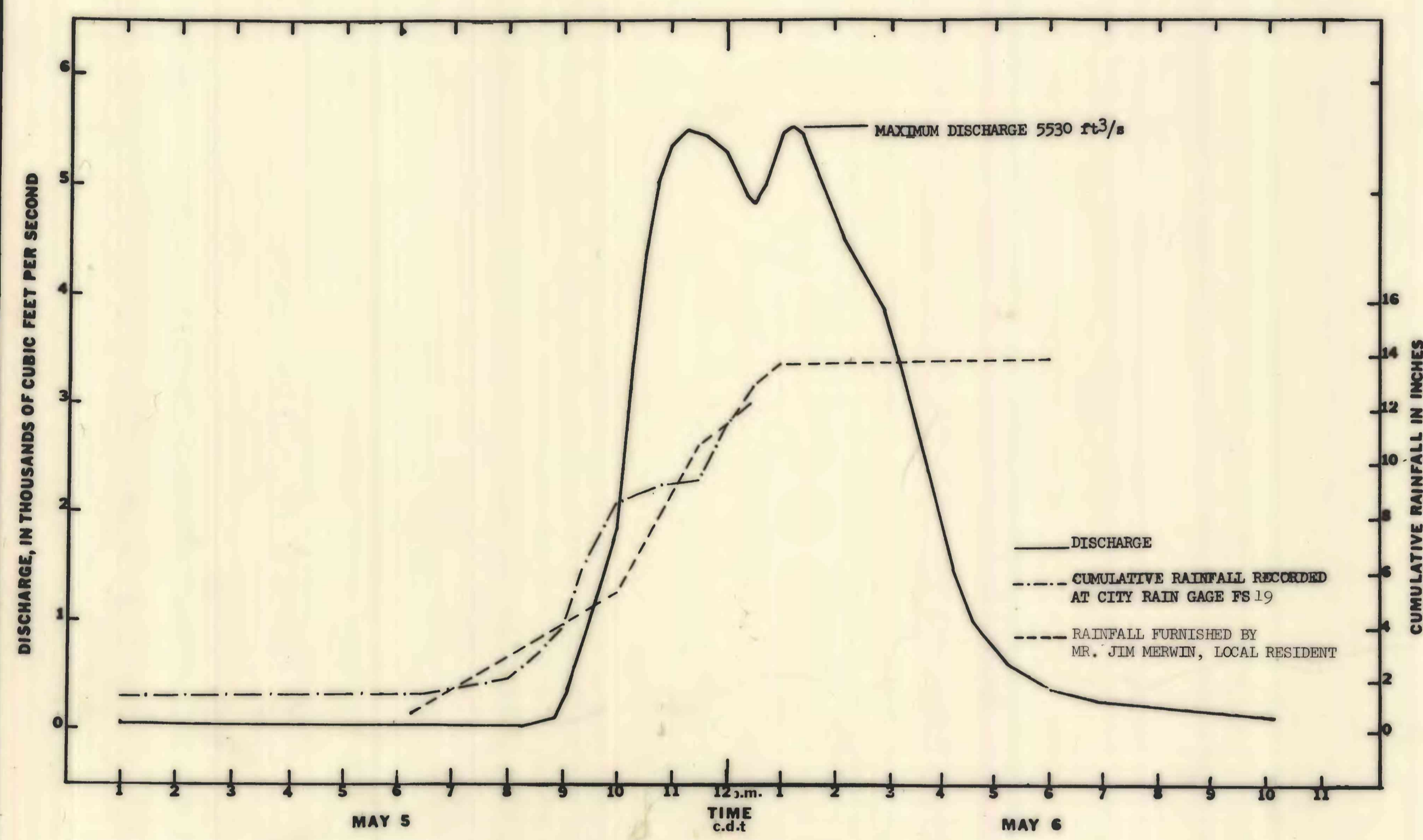
