of two vertical sections. The first section (-2 to 5 feet) is fastened to a rock near the left bank of the river. It is made of 4 by 6 inch black-oak timber, painted white, with graduations cut into the wood and painted black. The second section (5 to 20 feet) is attached with steel expansion bolts to the concrete wall of the power house, opposite the first section. The first section is made of heavy pine timber and the second is a 2 by 10 inch hard-pine plank. Both sections are painted white, with graduations cut into the wood and painted black. Graduation extends from 2 feet below to 20 feet above zero.

B. M., mark cut in southwest wall of power house of California Gas & Electric Co., is 18 feet above zero of the gage.

COLUMBIA, MISS.

The river gage is attached to the downstream side of the log boom of the Marion Lumber Co., 25 feet from the east bank of the river. It is made of 2 by 12 inch timber, painted white with graduations of brass figures and copper tacks. Graduation extends from zero to 30 feet above.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. B. M., top of steel casing on southeast side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above mean sea level.

COLUMBIA, S. C.

The river gage is a chain and weight gage, and is located on the Gervais Street highway bridge, near the fourth pier from the east side. There is also a brass gage of the Weather Bureau pattern attached to the third pier from the east side. Distance from marker on chain to lower end of weight, 38.5 feet. Graduation of brass gage extends from 0.4 foot below to 34.7 feet above zero.

B. M., top of rail at main line crossing of Atlantic Coast Line at Gervais Street, is 102.6 feet above zero of the gage and 222 feet above mean sea level.

DESCRIPTION OF RIVER GAGES, ETC.

B. M., top surface of middle pier and top surface of projection at upper end of south pier of above-mentioned bridge, are 47 feet above zero of the gage and 146.8 feet above m. s. l.

COLFAX, CAL.

The river gage, which belongs to the U. S. Geological Survey, is located on the left bank of the river, 50 feet above the Pacific Gas & Electric Co.'s dam, and is in three sections, bolted to 4 by 4 inch redwood supports. The first section (0.0 to 6.4 feet) is bolted to a rock; the second section (6.4 to 12.4 feet) is driven into the ground and supported by a tree; and the third section (12.4 to 16.0 feet) is bolted to a tree. Graduation extends from zero to 16 feet above.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of the gage, and 1,965 feet above m. s. l.

COLGATE (P. O., DOBBINS), CAL.

The river gage is vertical and in two sections. A new first section, -2 to 5 feet, was installed November 1, 1914. It is an enameled scale and is attached to a rock near the middle of the stream. The second section 5 to 20 feet, is wooden and is attached to the concrete wall of the power house, opposite the first section. Graduation extends from 2 feet below to 20 feet above zero.

B. M., mark cut in southwest wall of the Pacific Gas & Electric Co. power house, is 18 feet above zero of the gage.

COLUMBIA, MISS.

The river gage is attached to the downstream side of the log boom of the Marion Lumber Co., 25 feet from the east bank of the river. Graduation extends from zero to 30 feet above.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. B. M., top of steel casing on southeast side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above m. s. l.

COLUMBIA, S. C.

A brass river gage is attached to the west face of the third free granite pier, from the east, of the Gervais Street Bridge. The upper 7 feet are attached to a plank resting on top of the pier. Graduation extends from 0.4 foot below to 35 feet above zero. A board gage was installed November 4, 1914, on the east side of the fifth pier from the east abutment, in place of the chain and weight gage. Graduation extends from 2 feet below to 10 feet above zero. This gage is used only for low-water readings.

B. M., top of rail at main line crossing of the A. C. L. at Gervais Street, is 102.6 feet above zero of the gage and 222 feet above m. s. l.

COLUMBIA, TENN.

There are two river gages at this place, both located on the Columbia & Nashville Turnpike Co.'s bridge over Duck River. A tape and weight gage of the Mott pattern is attached to railing of bridge on north side, between footwalk and wagon drive, 3 feet above floor of bridge. It is 75 feet west from the center pier. Distance from zero mark on tape to lower end of weight, 54.3 feet. A wooden gage is attached to the west side of the center pier of the bridge near the northwest corner. Graduation extends from zero to 35 feet above.

B. M., top of stone step at south entrance to courthouse, is 87.4 feet above zero of the gage and 606.8 feet above m. s. l.

COLUMBIA, VA.

The river gage is in five sections. The first section (-0.9 to 9.0 feet) is attached to a locust post in a gully or waste way that is about 100 feet west of the C. & O. Ry. passenger depot. The second section (9 to 15 feet) is installed about 100 feet north of section 1 and in a similar manner. The third section (15 to 17 feet) is spiked to the south side of the wooden framework for water wheel that stands at the head of above-mentioned gully. The fourth section (17 to 30 feet) is spiked to the north side of the wooden framework to which section 3 is attached. The fifth section (30 to 42 feet) is attached to the southeast wooden upright supporting the railroad water tank. This tank is about 125 feet west of C. & O. Ry. passenger depot. Graduation extends from 0.9 foot below to 42 feet above zero.

B. M., top of rail in front of C. & O. Ry. depot, is 29.8 feet above zero of the gage and 206 feet above m. s. l. B. M., southeast bottom edge of capstone of most easterly of two north foundation piers of railway water tank, is 28.9 feet above zero of the gage and 205.1 feet above m. s. l.

XIV

COLGATE (P. O., DOBBINS), CAL.

On the Yuba River, 28 miles above Maysville, Cal.

The gage is in two sections. The first section (-2 to 5 feet) is an enameled scale and is attached to a rock near the middle of the stream. The second section (5 to 20 feet) is wooden and is attached to the concrete wall of the power house, opposite the first section.

B. M., mark cut in S. W. wall of the Pacific Gas & Electric Co. power house, is 18 feet above zero of the gage.

COLUMBIA, MISS.

On the Pearl River, 162 miles below Jackson, Miss.

An enameled scale gage was installed, September 9, 1916. It is attached to the downstream side of the log boom of the Marion Lumber Co., 25 feet from the east bank of the river. Graduation extends from 0 to 30 feet.

B. M., top of boom to which gage is attached, is 29 feet above zero of the gage and 110 feet above mean sea level. B. M., top of steel casing on S. E. side of center pier of Marion County steel highway bridge over Pearl River, 2 miles south of Columbia, is 29 feet above zero of the gage and 110 feet above m. s. l.

COLUMBIA, S. C.

On the Congaree River, 63 miles above Rimmie, S. C.

A brass gage is attached to the downstream end of the third pier from the E. end of the Gervais Street bridge and is graduated from -0.4 to 34.5 feet. A chain and weight gage was installed October 11, 1916, just E. of the fifth pier from the E. side. Distance from marker on chain to the lower end of the weight, 41.82 feet. The chain and weight gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near N.W. corner of main building of Presbyterian Theological Seminary, Pickens and Blandings Streets, is 186.20 feet above zero of the gage and 303.92 feet above m. s. l.

COLUMBIA, TENN.

On the Duck River, 76 miles above Johnsonville, Tenn.

There are two river gages at this place, both located on the Columbia & Nashville Turnpike Co.'s bridge over Duck River. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape to lower end of weight, 54.3 feet. A wooden gage is attached to the W. side of the center pier of the bridge near the N. W. corner. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, is 87.4 feet above zero of the gage and 606.8 feet above m. s. l.

COLUMBIA, VA.

On the James River, 56 miles above Richmond, Va.

The gage is in five sections. The first section (-0.9 to 9.0 feet) is attached to a locust post in a gully or wasteway that is about 100 feet W. of the C. & O. Ry. passenger depot. The second section (9 to 15 feet) is about 100 feet N. of section 1. The third section (15 to 17 feet) is spiked to the S. side of the wooden framework for water wheel that stands at the head of above-mentioned gully. The fourth section (17 to 30 feet) is spiked to the N. side of the wooden framework to which section 3 is attached. The fifth section (30 to 42 feet) is attached to the S. E. wooden upright supporting the railroad water tank. This tank is about 125 feet west of C. & O. Ry. passenger depot.

B. M., top of rail in front of C. & O. Ry. depot, is 29.8 feet above zero of the gage and 206 feet above m. s. l. B. M., S. E. bottom edge of capstone of most easterly of two N. foundation piers of railway water tank, is 28.9 feet above zero of the gage and 205.1 feet above m. s. l.

COLUMBUS, GA.

On the Chattahoochee River, 51 miles above Eufaula, Ala.

The gage is in two sections. The first section is in two parts. The lower part (0 to 20 feet) is nailed to the downstream side of the brick pier, near the left bank. The upper part (20 to 40 feet) is fastened just above the main brick pier. The second section (30 to 65 feet) is fastened to a pier on the left bank.

COLGATE (P. O., DOBBINS), CAL.

On the Yuba River, 28 miles above Maysville, Cal.

The first section (-2 to 5 feet) is an enameled scale and is attached to a rock near the middle of the stream. The second section (5 to 20 feet) is wooden and is attached to the concrete wall of the power house, opposite the first section.

B. M., mark cut in SW. wall of the Pacific Gas & Electric Co. power house, is 18 feet above zero of gage.

COLUMBIA, MISS.

On the Pearl River, 162 miles below Jackson, Miss.

The gage is attached to the downstream side of the log boom of the Prince Vencer Co., 25 feet from the east bank of the river. Graduation extends from 0 to 29 feet. The gage above 11.9 feet was washed away February 19, 1917, and a temporary gage (18 to 29 feet) was installed December 31, 1917. It is attached to piling at intersection of Beef Alley and Pearl Street, about 400 feet from the first section.

B. M., top of boom to which gage is attached, is 29 feet above zero of gage and 110 feet above mean sea level. B. M., top of steel casing on SE. side of center pier of steel highway bridge over Pearl River, 2 miles S. of Columbia, is 29 feet above zero of gage and 110 feet above m. s. l.

U. S. B. M., square cut into coping at N. end of steps, W. side of courthouse, is 35.4 feet above zero of gage.

COLUMBIA, S. C.

On the Congaree River, 63 miles above Rimini, S. C.

A brass gage is attached to the downstream end of third pier from E. end of Gervais Street bridge and is graduated from -0.4 to 34.5 feet. A chain and weight gage is located just E. of fifth pier from E. side. Distance from marker on chain to the lower end of the weight, 41.82 feet. The chain and weight gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blandings Streets, is 186.20 feet above zero of gage and 303.92 feet above m. s. l.

B. M. (city engineer's), top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above m. s. l. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above m. s. l. U. S. G. S. B. M., crosscut in SW. corner of foundation stone of Columbia Street Ry. powerhouse, near foot of Gervais Street, is 143.91 feet above m. s. l.

COLUMBIA, TENN.

On the Duck River, 76 miles above Johnsonville, Tenn.

There are two river gages at this place, both located on the C. & N. T. Co.'s bridge. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape to lower end of weight, 51.3 feet. A wooden gage is attached to the W. side of the center pier of the bridge near the NW. corner. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, is 87.4 feet above zero of gage and 606.8 feet above m. s. l.

COLUMBIA, VA.

On the James River, 56 miles above Richmond, Va.

A chain and weight gage was installed on the highway bridge just below the C. & O. station, November 14, 1917. Distance from marker on chain to lower end of weight, 52.38 feet.

B. M., base of rail in front of C. & O. station, is 32.65 feet above zero of gage and 205.5 feet above m. s. l. B. M., top of copper plug set vertically into the top of the second pier from Columbia side, 3.2 inches from E. end and 7.2 inches from S. face of pier, is 40.07 feet above zero of gage and 212.91 feet above m. s. l. Top of wheel guard stone at intersection of Main and another (not named) street, about 300 feet N. of station, is 40.8 feet above low water of 1892.

Levels run November 14, 1917, showed that the 10-foot mark of the first section of the old gage was 182.86 feet above m. s. l., instead of 186.2 feet as previously given. The second section was found to read 0.4 foot higher than the first section, but the observer stated that this was known and taken into consideration in reading the gage. The chain and weight gage was set to read with the low section of the old gage.

XVI

CLOVERPORT, KY.

On the Ohio River, 79 miles above Evansville, Ind.

The gage is located about 1 mile below the railroad station. Section 1, 0 to 5 feet, is on the concrete pier at the foot of the inclined section. Section 2, 5 to 39 feet, is inclined and consists of an inverted steel rail embedded in concrete. Section 3, 39 to 64 feet, is vertical, made of channel iron, fastened to the concrete dry of the L. H. & St. L. Ry.

