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RECONNAISSANCE OF THE GROUND WATER AND GEOLOGY OF THOMAS COUNTY, GEORGIA

By

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U.S. Geological Survey

Prepared in cooperation with the U.S. Geological Survey

ATLANTA

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ABSTRACT

This report briefly describes the geology and the availability and chemical quality of ground water in the upper Eocene to Recent aquifers of Thomas County, Ga. The Tallahatta Formation and the lower part of the Lisbon Formation, of middle Eocene age, contain saline water, the overlying formations all contain fresh water.

The Ocala Limestone of late Eocene age and the Suwannee Limestone of Oligocene age are the principal aquifers tapped by domestic, municipal, and industrial wells. The maximum yield of these two aquifers varies greatly within Thomas County. They yield only about 60 (gpm) gallons per minute near Meigs in northwestern Thomas County, but will yield more than 3,000 gpm near Thomasville in the central part of the county.

Contours drawn on the top of the Suwannee Limestone show a northeastward-trending fault with a displacement of as much as 190 feet. The rocks are upthrown on the southeast side of the fault. Changes in lithology and thickness of lower and middle Miocene sediments indicate that movement occurred during early and middle Miocene time. General absence of the Citronelle Formation of Pliocene age southeast of the fault indicates that faulting may have occurred again during post-Miocene time.

INTRODUCTION

This report presents the results of a reconnaissance investigation made of the ground-water resources in Thomas County, Georgia, by the U.S. Geological Survey in cooperation with the Georgia Department of Mines, Mining and Geology. It briefly describes the geology and the availability and chemical quality of ground water in the upper Eocene to Recent aquifers of Thomas County, an area of about 540 square miles along the Georgia-Florida state line in central south Georgia.

A well-numbering system based on geographic coordinates is used in this report. Each well is assigned two numbers separated by a letter. The first number and the letter refer to a coordinate system used to identify the individual 7½-minute quadrangles. Beginning at the southwest corner of Thomas County, the numbers 13 through 16 designate from west to east each 7½-minute interval of longitude and similarly, the letters D through G designate from south to north each 7½-minute interval of latitude. These quadrangle coordinates are shown on figure 1. The final number represents the well numbered serially within a quadrangle. Accordingly, well 14F12 was the 12th well to be located within the 7½-minute quadrangle represented by coordinates 14 and F.

Wells for which drill cuttings are available have also been given a Georgia Geological Survey (GGS) number. These numbers are shown under "Remarks" in tables. Drill cuttings from these wells are on file in the sample library of the Georgia Department of Mines, Mining and Geology in Atlanta.

GEOLOGIC FORMATIONS AND THEIR WATER-BEARING PROPERTIES

Thomas County is underlain by more than 7,000 feet of sedimentary rocks ranging in age from Cretaceous or older to Recent. However, data are not available concerning rocks underlying the Tallahatta Formation of middle Eocene age, thus the discussion of geology and water-bearing properties is limited to the Tallahatta and overlying formations. These are summarized in table 1.

The Tallahatta Formation is thought to underlie all of Thomas County but only well 14E16, the deepest well in the county, has penetrated this formation. According to Herrick (1961, p. 398-400) the bottom 23 feet of this well penetrated fine-to coarse-grained glauconitic sand belonging to the Tallahatta Formation at a depth of 1,612 to 1,635 feet. Water from this interval is highly mineralized and is under greater hydrostatic pressure than water in the overlying limestones. When well 14E16 was completed, the highly mineralized water from the Tallahatta Formation flowed up the well bore, then entered the Ocala Limestone and contaminated the city of Thomasville's well field. The well was subsequently plugged with cement and abandoned.

About 200 to 600 feet of glauconitic limestone of the Lisbon Formation of middle Eocene age overlies the Tallahatta Formation in Thomas County. The Lisbon consists of glauconitic white limestone interbedded with glauconitic marl. Gypsum and pyrite are common in the lower part of the formation. Water-bearing properties of the Lisbon are relatively unknown. Layne-Atlantic Company reported that at Meigs the upper part of the formation contained slightly mineralized water and the lower part contained saline water.