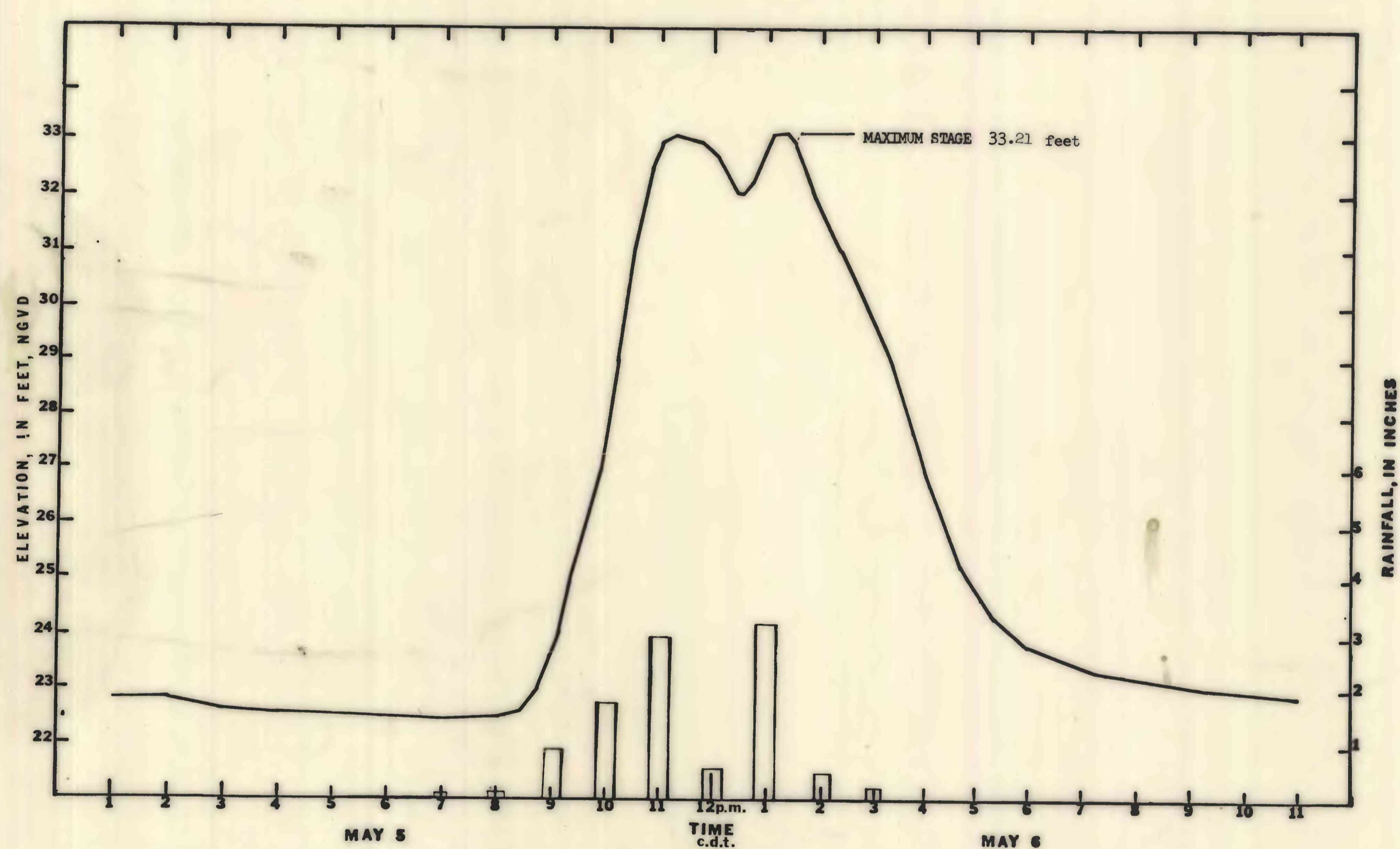