B. M., U. S. C. & G. S. high-water mark on Fisher's drug store, corner of Second and Main Streets, is 7 feet above zero of gage and 416.63 feet above m. s. l.

CLYDE, KANS.

On the Republican River, 32 miles above Clay Center, Kans.

A chain and weight gage is bolted to end of floorbeam of M. P. bridge, upstream side. Distance from marker on chain to lower end of weight, 29.45 feet.

B. M. No. 1, U. S. C. & G. S. bronze tablet on bridge seat at E. end of bridge, NE. corner, is 21.52 feet above zero of gage. B. M. No. 2, cross cut in NW. corner of concrete shoulder of W. concrete abutment, 7.5 feet upstream from inside of upstream rail, Bridge 74, is 25.67 feet above zero of gage and 1,292.62 feet above m. s. l.

COCHRANE, ALA.

On the Tombigbee River, 103 miles above Demopolis, Ala.

The gage is located on the piers of bridge of A. T. & N. Ry. Co. The first section, -1 to 8 feet, is bolted to the SE. side of the iron cofferdam of the middle pier. The second section, 8 to 47 feet, is painted on S. side of S. concrete pier.

B. M., top surface of middle pier and top surface of projection at upper end of S. pier of above-mentioned bridge, are 47 feet above zero of gage and 146.8 feet above m. s. l.

COLFAX, CALIF. (U. S. G. S. GAGE).

On the Bear River.

The gage is located on left bank of river, 50 feet above the P. G. & E. Co.'s dam. Section 1, 0.0 to 6.4 feet, is bolted to a rock. Section 2, 6.4 to 12.4 feet, is driven into the ground and supported by a tree. Section 3, 12.4 to 16.0 feet, is bolted to a tree.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of gage, and 1,965 feet above m. s. l.

COLGATE (P. O., DOBBINS), CALIF.

On the Yuba River, 28 miles above Maysville, Calif.

Section 1, -2 to 5 feet, is an enameled scale and is attached to a rock near the middle of the stream. Section 2, 5 to 20 feet, is wooden and is attached to a concrete wall of the powerhouse, opposite the first section.

B. M., mark cut in SW. wall of the Pacific Gas & Electric Co. powerhouse, is 18 feet above zero of gage, about 540 feet above m. s. l.

COLUMBIA, MISS.

On the Pearl River, 162 miles below Jackson, Miss.

The gage is attached to the downstream side of the log boom of the Price Veneer Co., 25 feet from the left bank of the river. Graduation extends from 0 to 29 feet. The gage above 14.9 feet was washed away February 19, 1917, and a temporary gage, 18 to 29 feet, was installed December 31, 1917. It is attached to pile at intersection of Beef Alley and Pearl Street, about 400 feet from the first section.

B. M., top of boom to which gage is attached, is 29 feet above zero of gage and 110 feet above m. s. l. B. M., top of steel casing on SE. side of center pier of steel highway bridge over Pearl River, 2 miles S. Columbia, is 29 feet above zero of gage and 110 feet above m. s. l.

U. S. B. M., square cut into coping at N. end of steps, W. side of courthouse, is 55.4 feet above zero of gage.

COLUMBIA, S. C.

On the Congaree River, 63 miles above Rimini, S. C.

A brass gage is attached to the downstream end of third pier from E. end of Gervais Street bridge and graduated from -0.4 to 34.5 feet. A chain and weight gage is located just E. of fifth pier from E. side. Distance from marker on chain to the lower end of the weight, 41.82 feet. The chain and weight gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blandings Streets, is 186.20 feet above zero of gage and 303.92 feet above m. s. l.

B. M. (city engineer's), top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above m. s. l. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above m. s. l. U. S. G. S. B. M., cross cut in SW. corner of foundation stone of Columbia Street Ry. powerhouse, near foot of Gervais Street, is 143.91 feet above m. s. l.

COLUMBIA, TENN.

On the Duck River, 76 miles above Johnsonville, Tenn

There are two river gages at this place, both located on the C. & N. T. Co.'s bridge. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape to lower end of weight, 54.3 feet. A wooden gage is attached to the W. side of the center pier of the bridge near the NW. corner. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, is 87.4 feet above zero of gage and 606.8 feet above m. s. l.

COLUMBIA, VA

On the James River, 56 miles above Richmond, Va.

A chain and weight gage is located on the highway bridge just below the C. & O. station. Distance from marker on chain to lower end of weight, 52.38 feet.

B. M., base of rail in front of C. & O. station, is 32.65 feet above zero of gage and 205.5 feet above m. s. l. B. M., top of copper plug set vertically into the top of the second pier from Columbia side, 3.2 inches from E. end and 7.2 inches from S. face of pier, is 40.07 feet above zero of gage and 212.91 feet above m. s. l. Top of wheel guard stone at intersection of Main and another (not named) street, about 300 feet N. of station, is 40.8 feet above low water of 1892.

COLUMBUS, GA.

On the Chattahoochee River, 51 miles above Eufaula, Ala.

Section 1, 0 to 20 feet, is nailed to downstream side of brick pier, near left bank. Section 2, 20 to 40 feet, is fastened just above the main brick pier. Section 3, 30 to 65 feet, is fastened to pier on left bank.

Graduations from 0 to 20 feet are in feet and tenths, and the rest of the gage in feet and fourths. The lower portion terminates at 20 feet and the second portion begins at the same height with 21 feet; and the gage therefore reads 1 foot too high for all points above 20 feet.

B. M. U. S. G. S., at W. entrance to post office building, aluminum tablet stamped "251 Adj., 1903." is 65.02 feet above zero of gage and 250.27 feet above m. s. l.

B. M. U. S. G. S., cross chiseled on shoreward face of left bank viaduct abutment of M. & G. Ry. bridge, about 1 foot above ground, is 46.98 feet above zero of gage and 232.23 feet above m. s. l. B. M. U. S. G. S., cross chiseled on downstream shoreward corner top of rock of left bank pier of railroad bridge, is 44.44 feet above zero of gage and 229.69 feet above m. s. l.

B. M., U. S. G. S., downstream shoreward corner top of second stone pier from left bank, is 43.10 feet above zero of gage and 228.35 feet above m. s. l. B. M., U. S. G. S., cross chiseled on top of lower tension rod of railroad bridge about 2 feet shoreward from second pier from left bank, is 46.10 feet above zero of gage and 231.35 feet above m. s. l.

COLUMBUS, MISS.

On the Tombigbee River, 45 miles above Cochrane, Ala.

The gage is attached to E. side of channel pier of S. Ry. bridge. The first section, --4 to 0 feet, is fastened to concrete base of pier. The second section, 0 to 38.5 feet, is fastened to brick portion of pier.

B. M., copper plug in tree at SE. corner of First Street and Second Avenue, is 17.9 feet above zero of gage and 153.6 feet above m. s. l. B. M., top of rail in front of S. Ry. station, is 55.2 feet above zero of gage and 190.9 feet above m. s. l.

COLUMBUS, OHIO.

On the Scioto River, 27 miles above Circleville, Ohio.

The gage was moved June 20, 1918, to W. end of S. face of S. pier of H. V. bridge a short distance above Mound Street. There is a dam below the gage. Graduation extends from 0 to 24 feet.

COLFAX, CALIF. (U. S. G. S. GAGE). XVII

On the Bear River.

The gage is located on left bank of river, 50 feet above the P. G. & Co.'s dam. Section 1, 0.0 to 6.4 feet, is bolted to a rock. Section 2, 6.4 to 12.4 feet, is driven into the ground and supported by a tree. Section 3, 12.4 to 16.0 feet, is bolted to a tree.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of gage, and 1,965 feet above msl.

COLGATE (P. O., DOBBINS), CALIF.

On the Yuba River, 28 miles above Marysville, Calif.

Section 1, -2 to 5 feet, is an enameled scale and is attached to a rock near the middle of the stream. Section 2, 5 to 20 feet, is wooden and is attached to a concrete wall of the power house, opposite the first section.

B. M., mark cut in SW. wall of the Pacific Gas & Electric Co. power house, is 18 feet above zero of gage, and about 540 feet above msl.

COLUMBIA, MISS.

On the Pearl River, 162 miles below Jackson, Miss.

The gage, 0 to 14.9 feet, is attached to the downstream side of the log boom of the Price Vencer Co., 25 feet from the east bank of the river. Section 11 to 29 feet, is attached to a post about 400 feet upstream from the low section, at Beef Alley and Pearl Street.

B. M., spike in willow tree, 19.5 feet upstream from second pile from bank at low section of gage is 19.34 feet above zero of gage. B. M., nail in cypress tree about 20 feet upstream from high section, is 20.4 feet above zero of gage.

B. M., top of steel casing on SE. side of center of pier of steel highway bridge over Pearl River, 2 miles S. of Columbia, is 29 feet above zero of gage and 110 feet above msl.

U. S. B. M., square cut into coping at N. end of steps, W. side of courthouse, is 35.4 feet above zero of gage.

COLUMBIA, S. C.

On the Congaree River, 63 miles above Rimini, S. C.

A brass gage is attached to the downstream end of third pier from E. end of Gervais Street bridge and is graduated from -0.4 to 34.5 feet. A chain and weight gage is located just E. of fifth pier from E. side. Distance from marker on chain to the lower end of the weight, 41.82 feet. The chain and weight gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blandings Streets, is 186.20 feet above zero of gage and 303.92 feet above msl.

B. M. (city engineer's), top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above msl. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above msl. U. S. G. S. B. M., cross cut in SW. corner of foundation stone of Columbia Street Ry. power house, near foot of Gervais Street, is 143.91 feet above msl.

COLUMBIA, TENN.

On the Duck River, 80 miles above Johnsonville, Tenn.

There are two river gages at this place, both located on the C. & N. T. Co.'s bridge. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape to lower end of weight, 54.3 feet. A wooden gage is attached to the W. side of the center pier of the bridge near the NW. corner. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, is 87.4 feet above zero of gage and 606.8 feet above msl.

COLUMBIA, VA.

On the James River, 56 miles above Richmond, Va.

A chain gage is located on the highway bridge just below the C. & O. station. Distance from marker on chain to lower end of weight, 52.38 feet.

B. M., base of rail in front of C. & O. station, is 32.65 feet above zero of gage and 205.5 feet above msl. B. M., top of copper plus set vertically into the top of the second pier from Columbia side, 3.2 inches from E.

B. M. No. 1, U. S. G. S., bronze tablet on bridge seat of E. end of bridge, NW. corner, upstream from bridge, is 21.50 feet above zero of gage. B. M. No. 2, cross cut in NW. corner of concrete shoulder of W. concrete abutment, 7.5 feet upstream from inside of rail of bridge No. 74, is 25.67 feet above zero of gage and 1,292.62 feet above msl. B. M. No. 3, cross cut in top of bridge floor beam, adjacent to gage box, is 26.60 feet above zero of gage.

COCHRANE, ALA.

On the Tombigbee River, 86 miles above Demopolis, Ala.

Gage is located on piers of bridge of A. T. & N. Ry. Co. First section, - 1 to 8 feet, is bolted to SE. side of iron cofferdam of middle pier. Second section, 8 to 47 feet, is painted on SW. side of S. concrete pier.

B. M., U. S. E., top surface of middle pier and top surface of projection at upper end of S. pier of above-mentioned bridge, are 47 feet above zero of gage and 146.8 feet above msl.

COLFAX, CALIF. (U. S. G. S. GAGE).

On the Bear River.

Gage is located on left bank of river, 50 feet above P. G. & E. Co.'s dam. Section 1, 0.0 to 6.4 feet, is bolted to rock. Section 2, 6.4 to 12.4 feet, is driven into ground and supported by tree. Section 3, 12.4 to 16.0 feet, is bolted to tree.

B. M., U. S. G. S., crest of dam of Pacific Gas & Electric Co., marked 1,965 feet, is 5.2 feet above zero of gage, and 1,965 feet above msl.

COLGATE (P. O., DOBBINS), CALIF.

On the Yuba River, 28 miles above its mouth, at Marysville, Calif.

