Introduction.—The approximate areas inundated in and near Richmond, Va., by the flood of August 22, 1969, on the James River are shown on the topographic map. The flood was caused by torrential rains brought by the remnants of Hurricane Camille.

Flood stage, the stage at which damage begins, is at an elevation of 110 feet above mean sea level (msl), gage height, 11 feet, at the Virginia Division of Water Resources gaging station near Richmond, and at elevation 8 feet, msl, at the U.S. Weather Bureau gaging station at Richmond.

Flood history.—The flood of May 1771 is considered the greatest in the James River basin since the settlement of Jamestown in 1607. Table 1 shows the maximum stages for the greatest known floods since 1771 on the James River at river mile 104.6.

The August 1969 flood at the Virginia Division of Water Resources gaging station, 0.1 mile upstream from the Huguenot Memorial Bridge (river mile 111.7), reached a stage of 24.95 feet, gage datum, (discharge, 222,000 cfs) and was the highest for the period of record (1935–69). At the U.S. Weather Bureau gaging station at river mile 103.7, the flood reached a stage of 28.6 feet, msl, (29.9 ft at former site of U.S. Weather Bureau gaging station at river mile 104.6), and was the highest since the great flood of 1771.

TABLE 1.—*Peak stages, James River at Richmond.*

Date	Elevation above mean sea level at river mile 104.6 (feet)
Oct. 1, 1870	*27.5
Nov. 26, 1877	*29.0
Apr. 2, 1886	*25.6
June 22, 1889	*26.6
May 24, 1901	21.6
Dec. 31, 1901	25.5
Oct. 22, 1906	21.0
Jan. 5, 1919	19.5
May 14, 1924	22.4
Oct. 2, 1924	21.7
Sept. 7, 1935	25.9
Mar. 20, 1936	28.8
Apr. 27, 1937	25.7
Aug. 18, 1940	21.8
Oct. 17, 1942	21.6
Sept. 21, 1944	24.7
Dec. 6, 1948	23.9
Aug. 22, 1969	29.9

*U.S. Army Corps of Engineers flood plain report, Norfolk district, September 1965.

Flood profiles.—Profiles of the water surface along the James River between mile 102.0 and mile 108.6 for the floods of April 1937 (floodmarks from U.S. Army Corps of Engineers) and August 1969 are shown in figure 1. Highwater marks for the flood of March 1936 are also shown at several points along the river. Because of the steep slope of the river as it flows through the fall line, the local effects of the low dams and islands, and the paucity of floodmarks within the reach, the profile for the 1969 flood was constructed largely on the basis of the profile for the 1937 flood between miles 105 and 107. River miles used in figure 1 were measured upstream from the mouth of James River, and are marked on the map along the thalweg of the stream.

Depth of flooding at any point can be estimated by subtracting the ground elevation from the water-surface elevation indicated by the profile in figure 1. Approximate ground elevations can be estimated from contours on the map; however, more accurate elevations can be obtained by leveling to bench marks.

Flood frequency.—Frequency of flooding on the James River in the vicinity of Richmond is derived from the continuous record of annual floods since 1935 at the Virginia Division of Water Resources gaging station near Richmond,

supplemented by comparison with streamflow records during the period 1899–1969 at the U.S. Geological Survey gaging station at Cartersville.
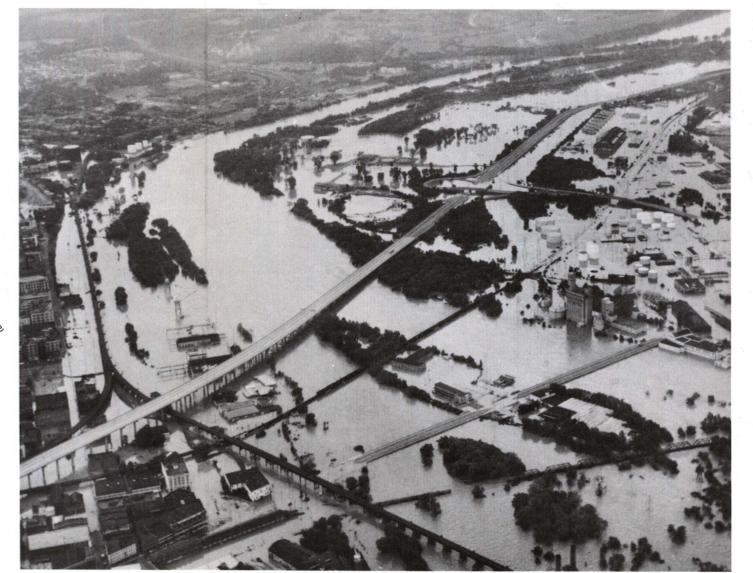
Recurrence intervals.—As applied to flood events, the recurrence interval is the average interval of time within which a given flood will be equaled or exceeded once. Recurrence interval is inversely related to the chance of a flood of a specific height being equaled or exceeded in any one year. Thus, a 20-year flood would have 1 chance in 20 of being equaled or exceeded in any year, or a 50-year flood would have 1 chance in 50 of being equaled or exceeded in any year.

The relationship between recurrence interval and elevation above mean sea level at the gaging station on James River near Richmond (river mile 111.7) is shown graphically in figure 2. The August 1969 flood had a recurrence interval of about 110 years.

It is emphasized that recurrence intervals are average figures—the average number of years that will elapse between the occurrences of floods that equal or exceed a given magnitude. The fact that a major flood occurs does not reduce the probability of occurrence of a flood as great or greater in the next year or even in the next week.
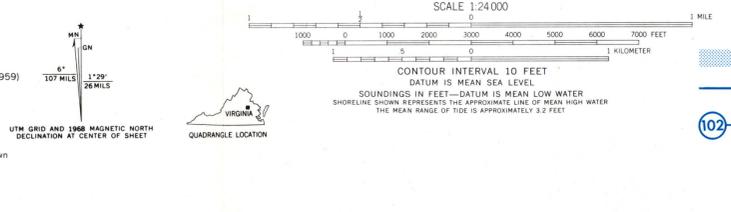

FIGURE 1.—*Flood profile, James River near Richmond.*

FIGURE 2.—*Frequency of floods on James River near Richmond, river mile 111.7.*
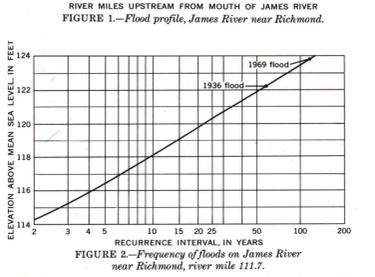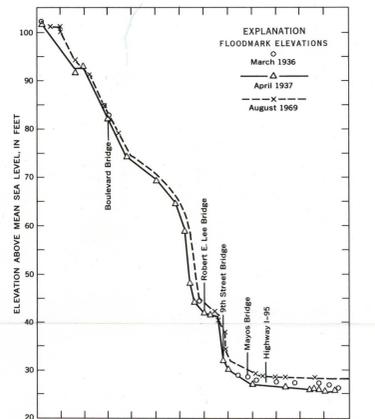
View along Main Street on morning of flood crest.
Photograph from Richmond Times-Dispatch

James River at Interstate Highway 95 in South Richmond.
Photograph from Richmond News-Leader

FLOOD OF AUGUST 1969, RICHMOND QUADRANGLE, RICHMOND, VIRGINIA

By

E. M. Miller

1969

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

SCALE 1:24000

Base by U.S. Geological Survey, 1964

Area flooded August 1969
Boundary of flooded area
River mile measured along stream channel upstream from mouth

For sale by U.S. Geological Survey, price 75 cents