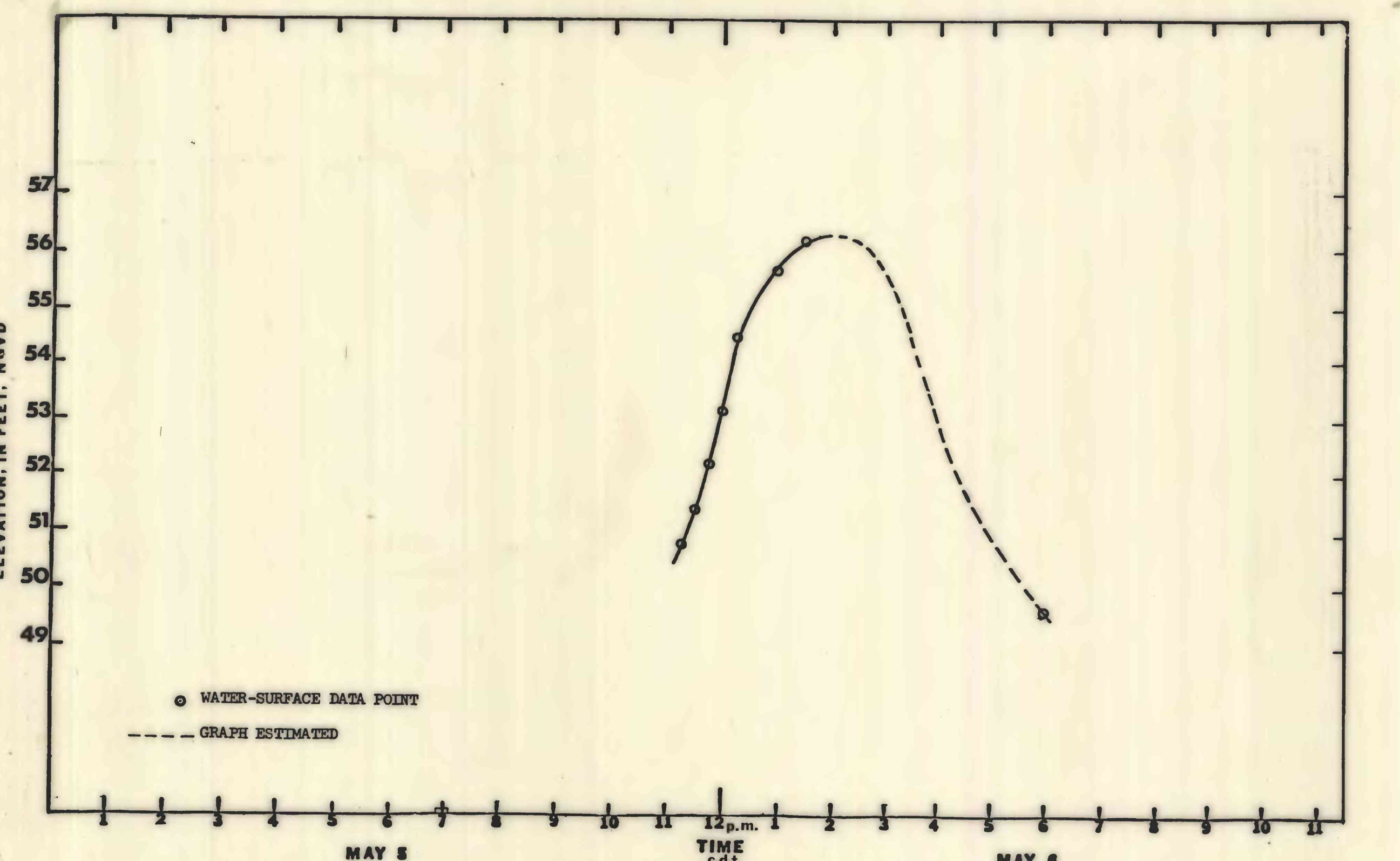
Index of Mobile city maps for which hydrologic data for the flood of May 5 and 6, 1981, are shown.