Section 1 of gage, - 2 to 5 feet, is of enameled steel, attached to rock near middle of stream. Section 2, 5 to 20 feet, is wooden and is attached to concrete wall of power house, opposite first section.

B. M., U. S. G. S., mark cut in SW. wall of Pacific Gas & Electric Co. power house, is 18 feet above zero of gage and about 540 feet above msl.

COLUMBIA, MISS.

On the Pearl River, 132 miles below Jackson, Miss.

Section 1 of gage, 0 to 14.9 feet, is attached to downstream side of log boom of Price Veneer Co., 25 feet from left bank of river. Section 2, 11 to 29 feet, is attached to post about 400 feet upstream from low section, at Beef Alley and Pearl Street.

B. M., spike in willow tree, 19.5 feet upstream from second pile from bank at low section of gage is 19.34 feet above zero of gage. B. M., nail in cypress tree about 20 feet upstream from high section, is 20.4 feet above zero of gage, and 101.4 feet above msl.

B. M., top of steel casing on SE. side of center of pier of steel highway bridge over Pearl River, 2 miles S. of Columbia, is 29 feet above zero of gage and 110 feet above msl.

B. M., U. S. E., 1915, square cut into coping at N. end of steps, W. side of courthouse, is 35.4 feet above zero of gage.

COLUMBIA, S. C.

On the Congaree River, 52 miles from its mouth and 63 miles above Rimini, S. C., on the Santee River.

Brass gage is attached to downstream end of third pier from E. end of Gervais Street bridge and is graduated from - 0.4 to 34.5 feet. A chain gage is located just E. of fifth pier from E. side. Distance from marker on chain to lower end of weight, 41.82 feet. Chain gage is used for low stages.

B. M., U. S. G. S., aluminum tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blanding Streets, is 186.20 feet above zero of gage and 303.92 feet above msl.

B. M. (city engineer's), top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above msl. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above msl. B. M., U. S. G. S., cross cut in SW. corner of foundation stone of Columbia Street Ry. power house, near foot of Gervais Street, is 143.91 feet above msl.

COLUMBIA, TENN.

On the Duck River, 66 miles from its mouth and 80 miles above Johnsonville, Tenn.

There are two gages at this place, both located on Maury County highway bridge. A Mott gage is attached to railing of bridge on N. side. Distance from zero mark on tape on lower end of weight, 51.3 feet. Wooden gage is attached to W. side of center pier of bridge. Graduation extends from 11 to 38 feet.

B. M., top of stone step at S. entrance to courthouse, has been removed. B. M., U. S. G. S., chiseled mark on right side of post, 119 feet from left end of bridge, is 53.71 feet above zero of gage and (calculated) 573.1 feet above msl.

COLUMBIA, VA.

On the James River, 63 miles above Richmond, Va.

A chain gage is located on highway bridge just below C. & O. station. Distance from marker on chain to lower end of weight, 52.38 feet.

Section 1 of gage, -2 to 5 feet, of enameled steel, attached to rock near middle of stream. Section 2, 5 to 20 feet, wooden, attached to concrete wall of power house, opposite first section.

B. M., U. S. G. S., mark cut in SW. wall of Pacific Gas & Electric Co. power house, is 18 feet above zero of gage and about 540 feet above msl.

COLUMBIA, MISS.

On Pearl River.

New enameled steel gage installed January 1, 1922. Attached to E. side of wing wall on upstream side of N. O. & G. N. R. R. bridge, about 125 feet along wall from bridge, and about 1½ miles upstream from old gage. Wing wall made of creosoted piling. Graduation from -2 to 30 feet.

B. M., N. O. & G. N. R. R., Lester, 1921, boat spike driven near N. end of cap into W. pile pier of gage bridge, is 0.84 foot above B. M. at Marion County courthouse in Columbia, 36.24 feet above zero of gage and 117.24 feet above msl. B. M., U. S. E., 1915, at courthouse in Columbia, 2½-inch square cut in limestone block coping at N. end of steps entering W. side, is 35.4 feet above zero of gage and 116.4 feet above msl. Authority for elevation of gage zero, G. & S. I. R. R. Co.

Section of old gage, 11 to 29 feet, near sewer abutment at intersection of Beef Alley and Pearl Street. Zero of new gage at same level as that of old one, but comparisons thus far made show readings at new gage about 0.1 foot higher.

COLUMBIA, S. C.

On Congaree River, 52 miles from its mouth and 58 miles above Rimini, S. C., on Santee River.

Brass gage attached to downstream end of third pier from E. end of Gervais Street bridge and graduated from -0.4 to 34.5 feet. Short-box chain gage just E. of fifth pier from E. side. Chain length, 41.82 feet. Chain gage used for low stages.

B. M., U. S. G. S., alumina tablet stamped "305 Columbia, 1900," in front face near NW. corner of main building of Presbyterian Theological Seminary, Pickens and Blanding Streets, is 186.20 feet above zero of gage and 303.92 feet above msl.

B. M. (city engineer's), cross cut on top of stone at NE. corner of intersection of Gervais and Gist Streets, is 40.70 feet above zero of gage and 158.42 feet above msl. B. M., cross cut in center of top of stone head wall at NE. corner of Gervais and Williams Streets, is 63.59 feet above zero of gage and 181.31 feet above msl. B. M., U. S. G. S., cross cut in SW. corner of foundation stone of Columbia Street Ry. power house, near foot of Gervais Street, is 143.91 feet above msl.

Dam at Parr Shoals, 23 miles upstream, and U. S. dam 2 miles below affect stages somewhat.

COLUMBIA, TENN.

On Duck River, 66 miles from its mouth and 81 miles above Johnsonville, Tenn., on Tennessee River.

Two gages at this place, both on Maury County highway bridge. Mott gage attached to railing of bridge on N. side. Tape length, 54.3 feet. Wooden gage attached to W. side of center pier of bridge. Graduation from 0 to 38 feet.

B. M., U. S. G. S., chiseled mark on right side of post, 119 feet from left end of bridge, is 53.71 feet above zero of gage and (calculated) 573.1 feet above msl.

Dam of Southern Cities Power Co., three-fourths mile upstream affects low stages. Covered at 18 feet.

COLUMBIA, VA.

On James River at mouth of Rivanna River, 63 miles above Richmond, Va.

Short-box chain gage attached to downstream side of highway bridge just below C. & O. station. Chain length, 52.38 feet.

B. M., base of rail in front of C. and O. Ry. station is 32.65 feet above zero of gage and 205.5 feet above msl. B. M., top of copper plug set vertically into top of second pier from Columbia side of highway bridge, 3.2 inches from E. end and 7.2 inches from S. face of pier, is 40.058 feet above zero of gage and 212.91 feet above msl.

COLUMBUS, GA.

On Chattahoochee River, 50 miles above Eufaula, Ala.

Gage attached to first channel pier from left bank of Mobile & Gerard Railway bridge. Graduation from 0 to 39 feet.

B. M., U. S. G. S., at W. entrance to post-office building, aluminum tablet stamped "251 ADJ. 1903," 65.02 feet above zero of gage and 250.27 feet above msl. B. M., U. S. G. S., cross chiseled on shoreward face of left-bank viaduct abutment of M. & G. Ry. bridge, about 1 foot above ground, is 46.93 feet above zero of gage and 232.23 feet above msl.

COLUMBUS, MISS.

On Tombigbee River, 49 miles above Cochrane, Ala.

Gage attached to E. side of channel pier of S. Ry. bridge. Section 1, -4 to 0 feet, fastened to concrete base of pier; section 2, 0 to 38.5 feet, to brick portion of pier.

B. M., copper plug in tree at SE. corner of First Street and Second Avenue, is 17.9 feet above zero of gage and 153.6 feet above msl. B. M., top of rail in front of S. Ry. station is 55.2 feet above zero of gage and 153.6 feet above msl.

Circleville, Ohio..... All readings of 10.0 and below should be corrected as follows: From July 23, 1924, to Oct. 11, 1926, subtract 0.1 foot; from Oct. 12, 1926, to Dec. 31, 1928, subtract 0.2 foot; from Jan. 1, 1929, to Dec. 31, 1930, subtract 0.3 foot. Readings from 10.1 to 20.0 should be corrected as follows: From June 1, 1925, to May 8, 1929, subtract 0.1 foot; from May 9, 1929, to Feb. 8, 1932, subtract 0.2 foot.

Columbia, S.C..... All records made from Sept. 1, 1929, to Dec. 31, 1932, should be corrected according to the following table:

	10 feet and below	10.1 to 20.0 feet	20.1 to 30.0 feet	30.0 feet and over
Subtract 0.1 foot..	Sept. 1, 1929–Sept. 30, 1930.	Jan. 1, 1930–Apr. 15, 1931.	June 1, 1930–Mar. 31, 1932.	Apr. 15, 1931–Dec. 31, 1932.
Subtract 0.2 foot..	Oct. 1, 1930–Oct. 31, 1931.	Apr. 16, 1931–July 31, 1932.	Apr. 1, 1932–Dec. 31, 1932.	
Subtract 0.3 foot..	Nov. 1, 1931–Nov. 30, 1932.	Aug. 1, 1932–Dec. 31, 1932.		
Subtract 0.4 foot..	Dec. 1, 1932–Dec. 31, 1932.			

Columbia, Va..... All readings for the period Jan. 1, 1918, to Dec. 31, 1929, should be corrected by subtracting the following amounts (in all cases the amounts given are in feet):

Year	10 and lower	10.1 to 20.0	Above 20	Year	10 and lower	10.1 to 20.0	Above 20
1918.....	0.1	0.1	0.0	1924.....	0.6	0.5	0.3
1919.....	.2	.1	.1	1925.....	.7	.5	.4
1920.....	.3	.2	.1	1926.....	.8	.6	.4
1921.....	.3	.3	.2	1927.....	.8	.7	.5
1922.....	.4	.3	.2	1928.....	.8	.7	.5
1923.....	.5	.4	.3	1929.....	.8	.7	.5

Columbus, Miss..... To reduce past records to present gage datum add 4.0 feet to all readings prior to Jan. 1, 1933.

Cotter, Ark..... Add 0.1 foot to all readings below 3.9 feet from Nov. 5, 1930, to Dec. 31, 1932.

Cotulla, Tex..... From July 26, 1927, to Oct. 19, 1928, add 1.2 feet; from Oct. 20, 1928, to Dec. 31, 1929, add 1.4 feet.

Covington, Ind..... The readings for Nov. 11, 1929, and for the period Dec. 1 to 14, 1929, should be corrected by the addition of 3.5 feet. The mean stage for December 1929 should be 11.4 feet.

Dam No. 48, Ohio River... Subtract 7.1 feet from Jan. 1, 1922, to Dec. 31, 1923.

Del Rio, Tex..... Gage readings made prior to July 1, 1932, are not comparable with present gage readings.

Des Moines, Iowa..... Subtract 0.9 foot previous to Jan. 1, 1908. From May 10, 1930, to Dec. 31, 1930, subtract 0.1 foot.

Dubuque, Iowa..... Subtract 1.0 foot from all published readings from beginning of records to Dec. 31, 1932.

El Reno, Okla..... Add 2.0 feet to all readings made prior to Dec. 31, 1932.

Eugene, Oreg..... Subtract 0.1 foot from readings 6.0 to 13.0 feet, and add 0.1 foot to readings above 25.0 feet from Nov. 16, 1913, to Dec. 31, 1915. Correct all readings of 6.0 feet and lower, for the period Sept. 1, 1920, to Dec. 31, 1929, by subtracting 0.2 foot.

Fayetteville, N.C..... Numerous changes in zero plane between Oct. 17, 1909, and Dec. 31, 1930, make the list of corrections long and complicated. Corrected readings on file in Office of Chief of Weather Bureau, Washington, D.C., and in Weather Bureau office, Raleigh, N.C.

Fort Ripley, Minn..... Staff gage zero was 1,134.71 feet above m.s.l. (1912 adj.) on May 16, 1929. Staff gage zero was 1,135.11 feet above m.s.l. (912 adj.) on Aug. 15, 1904; or the readings were 0.40 foot higher on May 16, 1929, than they were on Aug. 15, 1904, provided the elevation of b.m. 307/3 (cap on pipe) had not changed in the meantime. If the b.m. has remained constant the error of 0.40 foot was probably introduced in repairing or replacing the gage, and may have been introduced all at one time, or may have been cumulative, as gage was repaired or renewed several times.

