

Barometric minima reported from stations along the course of this typhoon are given below. Palanan, Isabela Pr., had 731.58 mm. (975.4 mb.) as its lowest pressure, July 3, 3 p. m. (Manila time). Tuguegarao, Cagayan Pr., reported 736.60 mm. (982.1 mb.) which occurred at 7:45 p. m. July 3. Aparri, Cagayan Pr., recorded 740.65 mm. (987.5 mb.) at 10:10 p. m. the same day. Early the next morning, Laoag, Ilocos Norte Pr., had its minimum value, 743.34 mm. (991.0 mb.) at 2:00 a. m. The highest wind velocities reported were force 9, from the south, at Palanan, after the center had passed. (NOTE.—Pressure values given above are corrected for gravity.)

Over the Philippines, the strongest velocity reported from the pilot-balloon stations was 110 k. p. h. at 2,000 meters over Cebu, July 3, afternoon ascent. The direction was southwest. At the other stations, the velocities at some levels were as high as 65 to 70 k. p. h. but mostly they were below 50 k. p. h., and in general, the upper winds were not so strong as during the preceding typhoon. The few reports received from Thailand and Indo-China stations indicated that the southwesterly air stream over these regions was weaker than during the 10-day period before July 1. At Guam, June 29, there were no ascents due to poor weather conditions and the easterly winds over that station reached velocities of 64 k. p. h. at 1,000 meters, June 30, 0300 G. C. T. ascent. This was the only time at Guam when velocities over 50 k. p. h. occurred during these few days when the disturbance was forming.

Typhoon, July 9-16, 1941.—A weak disturbance moved westward in a low-pressure area far to the east of northern Luzon. It became a definite depression on July 11, central about 500 miles east-northeast of San Bernardino Strait. After moving in a north-northwesterly direction about 800 miles, it intensified to typhoon strength over the regions about 450 miles east of Formosa. It then moved northwest into the Eastern Sea, where it recurved to the northeast, a course which carried it north of Oshima, Nansei Islands, and over the ocean parallel to the coast line of Japan. It disappeared southeast of central Japan.

Typhoon, July 11-16, 1941.—This typhoon appeared about 250 miles northeast of Guam, quite strong, probably originating over the eastern Caroline Islands. It moved north-northwest, then northwest, and coalesced with the typhoon described above (July 9-16) over the regions south of Kobe, after which both disturbances weakened and disappeared.

Guam had been in a southwesterly current since July 6, the velocities being under 50 k. p. h. There were no ascents July 10, due to poor weather conditions. July 11 and the following days showed a strong southwesterly current over the island, with velocities up to 80 k. p. h. (500 meters, afternoon ascent July 11) and then gradually decreasing to values less than 50 k. p. h. a few days later.

Typhoon, July 17-24, 1941.—There was a low-pressure area far to the southeast of Guam, which strengthened into a depression, July 18, central about 200 miles east-southeast of the island. The disturbance moved northwesterly and manifested itself as a typhoon about 120 miles north of Guam, July 19. It moved westerly for a short distance, and then made a sharp turn to the north. It moved rapidly in this direction, passing about 180 miles west of the Bonins, and reached Japan, July 23. It moved a short distance overland, recurving to the northeast about 100 miles north-northeast of Tokyo. It disappeared over the ocean July 24.

The upper winds over Guam changed from an easterly current, July 16, to a northerly current, July 17 and 18, and finally southwesterly winds were flowing over the island. At no time were the velocities over 35 k. p. h.

Depression, July 17-21, 1941.—Over the ocean between the Philippines and the Mariana Islands, a weak center appeared July 17, and moved slowly west-northwest, becoming a depression, July 20, about 500 miles east of the Balintang Channel. On July 21, it inclined to the north and disappeared about 400 miles east of Formosa. Apparently it was mild and not dangerous.

Typhoon, July 23-29, 1941.—A low pressure area moved west-northwest from the ocean regions about 300 miles west of the Mariana Islands. When it was central about 600 miles east of the Balintang Channel, it quickly changed to a northerly course and also intensified to typhoon strength. It moved rapidly toward Japan and crossed the southern regions of that country on July 27. It recurved to the northeast and east over the Sea of Japan and on July 29 it was over the Pacific Ocean, weakening to depression strength. It probably disappeared July 30.