Discharge hydrograph for station 02471065 on Montlinar Creek at U.S. Highway 90 in Mobile, Ala., and graph of cumulative rainfall furnished by the City of Mobile and Mr. Jim Herwin, local resident.



Stage hydrograph for station 02471065 on Montlinar Creek at U.S. Highway 90 in Mobile, Ala., and bar graph of hourly rainfall furnished by City of Mobile at gauge F519.



Stage hydrograph for Thremble Creek near Springwood Drive North. Hydrograph determined using actual water-surface data points recorded during the flood by Mrs. Bunkley who lives on Springwood Drive North. Site is located just northeast of the dam and along Springwood Drive North (See sheet 3).

FLOOD OF MAY 5 AND 6, 1981

MOBILE, ALABAMA

BY C. D. KING AND G. H. NELSON

INTRODUCTION

An intense rainstorm moved across the city of Mobile during the late evening and early morning hours of May 5 and 6, 1981. Rainfall amounts in excess of 12 inches were recorded in the city between 6 p.m. on May 5 and 3 a.m. on May 6, 1981. Maximum water-surface elevations on streams in the area ranged from 2 to 3 feet higher than those that occurred during the major flood on April 13, 1980.

This report presents a compilation of hydrologic data obtained in the city of Mobile for the flood of May 5 and 6, 1981. These data include rainfall records, peak flow determinations, hydrographs of stage and discharge for Montlinar Creek, maximum water-surface elevations, and a map showing approximate boundaries of some inundated areas in the city.

The U.S. Geological Survey in cooperation with the U.S. Army Corps of Engineers, Mobile District, determined the maximum water-surface elevations and outlined the approximate boundaries for inundated areas in the city. The City of Mobile, Engineering Department, furnished rainfall records for seven rain gauge stations and the vertical control data used in determining the maximum water-surface elevations. The City of Mobile Planning Commission provided base maps of the city on which the maximum water-surface elevations and areas inundated by the flood are shown.

National Geodetic Vertical Datum of 1929 (NGVD of 1929): A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Mean Sea Level."

USE OF METRIC (SI) UNITS OF MEASUREMENT

The compilations in this report are in inch-pound units of measurement. Conversion factors for metric units from inch-pound units are listed below. Multiply the inch-pound units by the conversion factor to obtain metric units.

Inch-pound units	Conversion factor	Metric units
inch (in)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi ²)	2.59	square kilometer (km ²)
cubic foot per second (ft ³ /s)	0.02832	cubic meters per second (m ³ /s)

RAINFALL

Torrential rains fell in the Mobile area in the late evening and early morning hours on May 5 and 6, 1981. The area had already been saturated by steady rains occurring early in the day on May 5. From rainfall data furnished by the City of Mobile, Engineering Department, the maximum 1- and 2-hour rainfall intensities were determined to be 4.53 and 7.53 inches, respectively, which exceeds the estimated 100-year rainfall frequency for this area. A total of 6.47 inches of rainfall was measured and recorded between 8 and 10 p.m. on May 5 at city rain gauge F519 located on Azalea Road just off Government Boulevard. (See adjacent index map.)

Rain, which began on the morning of May 5, was produced by an isolated storm system which, for the most part, was confined to the immediate area. The storm system passed over the area producing rainfall totals in excess of 12 inches in just a few hours in some areas of the city. Cumulative rainfall data furnished by the City of Mobile, Engineering Department; the National Weather Service; and Mr. Jim Herwin, a local resident, are summarized in the following table:

Cumulative Rainfall Data for Mobile, Alabama, May 5 and 6, 1981
(Inches of rainfall)