Fort Smith, Ark..... Gage readings for the period Nov. 20, 1910, to Feb. 15, 1911, considered doubtful and not used. Subtract 0.2 foot from readings below 10.0 feet from Oct. 1, 1913, to Dec. 31, 1917.

Franklinton, La..... All readings below 3.4 feet prior to Nov. 7, 1924, are unreliable. Add 0.4 foot to all readings below 10.7 feet prior to July 26, 1929, except to estimated readings in June, July, August and September 1928.

Gadsden, Ala..... The following stages (all in 1893) should be substituted for those previously published: July 10, 1.2; Aug. 10, 2.0; Sept. 10, -0.2; Oct. 10, 0.0; Nov. 10, -0.7; Dec. 10, 0.9. Readings below 3.0 feet in 1927, 1928, and 1929 considered unreliable.

Greenwood, Miss..... Subtract 0.1 foot from all readings 10.0 feet and below for the period Jan. 1, 1932, to Dec. 31, 1932. Subtract 0.1 foot from all readings above 10.0 feet for the period July 1, 1932, to Dec. 31, 1932.

Harrisburg, Pa..... Gage was located at waterworks, 1/4 mile upstream from present gage, until July 18, 1904. Both gages were set to the same zero plane.

Hendricks Bridge, Oreg... Add 1.0 foot in April 1919. Subtract 1.1 feet from Sept. 5, 1928, to Dec. 31, 1929.

Huntingdon, Pa..... Add 3.0 feet previous to 1895. Add 1.0 foot to readings on Aug. 6, and from Aug. 8 to 31, 1895. Readings on Oct. 31, 1907, should be 3.2 and on Nov. 1, 1907, 3.3. In vol. XII, p. 115, make highest stage 22.5 on June 1, 1889, and lowest stage 2.4 on Oct. 2, 1891, and subsequent dates. Records prior to Apr. 17, 1931, not comparable with subsequent ones.

Kermit, W.Va..... Subtract 0.2 foot from all readings from Dec. 21, 1928, to July 13, 1929, from Aug. 10, 1929, to Aug. 25, 1930, from Oct. 23, 1930, to Dec. 31, 1930. Subtract 0.3 foot from all readings from July 14, 1929, to Aug. 9, 1929, and from Aug. 26, 1930, to Oct. 22, 1930.

Kingston, Tenn..... Add 0.1 foot to all readings from Nov. 12, 1929, to Dec. 31, 1930.

Knights Landing, Calif... Add 5.0 feet prior to Dec. 1, 1906; add 12.0 feet from Dec. 1, 1906, to Dec. 31, 1931.

Knoxville, Tenn..... Readings made prior to July 1, 1929, are not comparable with subsequent readings.

La Crosse, Wis..... 1873, add 1.0 foot; 1874 to 1884, subtract 1.3 feet; Jan. 1, 1885 to Sept. 30, 1891, subtract 1.2 feet.

Lansing, Iowa..... Add 0.3 foot to all readings from July 16, 1912, to Nov. 28, 1919; subtract 0.2 foot from Mar. 20, 1920, to Feb. 23, 1922; subtract 0.1 foot from Mar. 19, 1926, to Apr. 30, 1930; add 0.6 foot from May 1, 1930, to Nov. 30, 1930.

Lock No. 4, Charleroi, Pa. Add 1.53 feet to all readings made prior to Jan. 1, 1915. Subtract 1.67 feet from all readings between Jan. 1, 1915, and Dec. 31, 1931.

Attachment 3—National Weather Service Gauge Description and
Corrigenda, Broad at Blairs (Volume numbers appear on the copies)

DESCRIPTION OF RIVER GAGES, ETC.

11

BIRDS BRIDGE, TENNESSEE.

Birds Bridge, Tenn. Established November 1, 1906. Is on the Nolachucky River, 45 miles from its mouth. The width of the river at average low water is 300 feet. The drainage area above the station is 1,100 square miles.

The river gage, which belongs to the Weather Bureau, is a tape and weight gage of the Mott pattern, and is located on the steel highway bridge, being fastened to a vertical member on the east, or upstream side of the first span, 80 feet from the right bank of the river.

Graduation extends from zero to 37 feet above. Highest water was 32 feet in 1900; lowest, unknown. Flood stage is at 10 feet.

BISMARCK, NORTH DAKOTA.

No change since publication of Part VII.

BLACKROCK, ARKANSAS.

No change since publication of Part VII.

BLAIR, NEBRASKA.

No change since publication of Part VII.

BLAIRS, SOUTH CAROLINA.

Blairs, S. C. Established July 1, 1905. Is on the Broad River, 36 miles above its mouth, at Columbia, S. C. The width of the river at average low water is 430 feet. The drainage area above the station is 4,560 square miles.

The river gage which belongs to the United States Engineer Corps, is located about one-third of a mile from the Southern Railway station, about 300 feet below a high rocky point, and is protected from drift by the point and the curve in the river. It is in two sections. The lower section (0 to 9.4 feet) is inclined and is fastened to rock. It is made of 2 by 8 inch heart pine, is painted white, and graduated with Arabic numerals and wire nails. The upper section (9.5 to 30.5 feet) is vertical and is attached to the upper portion of a sweet gum tree. It is made of 1 by 4 inch pine and is painted white with graduations of black Roman numerals and lines. Chisel cuts for reference purposes are made in the rocks at the 3.5 and 10 foot marks.

B. M., United States Geological Survey, pipe with brass cap, near mail crane, west of Southern Railway station, is 37.5 feet above zero of the gage, and 293 feet above mean sea level. Nail in root of sweet gum tree to which upper section of gage is attached is 9.4 feet above zero of the gage, and 264.9 feet above mean sea level. Zero of gage is low-water mark of 1903.

Graduation extends from zero to 30.5 feet above. Highest water was 29 feet in June, 1886; lowest, 0.0 in 1903. Flood stage is at 14 feet.

BLUE RAPIDS, KANSAS.

No change since publication of Part VII.

BLUFF CITY, TENNESSEE.

Highest water since establishment of station was 11.6 feet on January 23, 1906. Flood stage is at 12 instead of 15 feet.

BONNERS FERRY, IDAHO.

No change since publication of Part VII.

BOONE, IOWA.

No change since publication of Part VII.

The river gage, which belongs to the United States Engineer Corps, is located on the Blair crossing bridge. It is a wire-cable gage of the Missouri River Commission pattern, with graduation burnt into horizontal 1 by 4 inch planking.

B. M. 360, United States Engineers, on west pier of bridge, south side, in third course of masonry below lower coping stone, is 19.4 feet above zero of the gage and 1,008.4 feet above mean sea level.

Graduation extends from zero to as far above as may be necessary. Highest water was 19.3 feet, on April 6, 1884; lowest, 0.0, on January 26, 1900. Flood stage is at 15 feet.

575.4 should be subtracted from observed readings to obtain true stages.

BLAIRS, SOUTH CAROLINA.

Blairs, S. C. Established July 1, 1905. Is on the Broad River, 36 miles above its junction with the Saluda River at Columbia, S. C. The width of the river at average low water is 430 feet. The drainage area above the station is 4,560 square miles.

The river gage was carried away by the flood of August, 1908, and a new one installed by the Weather Bureau in September, 1908, about 500 feet farther upstream. It is located about one-third of a mile from the Southern Railway station, about 300 feet from a high rocky point, and is in two sections. The first section (0 to 12 feet) is made of 2 by 8 inch timber, bolted to the rocks, and is painted white with black graduations. The second section (9.4 to 30.5 feet) is a vertical wooden staff, 1 by 4 inches, nailed to a sweet-gum tree, about 300 feet below the first section, and is painted white with black graduations.

B. M., U. S. G. S., pipe with brass cap, near mail crane west of Southern Railway station, is 37.5 feet above zero of the gage and 293 feet above mean sea level. Nail in root of sweet-gum tree to which upper section of gage is attached is 9.4 feet above zero of the gage and 264.9 feet above mean sea level. Zero of gage is low-water mark of 1903.

Graduation extends from zero to 30.5 feet above. Highest water was 31.1 feet, at 4 a. m., August 26, 1908; lowest, 0.0, in 1903. Flood stage is at 14 feet.

BLUE RAPIDS, KANSAS.

Blue Rapids, Kans. Established August 1, 1904. Is on the Big Blue River, 47 miles from its mouth, at Manhattan, Kans. The width of the river at average low water is 170 feet. The drainage area above the station is 8,075 square miles.

The river gage is a chain and weight gage of the United States Geological Survey pattern and is located on Union Pacific Railroad steel bridge No. 953. The gage box is on the north side of the bridge, 75 feet from the east land pier. An extension scale is provided.

B. M., cross (+) cut in top stone east side of south abutment, about 4 feet from where bridge structure begins, is 32 feet above zero of the gage and 1,096.5 feet above mean sea level. Top of ties where gage descends is 33 feet above zero of the gage and 1,097.5 above mean sea level.

Graduation extends from zero to 25 feet above. Highest water was 34 feet, on June 7 and 8, 1908; lowest, 0.0, date unknown. Flood stage is at 14 feet.

BLUFF CITY, TENNESSEE.

Bluff City, Tenn. Established March 10, 1902. Is on the South Fork of the Holston River, 35 miles from its mouth, at Rotherwood, Tenn. The width of the river at average low water is 250 feet. The drainage area above the station is 855 square miles.

The river gage, which belongs to Mr. J. W. Lockart, of Bluff City, is attached to the southwest face of the first pier from the east end of the Bristol, Elizabethtown and North Carolina Railroad bridge at Bluff City. It is made of 4 by 12 inch heart pine timber, and is graduated with brass tacks.

B. M., cross cut in upper surface of northwest corner of pier to which gage is attached, is 3.8 feet above zero of the gage and 1,372.4 feet above mean sea level. United States Geological Survey B. M., bronze tablet set in upstream side of capstone of left abutment of highway bridge at Bluff City, is 20.4 feet above zero of the gage, and 1,389 feet above mean sea level.

Graduation extends from 2 feet below to 15 feet above zero. Highest water since establishment of station was 11.7 feet, on June 14, 1907; lowest, -0.2 foot, on December 1, 7, 12, and 19, 1903. Flood stage is at 12 feet.

The river gage is a chain and weight gage and is fastened to the handrail of the bridge over Black River.

B. M., U. S. G. S., top of dam near gage location, is 14 feet above zero of the gage and 763 feet above mean sea level.

Graduation extends from zero to as far as may be necessary. Highest water was 27 feet, date unknown; lowest, 0.0, date unknown. Flood stage is between 15 and 18 feet. The utility of the station was destroyed by dams, and it was therefore discontinued on March 31, 1910.

BLACKROCK, ARKANSAS.

Blackrock, Ark. Established August 1, 1904. Is on the Black River, 67 miles from its mouth and 73 miles above Newport, Ark., on the White River. The width of the river at average low water is 631 feet. The drainage area above the station is 1,343 square miles.

The river gage is located at the lower end of the west side of the downstream wooden crib or bridge rest of the Kansas City, Fort Scott & Memphis (Frisco) Railroad bridge over Black River, about midway of the stream. It is made of 2 by 12 inch yellow heart pine and is painted white, with graduations cut into the wood and painted black. Figures for even feet are made of galvanized iron.

B. M. (U. S. W. B. 1904), $\frac{7}{8}$ -inch rivet bolt 6 inches long, drilled into top of solid limestone rock on right bank of river, near ferry landing, 2 feet from southwest corner of street crossing and about 800 feet south and 81 feet west of the gage, is 46 feet above zero of the gage and 271.8 feet above mean sea level. B. M., base of rail on bridge on which gage is located is 26.9 feet above zero of the gage and 262.7 feet above mean sea level. B. M., top of concrete coping of middle draw pier of same bridge is 28.4 feet above zero of the gage and 254.2 feet above mean sea level.

Graduation extends from 4 feet below to 36 feet above zero. Highest water was 29 feet, date unknown; lowest, 0.0, date unknown. Flood stage is at 12 feet.

BLAIR, NEBRASKA.