NOTE.—On July 9, a ship's report was received at the Observatory (broadcast from 8 Z W, Zi-ka-wei, Shanghai) which read as follows: "Ships 13 136 SW. 3 rain vis. 744 pressure" (latitude 13 N. longitude 136 E., winds SW., force 3, pressure 744 mm. (991.9 mb.)). This observation could not be neglected. There were no means of verifying these numbers in a short space of time, so typhoon warnings were distributed and the disturbance, whatever it was, was kept on the weather maps for 2 or 3 days. There were other ships reporting from the regions east of San Bernardino Strait, none of which gave any indication of the existence of any typhoon, and so, unless further information is received, it will be assumed that there was an error of some kind in the above mentioned report. If the report is correct, and there really was a small typhoon in that locality, the writer would appreciate confirmation of the above report so that the typhoons of July 1941 may be correctly enumerated.

RIVER STAGES AND FLOODS

By BENNETT SWENSON

During July 1941, precipitation was above normal in all States east of the Mississippi River, except Indiana, Illinois, Michigan, and Wisconsin. In Tennessee, the precipitation was the heaviest for this month in 59 years of record, the average for the State being more than one and one-half times the normal; Virginia, the Carolinas, Alabama, and Mississippi had about one and one-half times the normal precipitation.

West of the Mississippi River, precipitation was deficient in the Upper Mississippi, the Missouri, and most of the Arkansas River Basins, but was above normal elsewhere except in Oregon and Arizona.

The excess rainfall during July maintained river stages above normal in the Southeastern States and in the Tennessee River for the first time this year. Floods, mostly light to moderate, were confined generally to the Carolinas and portions of Georgia, Tennessee, and Kentucky in the East, and in Kansas, Oklahoma, and eastern Texas west of the Mississippi.

Atlantic slope drainage.—Frequent rains during the month in the Carolinas and portions of Georgia, heavy during the week beginning July 13, resulted in light to moderate floods in most of the streams in this area.

The Roanoke River reached flood stage in the lower portion on July 22 and crested at a stage of 10.3 feet on the 24th at Williamston, N. C. The Neuse River overflowed from July 14 to 23, crest stages of from 2 to 4 feet above flood stage being recorded from Smithfield, N. C., to Kinston, N. C.

Light to moderate overflows occurred throughout the Santee River Basin with overflows extending throughout the month at some points. The total losses have been estimated at about \$80,000 of which \$42,000 was due to suspension of business (mostly on the Santee-Cooper Reservoir project). In addition, losses to highways and bridges in the State of South Carolina as a whole, mostly from high water in small streams, were estimated at approximately \$20,000 by the State highway department.

Light flooding also occurred in portions of the Savannah, Ogeechee, and Altamaha River Basins in Georgia during the month, but with no appreciable damage.

Missouri River Basin.—A slight overflow occurred in the Republican River in July with a crest stage of 11.2 feet (2.2 feet above flood stage) at Guide Rock, Nebr., on July 28. At Concordia, Kans., the river just reached flood stage (8 feet) on the 29th.

Ohio River Basin.—A flash flood occurred in the Licking River Valley in northeastern Kentucky, in Fleming and Rowan Counties, on July 18-19. Torrential rains fell in about 3 hours between 7 and 11 p. m., on the 18th, over an area of approximately 1,000 square miles, with amounts ranging from 3 to nearly 5 inches. From available reports, the greatest intensity of the storm was at Flemingsburg, Ky., where 4.81 inches of rain occurred; Farmers, Ky., reported 4.47 inches, and Hadleman, Ky., 3.14 inches.

According to the United States Engineer Office, Cincinnati, Ohio, no lives were reported lost and damage to property was confined to the town of Flemingsburg with an estimated loss of \$25,000.

In the Cumberland River Basin, heavy rains on July 2-5 caused a decided rise but flood stage was exceeded in the main river only at Williamsburg, Ky. Among the tributary streams, severe flooding occurred in the Wolf and Obey Rivers with crop damage in Clay and Pickett Counties in Tennessee amounting to several hundred thousand dollars. Byrdstown, Tenn., in this area, recorded 10.55 inches within 72 hours and 8.05 inches in 24 hours. Flood stage was also exceeded in the New River, at New River, Tenn., on July 4, by 0.9 foot.

The Tennessee River which was at a low stage at the beginning of the month, rose to somewhat higher stages during the last 3 weeks, due to rather heavy rains over the upper watershed.

Arkansas River Basin.—A slight overflow occurred in the Little Arkansas River on July 2-3 to the north of Wichita, Kans., as the result of heavy rains on the 2d. A few low places were inundated but no property loss was reported. The Ninnescah River also flooded slightly in the vicinity of Peck, Kans., on July 3, but with no material damage.

High stages in the Canadian Rivers at the close of June, followed by rains in the upper watersheds during the first week in July, led to further flooding in the North Canadian at Woodward and Canton, Okla., on July 7 and 8, and at Yukon, Okla., where the river was in flood the entire month. In the Canadian River, flood stage was exceeded at Canadian, Tex., on July 6 and again on July 26, and at Union, Okla., on July 26 and 27.