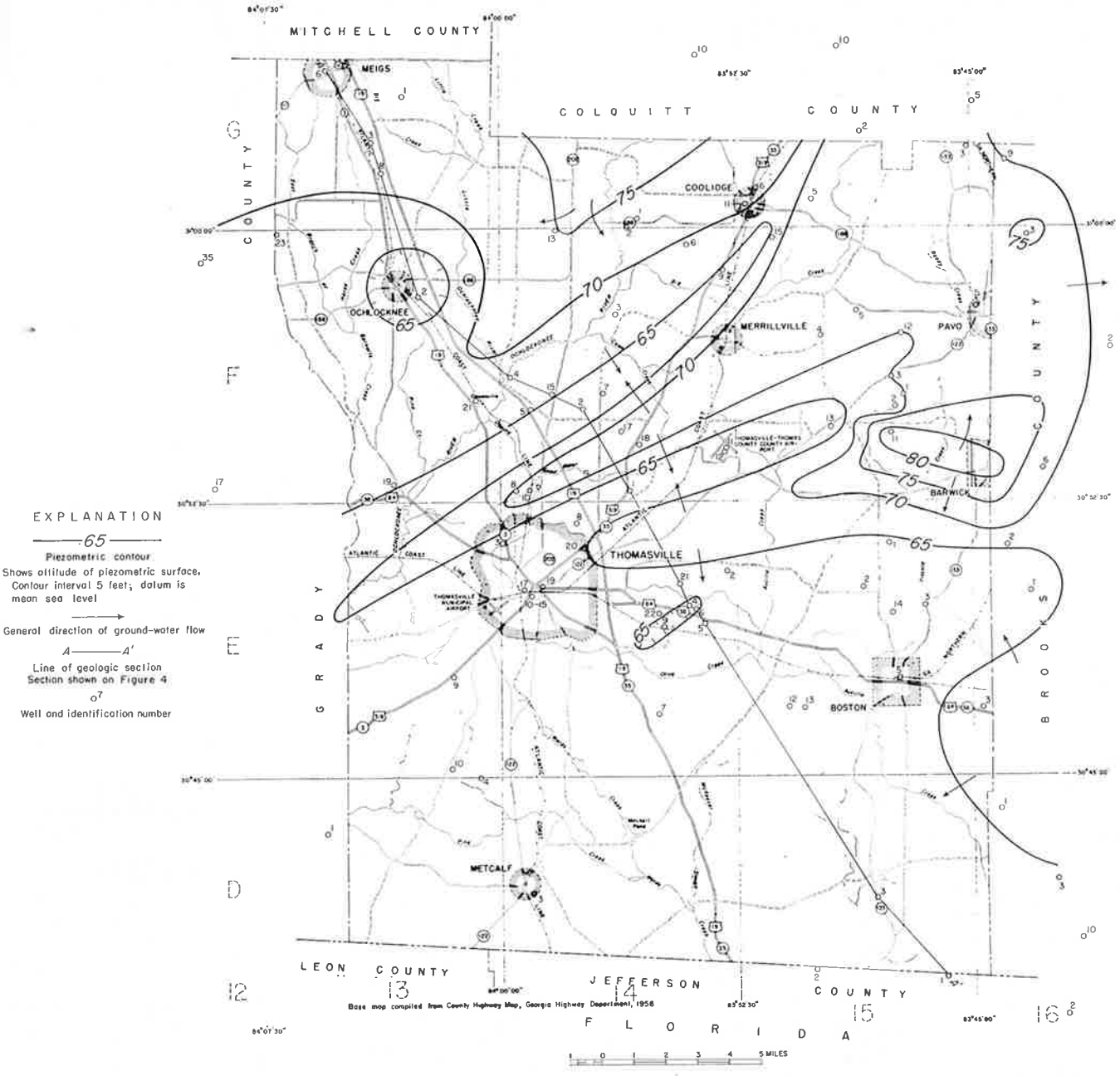

Figure 1.—Hydrologic map showing wells, and the piezometric surface of the Suwannee Limestone, March 16, 1964.

Table 1.—*Generalized section of geologic units underlying Thomas County, Ga., and their water-bearing properties.*