Blair, Nebr. Established August 16, 1904. Is on the Missouri River, 705 miles from its mouth and 36 miles above Omaha, Nebr. The width of the river at average low water is 600 feet. The drainage area above the station is 321,551 square miles.

The river gage, which belongs to the United States Engineer Corps, is located on the Blair crossing bridge. It is a wire-cable gage of the Missouri River Commission pattern, with graduation burnt into horizontal 1 by 4 inch planking.

B. M., 360, United States Engineers, on west pier of bridge, south side, in third course of masonry below lower coping stone, is 19.4 feet above zero of the gage and 1,008.4 feet above mean sea level.

Graduation extends from zero to as far above as may be necessary. Highest water was 19.3 feet, on April 6, 1884; lowest, 0.0, on January 26, 1900. Flood stage is at 15 feet.

575.4 should be subtracted from observed readings to obtain true stages.

BLAIRS, SOUTH CAROLINA.

Blairs, S. C. Established July 1, 1905. Is on the Broad River, 36 miles above its junction with the Saluda River at Columbia, S. C. The width of the river at average low water is 430 feet. The drainage area above the station is 4,560 square miles.

The river gage is located about one-third of a mile from the Southern Railway station, about 300 feet from a high rocky point, and is in two sections. The first section (0 to 12 feet) is made of 2 by 8 inch timber, bolted to the rocks, and is painted white with black graduations. The second section (9.4 to 30.5 feet) is a vertical wooden staff, 1 by 4 inches, nailed to a sweet-gum tree, about 300 feet below the first section, and is painted white with black graduations.

B. M., U. S. G. S., pipe with brass cap, near mail crane west of Southern Railway station, is 37.5 feet above zero of the gage and 293 feet above mean sea level. B. M., nail in root of sweet-gum tree, to which upper section of gage is attached, is 9.4 feet above zero of the gage and 264.9 feet above mean sea level. Zero of gage is low-water mark of 1903.

Graduation extends from zero to 30.5 feet above. Highest water was 31.1 feet, at 4 a. m., August 26, 1908; lowest, 0.0, in 1903. Flood stage is at 14 feet.

Zero of gage coincides with low water of November 3, 1889, and is 1,617.2 feet above mean sea level. B. M., top of rail at east end of Northern Pacific Railway depot, is 53.2 feet above zero of the gage, and 1,670.4 feet above mean sea level. B. M., top of stringer from which gage hangs, is 73.2 feet above zero of the gage and 1,690.4 feet above mean sea level.

BLACKROCK, ARK.

The river gage is located at the lower end of the west side of the downstream wooden crib or bridge rest of the Kansas City, Fort Scott & Memphis (Frisco) Railroad bridge over Black River, about midway of the stream. It is made of 2 by 12 inch yellow heart-pine and is painted white, with graduations cut into the wood and painted black. Figures for even feet are made of galvanized iron. Graduation extends from 4 feet below to 36 feet above zero.

B. M. (U. S. W. B. 1904), 7/8-inch rivet bolt 6 inches long, drilled into top of solid limestone rock on right bank of river, near ferry landing, 2 feet from southwest corner of street crossing and about 800 feet south and 81 feet west of the gage, is 46 feet above zero of the gage and 271.8 feet above mean sea level. B. M., base of rail on bridge on which gage is located is 36.9 feet above zero of the gage and 262.7 feet above mean sea level. B. M., top of concrete coping of middle draw pier of same bridge, is 28.4 feet above zero of the gage and 254.2 feet above mean sea level.

BLAIR, NEBR.

The river gage, which belongs to the United States Engineer Corps, is located on the Blair crossing bridge. It is a wire-cable gage of the Missouri River Commission pattern, with graduation burnt into horizontal 1 by 4 inch planking. Distance from marker on cable to lower end of weight, 83.3 feet.

B. M. 360, United States Engineers, on west pier of bridge, south side, in third course of masonry below lower coping stone, is 19.4 feet above zero of the gage and 1,007.7 feet above mean sea level. 575.4 should be subtracted from observed readings to obtain true stages.

BLAIRS, S. C.

The river gage is located about one-third of a mile from the Southern Railway station, about 300 feet from a high rocky point, and is in two sections. The first section (0 to 12 feet) is made of 2 by 8 inch timber, bolted to the rocks, and is painted white with black graduations. The second section (9.4 to 30.5 feet) is a vertical wooden staff, 1 by 4 inches, nailed to a sweet-gum tree, about 300 feet below the first section, and is painted white with black graduations. Graduation extends from zero to 30.5 feet above.

B. M., U. S. G. S., pipe with brass cap, near mail crane west of Southern Railway station, is 37.5 feet above zero of the gage and 293 feet above mean sea level. B. M., nail in root of sweet-gum tree, to which upper section of gage is attached, is 9.4 feet above zero of the gage and 264.9 feet above mean sea level. Zero of gage is low-water mark of 1903.

BLUE RAPIDS, KANS.

The river gage is a chain and weight gage and is located on Union Pacific Railroad steel bridge No. 953. The gage box is on the north side of the bridge, 75 feet from the east land pier. An extension scale is provided. Distance from marker on chain to lower end of weight, 36.6 feet.

B. M., cross (+) cut in top stone, east side of south abutment, about 4 feet from where bridge structure begins, is 32 feet above zero of the gage and 1,096.5 feet above mean sea level. B. M., top of ties where gage descends, is 33 feet above zero of the gage and 1,097.5 above mean sea level.

BLUFF CITY, TENN.

The river gage, which belongs to Mr. J. W. Lockart, of Bluff City, is attached to the southwest face of the first pier from the east end of the Bristol, Elizabethtown & North Carolina Railroad bridge at Bluff City. It is made of 4 by 12 inch heart-pine timber, and is graduated with brass tacks. Graduation extends from 2 feet below to 15 feet above zero.

B. M., cross cut in upper surface of northwest corner of pier to which gage is attached, is 3.8 feet above zero of the gage and 1,359.6 feet above mean sea level. B. M., U. S. G. S., bronze tablet set in upstream side of capstone of left abutment of highway bridge at Bluff City, is 20.4 feet above zero of the gage and 1,376.2 feet above mean sea level.

BLUFFTON, IND.

The river gage is painted on the south side of the east end of the middle concrete pier of the Wabash Valley Traction Co. bridge, and consists of white graduations on a 12-inch black surface. Graduation extends from 2 to 17.6 feet above zero.

DESCRIPTION OF RIVER GAGES, ETC.

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B. M. (U. S. W. B. 1904), $\frac{7}{8}$ -inch rivet bolt 6 inches long, drilled into top of solid limestone rock on right bank of river, near ferry landing, 2 feet from southwest corner of street crossing and about 800 feet south and 81 feet west of the gage, is 46 feet above zero of the gage and 271.8 feet above m. s. l. B. M., base of rail on bridge on which gage is located is 36.9 feet above zero of the gage and 262.7 feet above m. s. l. B. M., top of concrete coping of middle draw pier of same bridge, is 28.4 feet above zero of the gage and 254.2 feet above m. s. l.

BLAIR, NEBR.

The river gage, which belongs to the U. S. Engineer Corps, is located on the Blair crossing bridge. It is a wire-cable gage of the M. R. Commission pattern. Distance from marker on cable to lower end of weight, 83.3 feet.

B. M. 360, U. S. E., on west pier of bridge, south side, in third course of masonry below lower coping stone, is 19.4 feet above zero of the gage and 1,007.7 feet above m. s. l.

575.4 should be subtracted from observed readings to obtain true stages.

BLAIRS, S. C.

The river gage is located about one-third of a mile from the Southern Railway station, about 300 feet from a high rocky point, and is in two sections. The first section (0 to 15 feet) is bolted to the rocks. The second section, which belongs to the U. S. Engineer Corps (14 to 34 feet) is nailed to a sweet-gum tree, about 200 feet below the first section. Graduation extends from zero to 30.5 feet above.

B. M., U. S. G. S., pipe with brass cap, near mail crane west of Southern Railway station, is 37.5 feet above zero of the gage and 293 feet above m. s. l. B. M., nail in root of sweet-gum tree, to which upper section of gage is attached, is 9.4 feet above zero of the gage and 264.9 feet above m. s. l. Zero of gage is low-water mark of 1903.

BLUE RAPIDS, KANS.

The river gage is a chain and weight gage and is located on U. P. Ry. steel bridge No. 953. The gage box is on the north side of the bridge, 75 feet from the east land pier. An extension scale is provided. Distance from marker on chain to lower end of weight, 36.6 feet.

B. M., cross (+) cut in top stone, east side of south abutment, about 4 feet from where bridge structure begins, is 32 feet above zero of the gage and 1,096.5 feet above m. s. l. B. M., top of ties where gage descends, is 33 feet above zero of the gage and 1,097.5 feet above m. s. l.

BLUFF CITY, TENN.

The river gage, which belongs to Mr. J. W. Lockart, of Bluff City, is attached to the southwest face of the first pier from the east end of the Bristol, Elizabethtown & North Carolina Railroad bridge at Bluff City. Graduation extends from 2 feet below to 15 feet above zero.

B. M., cross cut in upper surface of northwest corner of pier to which gage is attached, is 3.8 feet above zero of the gage and 1,359.6 feet above mean sea level. B. M., U. S. G. S., bronze tablet set in upstream side of capstone of left abutment of highway bridge at Bluff City, is 20.4 feet above zero of the gage and 1,376.2 feet above m. s. l.

BLUFFTON, IND.

A new river gage was installed on August 22, 1913. It is attached to the south side of the east end of middle concrete pier of the Wabash Valley Traction Co. bridge. Graduation extends from 1 foot below to 19.6 feet above zero.

B. M., + BM near inside angle of southeast corner of south abutment of Wabash Valley Traction Co. bridge, is 21.9 feet above zero of the gage and 811.9 feet above m. s. l. B. M., notch cut in first stone above pavement in northeast corner of the courthouse, is 36.7 feet above zero of the gage and 826.7 feet above m. s. l.

BONNERS FERRY, IDAHO.

The river gage is attached to the south side of the first pier of the county highway bridge, 248 feet from the bank. The pier is V shaped at the upper end, and is made of rock covered with heavy plank sheathing. Graduation extends from 2 feet below to 38 feet above zero.

B. M., U. S. G. S., is 40.5 feet above zero of the gage and 1,770 feet above m. s. l. B. M., three large zinc spikes in form of a triangle, driven into west side of top stringer on Kootenai Valley Railway bridge over the Kootenai River, is 42.1 feet above zero of the gage and 1,771.6 feet above m. s. l.

XIV

DESCRIPTION OF RIVER GAGES, ETC.

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U. S. E. B. M. 1271, copper bolt in tile surmounted by iron pipe in corner of dooryard of H. L. Fisher, at corner of Seventh and Washington Streets; is 1,077.45 feet above m. s. l.
575.4 feet are subtracted from the observed readings to obtain true stages.

BLAIRS, S. C.

On the Broad River.

On January 11, 1917, levels were run to the gage and the high section was found to be 0.35 foot too high. Readings for 1916 have been corrected. Section 1 (0 to 15 feet) was changed by attaching an enameled scale to the old gage. Section 2 (15 to 30.4 feet) and section 3 (30 to 45 feet) are new. Section 2 is attached to a pine tree 150 feet downstream from section 1. Section 3 is attached to a pine tree 100 feet downstream from section 1.

U. S. G. S. B. M., iron post stamped "293 Columbia," 100 feet S. of road crossing, about 300 feet N. of depot, 12 feet E. of E. rail of S. Ry., is 38.65 feet above zero of the gage and 292.46 feet above m. s. l. B. M., 60 d. nail in N. side of tree to which section 3 is attached, is 30.69 feet above zero of the gage and 284.50 feet above m. s. l.

BLUE RAPIDS, KANS.

On the Big Blue River.

A chain and weight gage is located on U. P. Ry. steel bridge No. 953. The gage box is on the N. side of the bridge, 75 feet from the E. land pier. Distance from marker on chain to lower end of weight, 36.6 feet.

B. M., cross (+) cut in top stone, east side of south abutment, about 4 feet from where bridge structure begins, is 32 feet above zero of the gage and 1,096.5 feet above m. s. l. B. M., top of ties where gage descends, is 33 feet above zero of the gage and 1,097.5 feet above m. s. l.