Rain Gauge Stations										Mr. Jim Herwin, local resident	National Weather Service, Mobile, Ala.
Date	Time	Filter Plant	ESC	F52 ¹	F519 ²	F520 ³	F521 ⁴	F522 ⁵	F523 ⁶		
May 5	10 a.m.	--	0.01	0.01	0.76	0.05	0.49	0.47	--	--	0.07
	11	--	10	04	56	11	60	69	--	--	17
	12 a.	--	18	29	108	30	70	76	--	--	38
	1 p.m.	0.07	45	25	1.14	40	77	79	--	--	42
	2	12	50	28	1.15	45	79	79	--	--	45
	3	13	50	29	1.15	45	79	79	--	--	45
	4	13	50	29	1.15	45	79	79	--	--	45
	5	13	50	29	1.15	45	79	79	--	--	45
	6	13	50	29	1.17	45	80	80	--	--	45
	6:15	--	13	30	1.20	--	84	85	--	0.50	--
	6:30	--	17	36	1.25	--	85	93	--	--	64
	7:30	--	22	38	1.32	--	86	104	--	--	64
May 6	7:44	--	77	--	1.33	--	86	104	--	--	64
	8	26	78	35	1.35	--	86	104	--	--	64
	8:10	--	91	--	--	--	86	104	--	--	64
	8:30	37	90	49	2.77	76	1.44	2.31	--	--	1.35
	8:45	45	--	--	--	1.48	--	--	--	--	--
	9	59	2.02	1.00	3.09	1.76	1.89	4.35	--	--	2.50
	9:15	--	--	--	--	--	2.01	--	--	--	--
	9:30	1.77	3.20	1.37	6.00	2.13	2.36	5.99	--	--	--
	10	3.17	5.50	1.62	8.42	2.17	3.80	8.75	5.20	--	4.00
	10:07	--	5.93	--	--	--	--	--	--	--	--
	10:24	--	6.41	7.33	1.94	--	5.99	--	--	--	--
May 6	10:30	--	6.41	7.33	1.94	--	5.99	--	--	--	--
	10:39	6.00	--	--	--	2.34	--	--	--	--	--
	10:45	--	7.44	--	9.25	--	--	--	--	--	--
	10:50	--	--	--	--	--	--	9.21	--	--	--
	11	7.25	7.70	3.60	9.08	2.38	6.96	9.34	--	--	5.24
	11:10	--	--	--	--	--	7.44	9.39	--	--	--
	11:20	9.30	7.72	--	--	--	7.44	11.26	--	--	--
	11:30	--	8.09	--	--	--	--	--	10.45	--	--
	11:36	--	--	--	--	--	--	--	--	--	--
	11:55	10.64	--	--	--	--	--	--	--	--	--
	11:58	--	--	--	--	--	--	7.46	--	--	--
	12 p.m.	--	8.11	3.84	11.60	2.39	7.58	--	11.60	--	7.26
May 6	12:20 a.m.	--	8.11	--	--	--	--	--	--	--	--
	12:25	--	--	--	12.00	--	--	--	--	--	--
	12:30	--	--	3.84	--	2.39	9.88	--	12.95	--	--
	12:40	--	--	3.84	--	--	--	--	--	--	--
	12:45	--	--	--	--	2.40	10.53	--	--	--	--
	1	--	10.84	4.50	--	2.85	10.97	--	13.65	--	7.96
	1:30	--	11.84	5.97	--	4.07	11.36	--	--	--	--
	1:44	--	--	12.06	--	--	--	--	--	--	--
	2	--	--	6.82	--	4.54	11.59	--	--	--	8.00
	2:30	--	--	6.17	--	4.53	11.81	--	--	--	--
	2:45	--	--	7.35	--	4.94	--	--	--	--	8.00
	3	--	--	--	--	4.55	11.83	--	--	--	--
	4	--	--	--	--	--	--	--	--	--	--
	5	--	--	--	--	--	--	--	--	--	--
	6 a.m.	--	--	--	--	--	--	--	13.95	--	--

¹ Last rainfall amount recorded.² Rainfall data furnished by City of Mobile.³ Location of the seven rain gauges operated by the City of Mobile along with those furnished by the National Weather Service and Jim Herwin, local resident, are shown on the index map.⁴ Cumulative rainfall recorded at city rain gauge F519 and at a local residence at Cottage Hill and Shillinger Roads are presented graphically with a discharge hydrograph for Montlinar Creek at U.S. Highway 90.

DISCHARGE

Peak discharges were determined for sites on Thremble, Woodcock, and Halls Hill Creeks using indirect methods described in U.S. Geological Survey manual on Techniques of Water-Resources Investigations, Book 3, Chapter A5. Discharges for station 02471065 on Montlinar Creek at U.S. Highway 90 were determined by applying recorded stages to a stage-discharge relationship for the station. A discharge hydrograph for Montlinar Creek is shown in an adjacent illustration. Station numbers, stream names and locations, drainage areas, water-surface elevations, and peak discharges for the sites are listed below. The drainage area for each site was computed using USGS topographic maps of the area considering normal flow situations where the surface runoff follows the topography indicated by the contour lines on the topographic maps. The site numbers correspond to those on the adjacent index map.

Site	Stream name and location	Drainage area (mi ²)	Water-surface elevation (ft) (NGVD)	Peak discharges (ft ³ /s)
1	Station No. 02471065 Thremble Creek at Moffat Road at Mobile, Ala.	12.1	46.26	9560
2	Station No. 02471063 Woodcock Creek at Airport Boulevard at Mobile, Ala.	1.85	20.07	2240*
3	Station No. 02471065 Montlinar Creek at U.S. Highway 90 at Mobile, Ala.	8.57	33.21	5530**
4	Station No. 02471075 Halls Hill Creek at U.S. Highway 90 at Mobile, Ala.	27.2	16.15	8340

* Includes overflow discharge from Thremble and Esclava Creek basins.