Series	Group	Stratigraphic Unit	Lithologic Composition	Thickness (feet)	Water-bearing properties
Recent to late Pleistocene	.....	Undifferentiated	Loose sand and gravel along major streams	0-25	Contains appreciable water. Not developed because material occurs only in low areas subject to flooding.
Pleistocene	.....	Undifferentiated	Loose sand	0-10	Not developed in low areas because of flooding; generally dry in high areas because of drainage.
Pliocene		Citronelle Formation	Terrestrial deposits of cross-bedded yellow to red gravel, sand, and clay	0-80	Yields 1 to 5 gpm to dug wells. Cased out of all drilled wells. At places water is polluted. Generally missing southeast of the Ochlockonee fault.
Miocene	Alum Bluff	Upper Zone	Marine deposits of fuller's earth clay; gray clayey sand; and white calcareous-cemented sandstone	0-80	Acts as confining layer for Miocene aquifer system.
		Middle Zone	White phosphatic sandy limestone	0-50	Yields about 6 gpm. Specific capacity is about 0.3 gpm/ft. Limestone missing southeast of Ochlockonee fault.
		Lower Zone (Chipola Formation equivalent)	Phosphatic fine-grained sand interbedded with marl and thin white sandy limestone.	0-110	Yield unknown. Will cave into well unless cased out. Screens needed for development. Not utilized in Thomas County.
		Tampa Limestone	Upper: Yellowish-gray very phosphatic sandy limestone	0-70	Yields 5 to 50 gpm. Tapped by many domestic wells northwest of the Ochlockonee fault. Either absent or drained dry southeast of the Ochlockonee fault except along the southern edge of the county. Screens and gravel-packed well construction generally are necessary to prevent fine-grained sand from entering the well.
			Lower: Phosphatic sandy marl containing gravel interbedded with sandy limestone. Pyrite is sparse to common near the base.	0-85	Yields practically no water to wells. Acts as confining layer for principal artesian aquifer northwest of the Ochlockonee fault. Generally absent southeast of the Ochlockonee fault.
Oligocene		Suwannee Limestone	Dense pure white limestone with a porous secondary chert layer developed near the top of the formation east of the Ochlockonee fault. The formation is dolomitic and contains gypsum northwest of the fault.	75-210	Good aquifer where unconformably overlain by Tampa Limestone. East of the Ochlockonee fault it yields as much as 1,000 gpm. Specific capacity is more than 50 gpm per foot of drawdown. Yield to wells decreases northwestward from the Ochlockonee fault. Yields are reported to be less than 20 gpm to wells near Meigs.
Eocene	Jackson	Ocala Limestone	Dense brown dolomitic limestone containing gypsum.	175-700	Good aquifer where unconformably overlain by Suwannee Limestone. Capable of yielding more than 3,000 gpm to wells located east of the Ochlockonee fault. Yield to wells decreases northwestward from the fault. Yields are reported to be less than 30 gpm to wells near Meigs.
	Claiborne	Lisbon Formation	Loose granular white glauconitic limestone interbedded with light-gray glauconitic marl. Gypsum and pyrite are common in the lower part of the formation.	200-600	Yield unknown. Upper part contains slightly mineralized water. At Meigs water in lower part is saline.
		Tallahatta Formation	Glauconitic sand and marl interbedded with light-gray sandy glauconitic limestone and dark-brown glauconitic dolomitic limestone.	200-400	Contains highly mineralized water.
Lower Eocene to Cretaceous			No data available	more than 5,000	Probably contains highly mineralized water.

The Ocala Limestone of late Eocene age overlies the Lisbon Formation; it is a dense, brown dolomitic, gypsiferous limestone that contains slightly mineralized water. The Ocala underlies the entire county and is tapped by most of the industrial and municipal wells. Its yield is variable. At Meigs, Layne-Atlantic Company reported that the Ocala yielded less than 30 gpm to their test well (13G6). In contrast, at Thomasville the Ocala yields as much as 3,000 gpm with about 14 feet of drawdown. The permeability of the Ocala in the Thomasville area has probably been increased because of fracturing of the rocks by post-Eocene folding and faulting.

The most extensively developed aquifer in the county, the Suwannee Limestone of Oligocene age, overlies the Ocala Limestone. It generally is a white, non-sandy, oolitic, fossiliferous limestone that at places is almost a microcoquina; it becomes somewhat dolomitic northwest of the Ochlockonee fault (fig. 2). The Foraminifera *Pararotalia mexicana mecatepecensis* (*Rotalia mexicana* var. of former usage) generally can be found in cuttings from the upper 10 feet of Suwannee Limestone in Thomas County. This foraminiferal species is considered by Herrick and Vorhis (1963, p. 13) to be diagnostic of the Oligocene in Georgia. Other diagnostic species listed by them include *Quinqueloculina leonensis* Applin and Jordan, *Nummulites* (ex-*Camerina*) *dia* (Cole and Ponton), and *Asterigerina subacuta* Cushman var. *floridensis* Applin and Jordan. The Suwannee Limestone is easily distinguished from overlying Miocene limestones by the absence of sand and from the underlying Ocala Limestone by the diagnostic Foraminifera.