BLUFF CITY, TENN.

On the South Fork, Holston River, 74 miles above Rogersville, Tenn.

The gage is attached to the downstream end of N. channel pier of steel highway bridge. Graduation extends from 0 to 15 feet.

U. S. G. S. B. M. bronze tablet stamped "1389 ASH," is 20.44 feet above zero of the gage and 1,388.55 feet above m. s. l. B. M., top of foundation of pier at gage, is about 3.8 feet on the gage.

BLUFFTON, IND.

On the Wabash River, 70 miles above Logansport, Ind.

The gage is attached to the S. side of the E. end of middle concrete pier of the Wabash Valley Traction Co. bridge. Graduation extends from 1 foot below to 19.6 feet above zero.

B. M., + BM near inside angle of SE. corner of S. abutment of Wabash Valley Traction Co. bridge, is 21.9 feet above zero of the gage and 811.88 feet above m. s. l. B. M., notch cut in first stone above pavement in northeast corner of the courthouse, is 36.7 feet above zero of the gage and 826.67 feet above m. s. l.

BONNERS FERRY, IDAHO.

On the Kootenai River, 279 miles above Northport, Wash.

The river gage is attached to the S. side of the first pier of the county highway bridge, 248 feet from the bank. The pier is V shaped at the upper end, and is made of rock covered with heavy plank sheathing. Graduation extends from 2 feet below to 38 feet above zero.

B. M., U. S. G. S., is 40.5 feet above zero of the gage and 1,770 feet above m. s. l. B. M., three large zinc spikes in form of a triangle, driven into west side of top stringer on Kootenai Valley Railway bridge over the Kootenai River, is 42.1 feet above zero of the gage and 1,771.58 feet above m. s. l.

BOONE, IOWA.

On the Des Moines River, 46 miles above Fort Dodge, Iowa.

A chain and weight gage is located on the C. & N. Ry. viaduct over the Des Moines River, 4 miles west of the city of Boone. Distance from marker on chain to lower end of weight, 189.3 feet.

B. M., top of guardrail of viaduct to which gage is attached, is 187.15 feet above zero of the gage and 1,050.8 feet above m. s. l.

XV

BISMARCK, N. DAK.

On the Missouri River, 195 miles above Pierre, S. Dak.

A chain and weight gage is attached to truck stringer of N. P. Ry. bridge, 2 miles from city. Distance from marker on cable to the lower end of the weight, 73.6 feet.

Zero of gage coincides with low water of November 3, 1889, and is 1,617.2 feet above mean sea level. B. M., top of rail at E. end of N. P. Ry. depot, is 53.2 feet above zero of gage and 1,670.4 feet above m. s. l. B. M., top of stringer from which gage hangs, is 73.2 feet above zero of gage and 1,690.4 feet above m. s. l.

BLACK ROCK, ARK.

On the Black River, 73 miles above Newport, Ark.

The gage was moved to second pier from N. end of Frisco bridge, November 26, 1912. It is in two sections—4 to 15 feet and 15 to 27 feet.

B. M. (U. S. W. B. 1904), $\frac{3}{4}$ -inch rivet bolt 6 inches long, drilled into top of solid limestone rock on right bank of river, near ferry landing, 2 feet from SW. corner of street crossing and about 900 feet S. and 81 feet W. of gage, is 46 feet above zero of gage and 271.76 feet above m. s. l. B. M., base of rail on bridge on which gage is located, is 36.9 feet above zero of gage and 262.66 feet above m. s. l. B. M., top of concrete coping of middle draw pier of same bridge, is 28.4 feet above zero of gage and 254.16 feet above m. s. l.

BLACKWELL, MO.

On the Big River. 72 miles above Glencoe, Mo.

The gage is in two sections. Section 1 (1.2 to 18.9 feet) is inclined and is located 25 feet S. of mile post 50/25. Section (18.0 to 36.5 feet) is attached to N. side of L. E. Cole & Co.'s store, 2,600 feet upstream from the low section.

B. M. U. S. G. S., on top of E. end of N. abutment of St. L., I. M. & S. bridge No. 46, $\frac{1}{4}$ mile S. of Blackwell station. Copper b. m. bolt gone, and hole covered with concrete; elevation of point taken to be the same, which is 23.08 feet above zero of gage and 594.91 feet above m. s. l.

B. M. NW. corner of N. concrete step to door of Bank of Blackwell, is 27.88 feet above zero of gage.

B. M., brass rod driven nearly flush into SE. side, 9 feet above ground, of a 3-foot locust tree, 90 feet W. of railroad at highway crossing, Blackwell, Mo., is 24.05 feet above zero of gage.

BLAIR, NEBR. (U. S. ENGINEER GAGE).

On the Missouri River, 36 miles above Omaha.

A wire-cable gage is attached to the Blair crossing bridge. Distance from marker on cable to the lower end of weight, 83.3 feet.

U. S. E. B. M. 360, on W. pier of bridge, S. side, in third course of masonry below lower coping stone, is 19.36 feet above zero of gage and 1,007.7 feet above m. s. l.

U. S. E. B. M. 1271, copper bolt in tile surmounted by iron pipe in corner of dooryard of H. L. Fisher, at corner of Seventh and Washington Streets, is 1,077.45 feet above m. s. l.

575.4 feet are subtracted from the observed readings to obtain true stages.

BLAIRS, S. C.

On the Broad River.

Section 1 of gage (0 to 15 feet) is an enameled scale attached to granite boulders about 100 feet downstream from ferry landing, Section 2 (15 to 30.4 feet) is attached to a pine tree 150 feet downstream from first section. Section 3 (30 to 45 feet) is attached to a pine tree 100 feet downstream from the first section.

U. S. G. S. B. M., iron post stamped "293 Columbia," 100 feet S. of road crossing, about 300 feet N. of depot, 12 feet E. of E. rail of S. Ry., is 38.65 feet above zero of gage and 292.46 feet above m. s. l. B. M., 60 d. nail in N. side of tree to which section 3 is attached, is 30.69 feet above zero of gage and 284.50 feet above m. s. l.

BLUE RAPIDS, KANS.

On the Big Blue River.

A chain and weight gage is located on U. P. Ry. steel bridge No. 953. The gage box is on N. side of bridge, 75 feet from E. land pier. Distance from marker on chain to lower end of weight, 36.6 feet.

B. M., cross (+) cut in top stone, E. side of S. abutment, about 4 feet from where bridge structure begins, is 32 feet above zero of gage and 1,096.5 feet above m. s. l. B. M., top of ties where gage descends, is 33 feet above zero of gage and 1,097.5 feet above m. s. l.

BLACK ROCK, ARK.

On the Black River, 73 miles above Newport, Ark.

The gage is on second pier from N. end of Frisco bridge. It is in two sections, 4 to 15 feet and 15 to 27 feet. B. M. (U. S. W. B. 1904), $\frac{7}{8}$ -inch rivet bolt 6 inches long, drilled into top of solid limestone rock on right bank of river, near ferry landing, 2 feet from SW. corner of street crossing and about 900 feet S. and 81 feet W. of gage, is 46 feet above zero of gage and 271.76 feet above m. s. l. B. M., base of rail on bridge on which gage is located, is 36.9 feet above zero of gage and 262.66 feet above m. s. l. B. M., top of concrete coping of middle draw pier of same bridge, is 28.4 feet above zero of gage and 254.16 feet above m. s. l.

BLACKWELL, MO.

On the Big River, 72 miles above Glencoe, Mo.

Section 1, 1.2 to 18.9 feet, is inclined and is located 25 feet S. of mile post 50/25. Section 2, 18.0 to 36.5 feet, is attached to N. side of L. E. Cole & Co's store, 2,600 feet upstream from section 1.

B. M. U. S. G. S., on top of E. end of N. abutment of St. L., I. M. & S. bridge No. 46, $\frac{3}{4}$ mile S. of Blackwell station. Copper b. m. bolt gone, and hole covered with concrete; elevation of point taken to be the same, which is 23.08 feet above zero of gage and 594.91 feet above m. s. l.

B. M. NW. corner of N. concrete step to door of Bank of Blackwell, is 27.88 feet above zero of gage.

B. M., brass rod driven nearly flush into SE. side, 9 feet above ground, of a 3-foot locust tree, 90 feet W. of railroad at highway crossing, Blackwell, Mo., is 24.05 feet above zero of gage.

BLAIR, NEBR. (U. S. ENGINEER GAGE).

On the Missouri River, 36 miles above Omaha.

A wire-cable gage is attached to the Blair crossing bridge. Distance from marker on cable to the lower end of weight, 83.3 feet.

U. S. E. B. M. 300, on W. pier of bridge, S. side, in third course of masonry below lower coping stone, is 19.36 feet above zero of gage and 1,007.7 feet above m. s. l.

U. S. E. B. M. 1271, copper bolt in tile surmounted by iron pipe in corner of dooryard of H. L. Fisher, at corner of Seventh and Washington Streets, is 1,077.45 feet above m. s. l.

575.4 feet are subtracted from the observed readings to obtain true stages.

BLAIRS, S. C.

On the Broad River.

Section 1 of gage, 0 to 15 feet, is an enameled scale attached to granite boulders about 100 feet downstream from ferry landing, Section 2, 15 to 30.4 feet, is attached to a pine tree 150 feet downstream from first section. Section 3, 30 to 45 feet, is attached to a pine tree 100 feet downstream from the first section.

U. S. G. S. B. M., iron post stamped "293 Columbia," 100 feet S. of road crossing, about 300 feet N. of depot, 12 feet E. of E. rail of S. Ry., is 38.65 feet above zero of gage and 292.46 feet above m. s. l. B. M., 60 d. nail in N. side of tree to which section 3 is attached, is 30.69 feet above zero of gage and 284.50 feet above m. s. l.

BLUE RAPIDS, KANS.

On the Big Blue River.

A chain and weight gage is located on U. P. Ry. steel bridge No. 953. The gage box is on N. side of bridge, 75 feet from E. land pier. Distance from marker on chain to lower end of weight, 36.6 feet.

B. M., cross cut top of fifth steel floor beam, downstream side of bridge, directly under the gage box, is 35.73 feet above zero of gage and 1,117.11 feet above m. s. l. B. M., cross cut in steel plate, S. end, E. side of bridge, just N. of retaining wall 0.8 foot from S. end of plate, is 35.64 feet above zero of gage and 1,117.02 feet above m. s. l. B. M., top of copper, cemented into top of NE. coping stone of S. abutment, downstream side, is 29.80 feet above zero of gage and 1,111.18 feet above m. s. l.

The change in elevation of zero is due to a change in the b. m. elevations.

BLUFFTON, IND.

On the Wabash River, 87 miles above Logansport, Ind.

The gage is attached to S. side of E. end of middle concrete pier of Wabash Valley Traction Co. bridge. Graduation extends from -1 to 19.6 feet.

B. M., cross near inside angle of SE. corner of S. abutment of Wabash Valley Traction Co. bridge, is 21.9 feet above zero gage and 811.87 feet above m. s. l. B. M., notch cut in first stone above pavement in NE. corner of courthouse, is 36.7 feet above zero of the gage and 826.67 feet above m. s. l.

XVII

Zero of gage coincides with low water of November 3, 1889, and is 1,617.2 feet above msl. B. M., top of rail at E. end of N. P. Ry. depot, is 53.2 feet above zero of gage and 1,670.4 feet above msl. B. M., top of stringer from which gage hangs, is 73.2 feet above zero of gage and 1,690.4 feet above msl.

BLACK ROCK, ARK.

On the Black River, 73 miles above Newport, Ark.

The gage is on piling, N. side of center pier of Frisco bridge. It is in two sections, -4 to 15 feet and 15 to 27 feet.

B. M. (U. S. W. B. 1904), top of bolt in top of limestone rock on right bank of river, near ferry landing, 2 feet from SW. corner of street crossing and about 900 feet S. and 81 feet W. of gage, is 46 feet above zero of gage and 271.76 feet above msl. B. M., base of rail on bridge on which gage is located, is 36.9 feet above zero of gage and 262.66 feet above msl. B. M., top of concrete coping of middle draw pier of same bridge, is 28.4 feet above zero of gage and 254.16 feet above msl.

BLACKWELL, MO.