** Excludes overflow discharge from Montlinar to Esclava Creek and Bolton Branch basins.

No frequency interval was determined for this flood because of the rapid expansion in urban development.

INUNDATED AREAS

The approximate boundaries of areas inundated by floodwaters from Thremble Creek, Montlinar Creek, Esclava Creek, Woodcock Creek, and Bolton Branch were determined from field investigations of the area and maximum water-surface elevations along each stream. Grift, seed and trash, and lines found on buildings, trees and other landmarks were used in the delineation of these boundaries. Sheet 2 gives a map of the city showing the areas inundated by the floodwaters. Field inspection of a few obscure areas inundated by floodwaters was impractical. These areas are noted on the map on sheet 2.

WATER-SURFACE ELEVATIONS

Peak water-surface elevations were determined from marks left by the floodwaters. The marks were located and identified immediately following the flood. Most of the marks are upstream and downstream from roads or street crossings. Elevations of marks were determined by level survey using vertical-control data furnished by the City of Mobile, Engineering Department. The datum of the survey is National Geodetic Vertical Datum of 1929 (NGVD). The high-water elevations are shown on two maps depicting the elevation and location of each high-water mark. Peak water-surface elevations are shown on sheets 3 and 4 for the following streams:

Stream	Location	Elevation (ft) (NGVD)
Bolton Branch	Esclava Creek	33.21
Esclava Creek	Thremble Creek	46.26
Thremble Creek	Woodcock Creek	20.07
Woodcock Creek	Montlinar Creek	33.21
Montlinar Creek	Moore Creek	16.15

These streams are shown on the adjacent index map.

A stage hydrograph, covering the entire duration of the flood, for station 02471065 on Montlinar Creek at U.S. Highway 90 is shown in an adjacent figure. Also shown is a partial stage hydrograph for Thremble Creek determined using water-surface data furnished by Mrs. Bunkley, a local resident.

EXTENT OF FLOOD

Some of the most severe flooding occurred along Montlinar Creek. Montlinar Creek, formerly Vragg Swamp Canal, was developed in the early 1960's to drain the marshy area just west of Mobile to facilitate urban development in this area. Montlinar Creek parallels Federal Interstate Highway I-65 and, except for a small portion of land between the channel and Highway I-65, intersects all the surface drainage from the west. Montlinar Creek normally does not flow east across Highway I-65. The primary stream intersected by Montlinar Creek are Esclava Creek and Bolton Branch. (See adjacent index map.) The drainage pattern of these two streams east of I-65 was not changed. Flooding along Montlinar Creek was the highest known since its formation. Floodwaters from Montlinar Creek left its banks and flowed eastward around the high ridge of ground along the east bank in the vicinity of Daughlin Street, Airport Boulevard, Pleasant Valley, and Cottage Hill Roads, and then flowed farther eastward into the drainage basins of Esclava Creek and Bolton Branch. According to information furnished by the Alabama Highway Department, Interstate Highway I-65 was overtopped at two separate points. (See sheet 2.)

Severe flooding occurred along Thremble Creek. According to information from many local residents, this was the highest known flood for this area. Floodwaters from Thremble Creek left its banks in the vicinity of the Illinois Central Gulf Railroad bridge and flowed eastward beneath the I-65 overpass at Moffat Road and U.S. Highway 98 into the adjacent drainage basins of Woodcock and lower Esclava Creeks and their tributaries. (See map 2.)

Structural damage to bridges and culverts along Moore Creek and Spencer's and Spring Branches in west Mobile was extensive. Damage was also extensive along Bolton Branch in the vicinity of Michael Boulevard. Several streets and roads had to be closed indefinitely for repairs. Public utility services were temporarily interrupted for many city residences. The Mobile Public Works Department estimated the combined flood damage to public and private property to be millions of dollars.

LOCATION OF DATA

Additional information may be obtained by contacting the U.S. Geological Survey, Water Resources Division, 1765 Highland Avenue, Montgomery, Alabama 36102.