Red River Basin.—Flooding again prevailed during a portion of the month in the Sulphur River. At Ringo Crossing, Tex., an estimated crest of 28.5 feet was reached on July 16, and a crest of 25.6 feet at Naples, Tex., on July 22.

West Gulf of Mexico drainage.—The Sabine River exceeded flood stage between June 30 and July 8 but resulted in no material damage.

The flood in the Trinity River which began early in June continued during much of July. This flood will be discussed in a later report.

Estimated flood losses and savings for July 1941

River and drainage	Tangible property	Matured crops	Prospective crops	Live-stock and other movable property	Suspension of business	Total losses	Total savings
ATLANTIC SLOPE							
Neuse River.....	\$3,450				\$5,000	\$8,450	
Santee River.....	8,500	\$7,300	\$17,800	\$4,500	42,300	80,400	\$55,000
MISSISSIPPI SYSTEM							
<i>Upper Mississippi Basin</i>							
Streams in Northeastern Iowa ¹	579,500	6,000	307,430	51,800	1,000	945,730	5,000
<i>Ohio Basin</i>							
Licking River ²	25,000					25,000	
<i>Arkansas Basin</i>							
North Canadian River ³ ..	58,000	55,300	347,700	3,500	2,100	466,600	15,000
Canadian River ³	89,000	34,500	48,500	2,500		155,500	7,000
<i>Red Basin</i>							
Sulphur River ³	21,000	5,000	100,000	3,000	8,000	137,000	11,000
Red River ³	85,000	38,500	207,000	4,100	12,500	347,100	46,000
WEST GULF OF MEXICO							
Trinity River ⁴	59,680	192,860	532,700	19,700	93,670	898,610	366,670
Colorado River ⁴			3,000			3,000	
Pecos River ⁵	472,830	1,000	124,000	15,000	2,000	614,830	25,000
Rio Grande ⁵	327,500		112,200	24,000	193,160	656,860	1,511,000

¹ Floods of May 1941.
² Furnished by U. S. Engineer Office.
³ Floods of June 1941.
⁴ June and July 1941.
⁵ Floods of May and June, 1941 in New Mexico, in addition to figures published previously.

FLOOD-STAGE REPORT FOR JULY 1941

[All dates in July unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
Roanoke: Williamston, N. C.....	Feet 10	22	26	Feet 10.3	24
<i>Neuse:</i>					
Neuse, N. C.....	14	14	14	14.5	14
Smithfield, N. C.....	13	14	18	16.5	16
Goldsboro, N. C.....	14	17	23	17.9	21
Kinston, N. C.....	14	20	26	15.8	23
Pee Dee: Mars Bluff Bridge, S. C.....	17	20	23	17.1	21-22
<i>Saluda:</i>					
Pelzer, S. C.....	6	6	7	6.0	6-7
Chappells, S. C.....	13	8	9	6.5	9
		16	17	15.0	17
Broad: Blairs, S. C.....	14	6	10	18.5	7
		16	19	19.0	9
				20.0	18
<i>Catawba:</i>					
Catawba, N. C.....	8	16	18	12.6	17
Catawba, S. C.....	11	7	8	15.7	8
		18	18	13.5	18
Waterce: Camden, S. C.....	23	8	10	28.3	9
		18	19	26.3	18
<i>Santee:</i>					
Rimini, S. C.....	12	8	(¹)	17.9	14
				18.4	23
Ferguson, S. C.....	12	June 28	(¹)	12.1	June 30
Broad: Carlton, Ga.....	15	6	7	16.0	25
<i>Savannah:</i>					
Butler Creek, Ga.....	21	8	9	22.8	9
		18	19	21.9	18
		(²)	8	12.4	5-6
Clyo, Ga.....	11	13	(¹)	16.3	17
				15.4	26
Ogeechee: Dover, Ga.....	7	24	28	7.5	26
Altamaha: Charlotte, Ga.....	12	20	20	12.0	20
		22	25	12.4	24
MISSISSIPPI SYSTEM					
<i>Upper Mississippi Basin</i>					
Mississippi: Louisiana, Mo.....	12	(¹)	(¹)	12.2	1
<i>Missouri Basin</i>					
<i>Republican:</i>					
Guide Rock, Nebr.....	9	28	29	11.2	28
Concordia, Kans.....	8	29	29	8.0	29
<i>Ohio Basin</i>					
New: New River, Tenn.....	18	4	4	18.9	4
<i>Cumberland:</i>					
Williamsburg, Ky.....	19	5	6	21.0	6
Celina, Tenn.....	28	5	9	34.5	7

See footnotes at end of table.