On the Big River, 72 miles above Glencoe, Mo.

Section 1, 1.2 to 18.9 feet, is inclined and is located 25 feet S. of mile post 50/25. Section 2, 18.0 to 36.5 feet, is attached to N. side of L. E. Cole & Co.'s store, 2,600 feet upstream from section 1.

B. M. U. S. G. S., on top of E. end of N. abutment of St. L., I. M. & S. bridge No. 46, $\frac{3}{4}$ mile S. of Blackwell station. Copper b. m. bolt gone and hole covered with concrete; elevation of point taken to be the same, which is 23.08 feet above zero of gage and 594.91 feet above msl. B. M. NW. corner of N. concrete step to door of Bank of Blackwell, is 27.88 feet above zero of gage.

B. M., brass rod driven nearly flush into SE. side, 9 feet above ground, of a 3-foot locust tree, 90 feet W. of railroad at highway crossing, Blackwell, Mo., is 24.05 feet above zero of gage.

BLAIR, NEBR.

On the Missouri River, 36 miles above Omaha.

A chain gage is attached to the Blair crossing bridge. Distance from marker in chain to the lower end of weight, 83.3 feet.

U. S. E. B. M. 360, on W. pier of bridge, S. side, in third course of masonry below lower coping stone, is 19.36 feet above zero of gage and 1,007.7 feet above msl. U. S. E. B. M. 1271, copper bolt in tile surmounted by iron pipe in corner of dooryard of H. L. Fisher, at corner of Seventh and Washington Streets, is 1,077.45 feet above msl.

575.4 feet are subtracted from the observed readings to obtain true stages.

BLAIRS, S. C.

On the Broad River.

Section 1 of gage, 0 to 15 feet, is an enameled scale attached to granite boulders about 100 feet downstream from ferry landing. Section 2, 15 to 30.4 feet, is attached to a pine tree 150 feet downstream from first section. Section 3, 30 to 45 feet, is attached to a pine tree 100 feet downstream from the first section.

U. S. G. S. B. M., iron post stamped "293 Columbia," 100 feet S. of road crossing, about 300 feet N. of depot, 12 feet E. of E. rail of S. Ry., is 38.65 feet above zero of gage and 292.46 feet above msl. B. M., 60 d. nail in N. side of tree to which section 3 is attached, is 30.69 feet above zero of gage and 284.50 feet above msl.

BLOODY ISLAND, CALIF.

On the Sacramento River, just below the mouths of Battle and Cottonwood Creeks.

The gage is in four sections, attached to trees. Graduation extends from 0.5 to 40 feet.

B. M., head of 20d. spike in the root of a sycamore tree, 15 feet back of section No. 2, is 11.14 feet above zero of gage. B. M., top of a bent-over nail in the root of an oak tree, near the highway, 80 feet below the observer's house, is 30.41 feet above zero of gage.

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BLACKWELL, MO.

On the Big River, 66 miles from its mouth.

Section 1 of gage, 1.2 to 18.9 feet, is inclined and is located 25 feet S. of mile post 50/25. Section 2, 18.0 to 36.5 feet, is attached to N. side of L. E. Cole & Co.'s store, 2,600 feet upstream from section 1.

B. M., U. S. G. S., on top of E. end of N. abutment of St. L., I. M. & S. bridge No. 46, $\frac{7}{8}$ mile S. of Blackwell station. Copper b. m. bolt gone and hole covered with concrete; elevation of point, taken to be same, is 23.08 feet above zero of gage and 594.91 feet above msl. B. M. NW. corner of N. concrete step to door of Bank of Blackwell, is 27.88 feet above zero of gage.

B. M., brass rod driven nearly flush into SE. side, 9 feet above ground, of a 3-foot locust tree, 90 feet W. of railroad at highway crossing, Blackwell, Mo., is 24.05 feet above zero of gage.

BLAIR, NEBR.

On the Missouri River, 36 miles above Omaha, Nebr.

A chain gage is attached to Blair crossing bridge. Distance from marker on chain to lower end of weight, 83.3 feet.

Gage B. M., U. S. E., on W. pier of R. R. bridge across Missouri River, on S. side of pier in third course of masonry below lower coping stone, being upper surface of projection, 0.5 foot below top of stone and 2.3 feet NE. of S. corner of pier, is 19.36 feet above zero of gage and 1,008.189 feet above msl.

B. M., $\frac{127}{1}$ U. S. E., copper bolt in tile surmounted by iron pipe in SE. corner of dooryard of H. L. Fisher, 7th and Washington Sts., is 89.779 feet above zero of gage and 1,078.608 feet above msl. 575.4 feet are subtracted from observed readings to obtain true stages.

BLAIRS, S. C.

On the Broad River, 36 miles from its mouth, near Columbia, S. C.

Section 1 of gage, 0 to 15 feet, is enameled steel scale attached to granite boulders about 100 feet downstream from ferry landing. Section 2, 15 to 30.4 feet, is attached to pine tree 150 feet downstream from first section. Section 3, 30 to 45 feet, is attached to pine tree 100 feet downstream from first section.

B. M., U. S. G. S., iron post stamped "293 Columbia," 100 feet S. of road crossing, about 300 feet N. of depot, 12 feet E. of E. rail of S. Ry., is 38.65 feet above zero of gage and 292.46 feet above msl. B. M., 60d. nail in N. side of tree to which section 3 is attached, is 30.69 feet above zero of gage and 284.50 feet above msl.

BLOODY ISLAND, CALIF.

On the Sacramento River, just below the mouths of Battle and Cottonwood Creeks, and 25 miles above Red Bluff, Calif.

Gage is in four sections, attached to trees. Graduation extends from 0.5 to 40 feet.

B. M., U. S. G. S., head of 20d. spike in root of sycamore tree, 15 feet back of section No. 2, is 11.14 feet above zero of gage. B. M., U. S. G. S., top of bent-over nail in root of oak tree, near highway, 80 feet below observer's house, is 30.31 feet above zero of gage.

Inspection on December 9, 1921, developed that three lower sections of gage are not correctly set. Corrections will be applied to readings when gage is read until changes have been made.

BLOUNTSTOWN, FLA.

On the Apalachicola River, 59 miles from its mouth.

Readings began September 17, 1921.

Gage is located about 600 feet above steamboat landing and is made of enameled steel in three sections. Section 1, 0 to 16 feet, is bolted to one of a cluster of four piles driven into river bottom about 15 feet from water's edge. Section 2, 13 to 20 feet, is bolted to post set deep in ground 330 feet W. of river. Section 3, 20 to 26 feet, is bolted to large water oak 20 feet W. of section 2 and 40 feet E. of railroad embankment.

B. M., U. S. E., top of 40d. nail driven into cut on base of water oak tree to which third section of gage is attached, is 17.56 feet above zero of gage. B. M., U. S. E., top of 40d. nail driven into root of large oak tree on river bank 25 feet downstream from first section of gage, is 9.08 feet above zero of gage. B. M., U. S. E., top of railroad rail opposite third section of gage, is 23.8 feet above zero of gage and corresponds to crest of high water of July, 1916. Zero of gage is 3 feet below lowest known water.

BLUE RAPIDS, KANS.

On the Big Blue River, $1\frac{1}{2}$ miles below mouth of Little Blue.

Chain gage (short-box type) was removed on March 29, 1921, from U. P. R. R. bridge to steel highway bridge at foot of main street through town, and is located 190 feet S. of N. abutment on E., or downstream, side. Distance from marker on chain to lower end of weight, 47.77 feet. (Old length, 38.57 feet.)

Vertical high water section of gage, 32 to 37 feet, is attached to soft maple tree, 106 feet S. of N. side of First Street, the first cross street S. of highway bridge.

B. M., U. S. W. B. Hayes, 1917, cross cut on top of fifth steel floor beam, downstream side of U. P. R. R. bridge, is 35.73 feet above zero of gage and 1,117.11 feet above msl. B. M.,

B. M., U. S. G. S., on top of E. end of N. abutment of M. P. R. R. bridge No. 46, $\frac{1}{4}$ mile S. of Blackwell station. Copper b. m. bolt gone and hole covered with concrete; elevation of point, taken to be same, is 23.08 feet above zero of gage and 594.91 feet above msl. B. M. NW. corner of N. concrete step to door of Bank of Blackwell, is 27.88 feet above zero of gage.

B. M., U. S. W. B., Hayes, 1916, brass rod driven nearly flush into SE. side, 9 feet above ground, of a 3-foot locust tree, 90 feet W. of railroad at highway crossing, Blackwell, Mo., is 24.05 feet above zero of gage. No data for 1922.

BLAIR, NEBR.

On Missouri River, 36 miles above Omaha, Nebr.

Chain gage attached to downstream guardrail of span No. 3 of C. & N. W. R. R. bridge, S. 72. Chain length, 83.3 feet.

Gage B. M., U. S. E., on W. pier of C. & N. W. R. R. bridge across Missouri River, on S. side of pier in third course of masonry below lower coping stone, being upper surface of projection, 0.5 foot below top of stone and 2.3 feet N.E. of S. corner of pier, is 19.36 feet above zero of gage and 1,008.189 feet above msl.

B. M., $\frac{127}{1}$ U. S. E., copper bolt in tile surmounted by iron pipe in SE. corner of dooryard of H. L. Fisher, 7th and Washington Sts., is 89.779 feet above zero of gage and 1,078.608 feet above msl. 575.4 feet are subtracted from observed readings to obtain true stages.

BLAIRS, S. C.

On Broad River, 36 miles from its mouth, near Columbia, S. C., on Congaree River.

Section 1 of gage, 0 to 15 feet, enameled steel scale attached to granite boulders about 100 feet downstream from ferry landing. Section 2, 15 to 30.4 feet, attached to pine tree 150 feet downstream from first section. Section 3, 30 to 45 feet, attached to pine tree 100 feet downstream from first section.

B. M., U. S. G. S., iron post stamped "293 Columbia," 100 feet S. of road crossing about 300 feet N. of depot, 12 feet E. of E. rail of S. Ry., is 38.655 feet above zero of gage and 292.465 feet above msl. B. M., 60d. nail in N. side of tree to which section 3 of gage is attached, is 30.69 feet above zero of gage and 284.50 feet above msl.

Dam of Parr Shoals Power Co., 13 miles below, makes normal pool of 4.1 feet.

BLOODY ISLAND, CALIF.

On Sacramento River, just below mouths of Battle and Cottonwood Creeks, and 24 miles above Iron Canyon, Calif.

Gage in four sections, attached to trees. Graduation from 0.5 to 40 feet.

B. M., U. S. G. S., head of 20d. spike in root of sycamore tree, 15 feet back of section No. 2, is 11.14 feet above zero of gage. B. M., U. S. G. S., top of bent-over nail in root of oak tree, near highway, 80 feet below observer's house, is 30.31 feet above zero of gage.

Inspection on December 9, 1921, developed that three lower sections of gage are not correctly set. Corrections will be applied to readings when gage is read until changes have been made.

BLOUNTSTOWN, FLA.

On Apalachicola River, 59 miles from its mouth.

Gage located about 600 feet above steamboat landing and made of enameled steel in three sections. Section 1, 0 to 16 feet, bolted to one of cluster of four piles driven into river bottom about 15 feet from water's edge. Section 2, 13 to 20 feet, bolted to post set deep in ground 330 feet W. of river. Section 3, 20 to 26 feet, bolted to large water oak 20 feet W. of section 2 and 40 feet E. of railroad embankment.

B. M., U. S. E., top of 40d. nail driven into cut on base of water-oak tree to which third section of gage is attached, is 17.56 feet above zero of gage. B. M., U. S. E., top of 40d. nail driven into root of large oak tree on river bank 25 feet downstream from first section of gage, is 9.08 feet above zero of gage. B. M., U. S. E., top of railroad rail opposite third section of gage, is 23.8 feet above zero of gage and corresponds to crest of high water of July, 1916. Zero of gage 3 feet below lowest known water.

BLUE RAPIDS, KANS.

On Big Blue River, $1\frac{1}{2}$ miles below mouth of Little Blue, and 25 miles above Randolph, Kans.

Short-box chain gage on steel highway bridge at foot of main street through town, 190 feet S. of N. abutment on E., or downstream, side. Chain length, 47.77 feet.