The Suwannee Limestone is the principal source of water for domestic wells over much of Thomas County, however, the maximum yield and the quality of its water varies within the county. Its maximum yield decreases northwestward from the Ochlockonee fault, and the water becomes very hard and contains abundant dissolved sulfates. At Meigs, Layne-Atlantic Company reported that it yielded less than 30 gpm to their test well (13G6). However, southeast of the fault it generally will yield several hundred gallons per minute of moderately hard water of good quality. An exception is along the crest of the Barwick arch (fig. 2) where the upper part of the Suwannee Limestone generally either is drained dry or contains water that is corrosive.

Overlying the Suwannee Limestone is the Tampa Limestone of early Miocene age which can be divided into two members in Thomas County. The lower member of the Tampa is predominately a sandy marl with interbedded thin white sandy limestones. It is as much as 100 feet thick in the northwestern part of Thomas County, but yields little or no water to wells and acts as a confining layer to water in the underlying limestone aquifer system. The lower member of the Tampa Limestone is absent southeast of the Ochlockonee fault.

The upper member of the Tampa Limestone is an easily recognized, gray to brown, dense, sandy limestone containing abundant chert and phosphate. It is about 20 feet thick in the southeastern part of Thomas County and thickens to about 70 feet in the northwestern part, but it maintains a similar lithology across the entire county. This member (the Chattahoochee Formation of previous usage) is easily distinguished from other Miocene limestones by its color and sand content; its denseness which causes a prominent high anomaly on electric logs; its phosphate content that contains traces of uranium which causes a distinctively high radiation anomaly on gamma radiation logs; and its microfauna which includes specimens of *Archaias* sp., *Sorites* sp. and numerous fragments of larger shells. Northwest of the Ochlockonee fault this upper member is a source of as much as 300 gpm of moderately hard water of good quality to many domestic and a few municipal and industrial wells. Screens and gravel-packed well construction are necessary in some places to prevent fine-grained sand from entering the wells. Southeast of the Ochlockonee fault this member either is drained dry or has been eroded and is missing and is not a source of water.

Overlying the Tampa Limestone is the Alum Bluff Group of middle Miocene age. Northwest of the Ochlockonee fault this group is divisible into three mappable units or zones: A sandy marl lower zone; a phosphatic sandy limestone middle zone that causes a high anomaly on gamma radiation logs; and a fuller's earth clay upper zone. Southeast of the Ochlockonee fault the middle zone is missing and the group becomes a sandy clay with interbedded sandy marl which could not be differentiated.

Only one drilled well (13F20) taps the Alum Bluff Group in Thomas County. It taps the middle zone in northwestern Thomas County. There this zone will yield a maximum of 6 gpm of moderately hard water of good quality. Numerous dug wells tap sand beds within the Alum Bluff Group in the county. The water from these sand beds reportedly is corrosive and some places contain excessive dissolved iron.

About 90 feet of gravel and coarse sand of terrestrial origin overlies the Alum Bluff Group within the Meigs basin. This unit is known as the Citronelle Formation and is considered by the U. S. Geological Survey to be of Pliocene age. On the Barwick arch this unit generally is absent but occasionally is represented by as much as 20 feet of sand and gravel in what appears to be old river channels. Southeast of the Barwick arch the lower part of the Citronelle appears to interfinger with shallow water marine beds in which the author and several others have found numerous fossil mammal teeth and a ray plate. The teeth were identified as *Merychippus* sp. and *Diceratherium* sp. by Olsen (1963) who considers them to be of late Miocene age. Numerous dug wells tap this formation in Thomas County. The maximum yield to these wells is not known but the yield is adequate for domestic supplies. The water, however, is corrosive and contains excessive iron.

Beds of sand and gravel of Pleistocene to Recent age have been deposited along the flood plains

of streams within the county. They generally are thin and contain water that is probably corrosive. These sands are generally subject to flooding, so no wells have been developed in them.

Many remnants of terraced surfaces, believed to have been continuous at one time, are found in Thomas County (fig. 4). Cooke (1945) named the terraces and concluded that they were of Pleistocene age. In Thomas County, two of these terraces, the Wicomico (90 feet) and the lower Sunderland (120 feet), generally occur as flat swampy areas whose shapes and distribution resemble embayments, lagoons, and other features found along the present-day coastal areas. In contrast, the remnants of the Sunderland (150 feet), Coharie (200 feet), and Brandywine (260 feet) terraces occur as a series of flat-topped hills.