Vertical-high water section of gage, 32 to 37 feet, attached to soft maple tree, 100 feet S. of N. side of First Street, the first cross street S. of highway bridge.

B. M., Flora, 1921, cross cut in top surface of iron shoe at NE. corner of highway bridge on which gage is located, E. end of N. abutment, is 43.33 feet above zero of gage and 1,124.71 feet above msl. B. M., Flora, 1921, $\frac{1}{4}$ -inch copper plug cemented vertically into top of NE. pier of highway bridge, $7\frac{1}{2}$ inches from N. side of pier, and $4\frac{1}{2}$ inches E. of steel shoe of bridge resting on pier, is 43.52 feet above zero of gage and 1,124.90 feet above msl.

Dam $\frac{1}{4}$ mile above gage. No effect on stages.

B. M., U. S. E., top of lower miter sill of lock, corresponds with zero of gage and is 602.6 feet above msl. B. M., top of upper miter sill, is 8.94 feet above zero of gage. Comb of dam is 14.94 feet above zero of gage.

BINGHAMTON, N. Y.

Susquehanna River, 57 miles above Towanda, Pa.

Mott gage attached to iron lattice guardrail on upstream side of left or S. span of Washington Street highway bridge. Tape length, 25.37 feet.

B. M., Hosmer, 1918, chisel draft on corner coping, upstream side of S. or left-hand bridge abutment of Washington Street Bridge, is 23.71 feet above zero of gage and 845.13 feet above msl. B. M., U. S. G. S., aluminum tablet stamped "867," in Broome County courthouse, W. end, at left of basement entrance from Collier Street, is 44.636 feet above zero of gage.

Small dam 50 feet N. of gage raises water about 0.2 foot when under 2.5 feet.

BISMARCK, N. DAK.

Missouri River, 277 miles above Pierre, S. Dak.

Cable gage attached to truck stringer of N. P. Ry. bridge, 2.5 miles from city. Cable length, 73.6 feet. Zero of gage coincides with low water of November 3, 1889, and is 1,617.2 feet above msl.

B. M., Bismarck Bridge, U. S. E., top of E. bolt on S. side of pair No. 1, being one of bolts that anchor iron work of bridge to pier, is 73.556 feet above zero of gage and 1,690.756 feet above msl. B. M., $\frac{186}{2}$, U. S. E., on left bank of river, about 1 mile below Bismarck Bridge, 850 feet from river on bench N. of railway track, 150 feet from track, is 57,860 feet above zero of gage.

BLACK ROCK, ARK.

Black River, 68 miles from mouth and 73 miles above Newport, Ark., on White River.

New gage installed September 4, 1928. Cut and painted, 4 to 34 feet, on W., or downstream, end of first pier from N. bank of St. L. & S. F. R. R. bridge, 3902. Low-water section will be painted later on pile about 15 feet NW of corner of gage pier.

B. M., U. S. W. B., 1904, top of bolt in top of limestone rock on right bank of river, near ferry landing, 2 feet from SW. corner of street crossing and about 800 feet S. and 155 feet W. of gage, is 46 feet above zero of gage and 275.976 feet above msl. B. M., U. S. E., bronze tablet marked, "U. S. Engineer Office, Little Rock, Ark.," in top of downstream end of right-bank pier of St. L. & S. F. R. R. bridge, 3902, over Black River, near Black Rock, Ark., is 30.652 feet above zero of gage. Top of concrete coping of middle draw pier of same bridge is 28.4 feet above zero of gage. Base of rail on bridge is 36.90 feet above zero of gage.

BLAIR, NEBR.

Missouri River, 36 miles above Omaha, Nebr.

Short-box chain gage outside of plank walk of span No. 3 of C. & N. W. R. R. bridge, 131 feet from W. end of span. Chain length, 83.3 feet.

Gage B. M., U. S. E., on W. pier of C. & N. W. R. R. bridge across Missouri River, S. side of pier in third course of masonry below lower coping stone, being upper surface of projection, 0.5 foot below top of stone and 2.3 feet NE. of S. corner of pier, is 19.36 feet above zero of gage and 1,008.189 feet above msl.

B. M., $\frac{127}{1}$, U. S. E., copper bolt in tile surmounted by iron pipe in SE. corner of dooryard of H. L. Fisher, Seventh and Washington Streets, is 89.779 feet above zero of gage. 575.4 feet are subtracted from observed readings to obtain true stages.

BLAIRS, S. C.

Broad River, 36 miles from mouth, near Columbia, S. C., on Congaree River.

Section 1 of gage, 0 to 15 feet, enameled steel scale attached to granite boulders about 100 feet downstream from ferry landing. Section 2, 15 to 30.4 feet, attached to pine tree 150 feet downstream from first section. Section 3, 30 to 45 feet, attached to pine tree 100 feet downstream from first section.

B. M., U. S. G. S., iron post stamped "293 Columbia," 100 feet S. of road crossing about 300 feet N. of depot, 12 feet E. of E. rail of S. Ry., is 38.655 feet above zero of gage and 292.465 feet above msl. B. M., 60d. nail in N. side of tree to which section 3 of gage is attached, is 30.69 feet above zero of gage.

Dam of Parr Shoals Power Co., 13 miles below, makes normal pool of 4.1 feet.

BLOODY ISLAND, CALIF. (P. O. JELLY, CALIF.)

Sacramento River, just below mouths of Battle and Cottonwood Creeks, and 24 miles above Iron Canyon, Calif.

Gage in four sections, attached to trees. Graduation from 0.5 to 40 feet.

XXVII

CORRIGENDA. (ALL DATES INCLUSIVE)

Owing to changes in elevations of gage zeros and to other causes, corrections as follows should be applied to data in previous publications of Daily River Stages. The corrections given include all corrections in previous volumes, and so far as is known they are complete as of December 31, 1929. In a few instances corrections of 0.1 foot or less have been disregarded.

- Albany, N. Y.----- Add 0.1 foot from September 19, 1914, to December 31, 1921.
- Albany, Oreg.----- Subtract 0.3 foot from readings above 19 feet from September 27, 1906, to December 31, 1915.
- Alton, Ill.----- All readings from January 1, 1917, to June 1, 1923, more or less doubtful except absolute high and low water.
- Arkadelphia, Ark.----- All readings of zero previous to November, 1, 1924, doubtful. Previous to December 31, 1928, add 0.2 to all readings from 15.9 to 21.8, and 0.3 to all readings above 21.8.
- Arkansas City, Ark.----- Subtract 0.2 foot from August 19 to September 15, and from September 21 to October 29, 1895. Subtract 0.3 foot from October 30 to November 18, 1895. Subtract 0.4 foot from November 19 to 23, 1895.

Stages from September 23 to 30, 1924, should read as follows:

Date	Stage	Date	Stage
Sept. 23.....	12.5	Sept. 28.....	14.6
Sept. 24.....	12.5	Sept. 29.....	15.0
Sept. 25.....	12.7	Sept. 30.....	15.0
Sept. 26.....	13.3		
Sept. 27.....	14.0	Mean.....	16.6

- Arlington, Mo.----- Subtract 1 foot from March 1, 1905, to May 31, 1909. From January 1, 1926, U. S. G. S. gage in use. Previous readings not comparable.
- Austin, Tex.----- Subtract 0.4 foot for 1903 and 1904.
- Bainbridge, Ga.----- Add 0.8 foot to readings from March 6, 1925, to December 31, 1926.
- Batesville, Ark.----- Add 5.3 feet from 1904 to 1915.
- Baton Rouge, La.----- Apply corrections as given in page 20, Daily River Stages, Part XXIII, 1925.
- Beatrice, Nebr.----- Subtract 0.4 foot from May 15 to December 31, 1919.
- Binghamton, N. Y.----- Subtract 0.7 foot from April 1, 1902, to January 3, 1903. Subtract 0.9 foot from January 4 to October 13, 1903. Add 0.2 foot from October 14, 1903, to March 5, 1904.
- Blairs, S. C.----- Add 0.4 foot to readings above 15 feet from September 28, 1908, to December 31, 1915.
- Bluff City, Tenn.----- Published readings previous to January 1, 1929, not comparable with subsequent ones.
- Bon Wier, Tex., or Merryville, La.----- Add 1.7 feet from June 3 to December 31, 1916. Subtract 1 foot from April 2, 1919, to December 31, 1923.
- Boone, Iowa.----- Readings previous to 1924 made from Centerville gage and are approximately 1.0 feet lower than subsequent ones.
- Boonville, Mo.----- Owing to errors in observations and to gage changes finally computed in 1926, corrections to previous gage readings should be made as follows: November 16, 1873, to July 8, 1875, add 1.6 feet; July 9, 1875, to June 30, 1884, add 0.7 foot; July 1 to December 31, 1884, add 2.5 feet; January 1, 1885, to July 31, 1888, add 0.7 foot; August 1, 1888, to May 31, 1891, readings unreliable. September 10, 1905, should be 7.9 feet. September 11, 1905, should be 7.9 feet. September 12, 1905, should be 8 feet. October 19, 1905, should be 7.2 feet. October 20 to 23, 1905, should be 6.6 feet. October 24, 1905, to August 7, 1906, subtract 2.3 feet; August 8, 1906, to March 6, 1907, subtract 4.2 feet; March 7, 1907, to December 31, 1912, subtract 1.5 feet.
- Buchanan, Va.----- Add 1.7 feet from April 22, 1913, to December 31, 1914.
- Burnside, Ky.----- Readings previous to January 1, 1915, not comparable with subsequent ones by from 0.1 to 0.7 foot.
- Cairo, Ill.----- Gage reading for May 31, 1893, should be 38.7 feet.
- Calloun Falls, S. C.----- Add 2 feet from June 29, 1910, to December 31, 1915. Readings previous to July 1, 1928, not comparable with subsequent ones.
- Calico Rock, Ark.----- From October 21 to December 31, 1914, subtractive corrections as follows should be made to gage readings: Stages from 2.3 to 3.5 feet, 0.1 foot; from 3.6 to 6 feet, 0.2 foot; from 6.1 to 8.6 feet, 0.1 foot; from 8.7 to 10 feet, 0.2 foot; from 10.1 to 11.2 feet, 0.3 foot; from 11.3 to 12.6 feet, 0.4 foot; from 12.7 to 13.5 feet, 0.5 foot; from 13.6 to 14.5 feet, 0.6 foot; from 14.6 to 15.9 feet, 0.8 foot; from 16 to 17.3 feet, 0.9 foot; from 17.4 to 18.2 feet, 1 foot; from 18.3 to 23 feet, 1.1 feet; from 23.1 to 26.6 feet, 1.2 feet; from 26.7 to 29.7 feet, 1.3 feet; from 29.8 to 33 feet, 1.4 feet; from 33.1 to 37.2 feet, 1.5 feet; from 37.3 to 38.7 feet, 1.6 feet; from 38.8 to 39.6 feet, 1.7 feet; from 39.7 to 40.1 feet, 1.8 feet. Readings for 1915 are in error by small amounts, except in volumes corrected by printed slip.
- Canton, Okla.----- Add 2 feet to all records previous to January 1, 1927.
- Cascade Locks, Oreg.----- Subtract 6 feet from December 1, 1896, to December 31, 1899. Other corrections as follows: May 11, 1893, stage, should be 18.1 feet; July 6, 1893, 23.8 feet; July 7, 1893, 23.7 feet; December 5, 1893, 9.6 feet; March 13, 1894, 4.6 feet; July 1, 1895, 17.8 feet; July 2, 1895, 18.1 feet; July 11, 1895, 18.4 feet; August 2, 1895, 12.4 feet.
- Cedar Rapids, Iowa.----- Add 1 foot from March 13 to December 31, 1910.
- Celina, Tenn.----- From March 1, 1912, to June 17, 1914, readings from 2 to 30.7 feet are too low by variable amounts from 0.2 to 0.5 foot. Add 0.3 foot to readings from 45 to 56 feet. For 1915 subtract as follows: 0.4 foot from readings below 3 feet; 0.3 foot from readings from 3 to 4.9 feet; 0.2 foot from readings from 5 to 6.9 feet; 0.1 foot from readings from 7 to 9 feet.
- Centerville, Ala.----- Add 0.3 foot from December 15, 1916, to December 31, 1918.