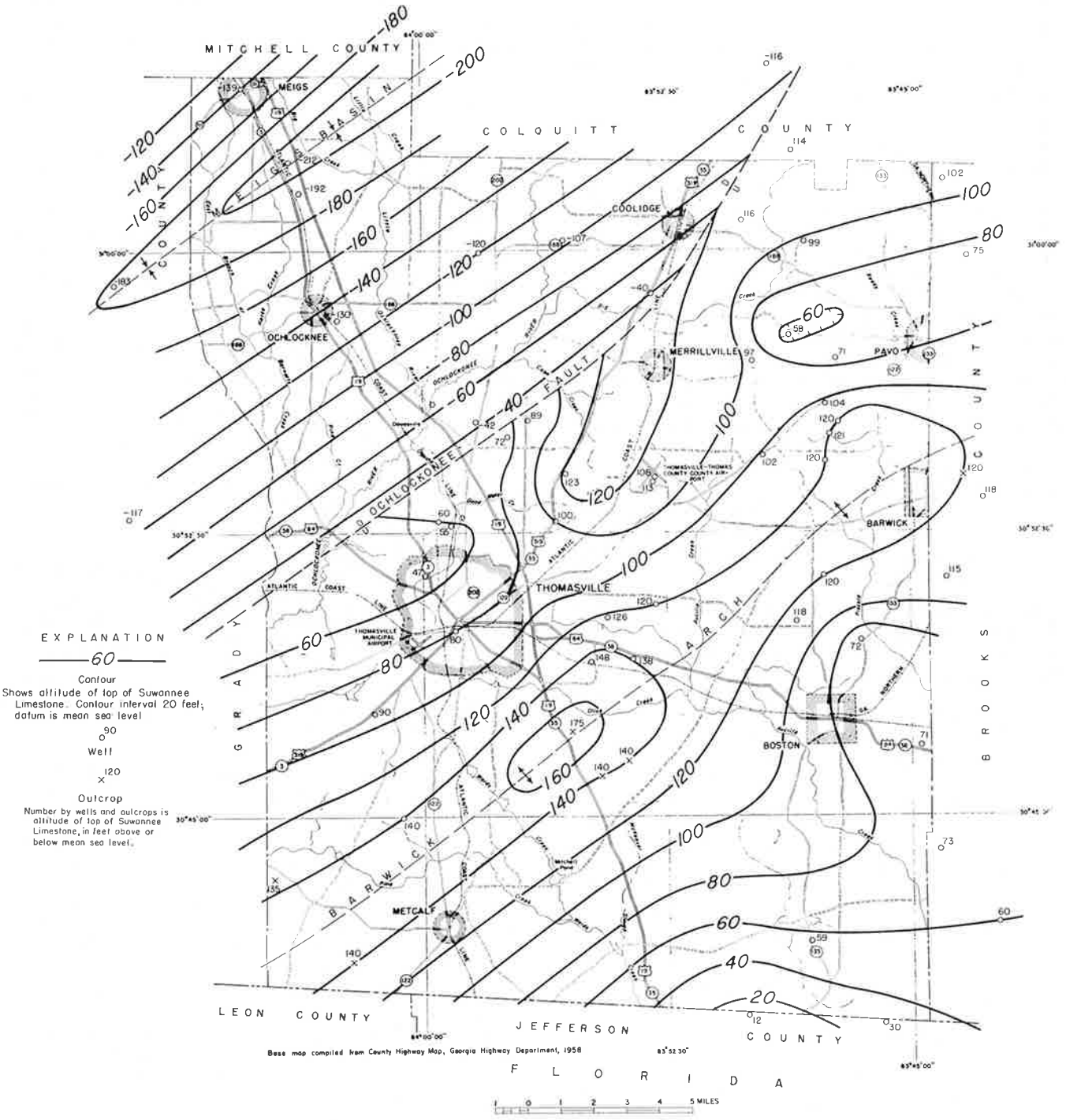

Figure 2.—Map showing configuration of the top of the Suwannee Limestone.

MacNeil (1950, p. 99) concluded that the terraces below 150 feet were Pleistocene terraces of marine origin and those above 150 feet were older fluvial terraces of subaerial origin possibly modified by later seas. MacNeil's interpretation is one possible explanation of the difference between the two types of terraces in Thomas County, but this difference could be related to structural uplift along the Barwick arch described elsewhere in this paper. The loose sands that at places occur on these terraces either are drained or contain water that is corrosive and high in dissolved iron content. Wells on the lower terraces would be subject to flooding.

GEOLOGIC STRUCTURE

Contours drawn on the top of the Suwannee Limestone of Oligocene age and the Tampa Limestone of early Miocene age (fig. 2 and 3) show that these rocks in northwestern Thomas County are downfolded along a northeast-plunging structure called the Meigs basin (Sever, in review). In central Thomas County the rocks have been up-

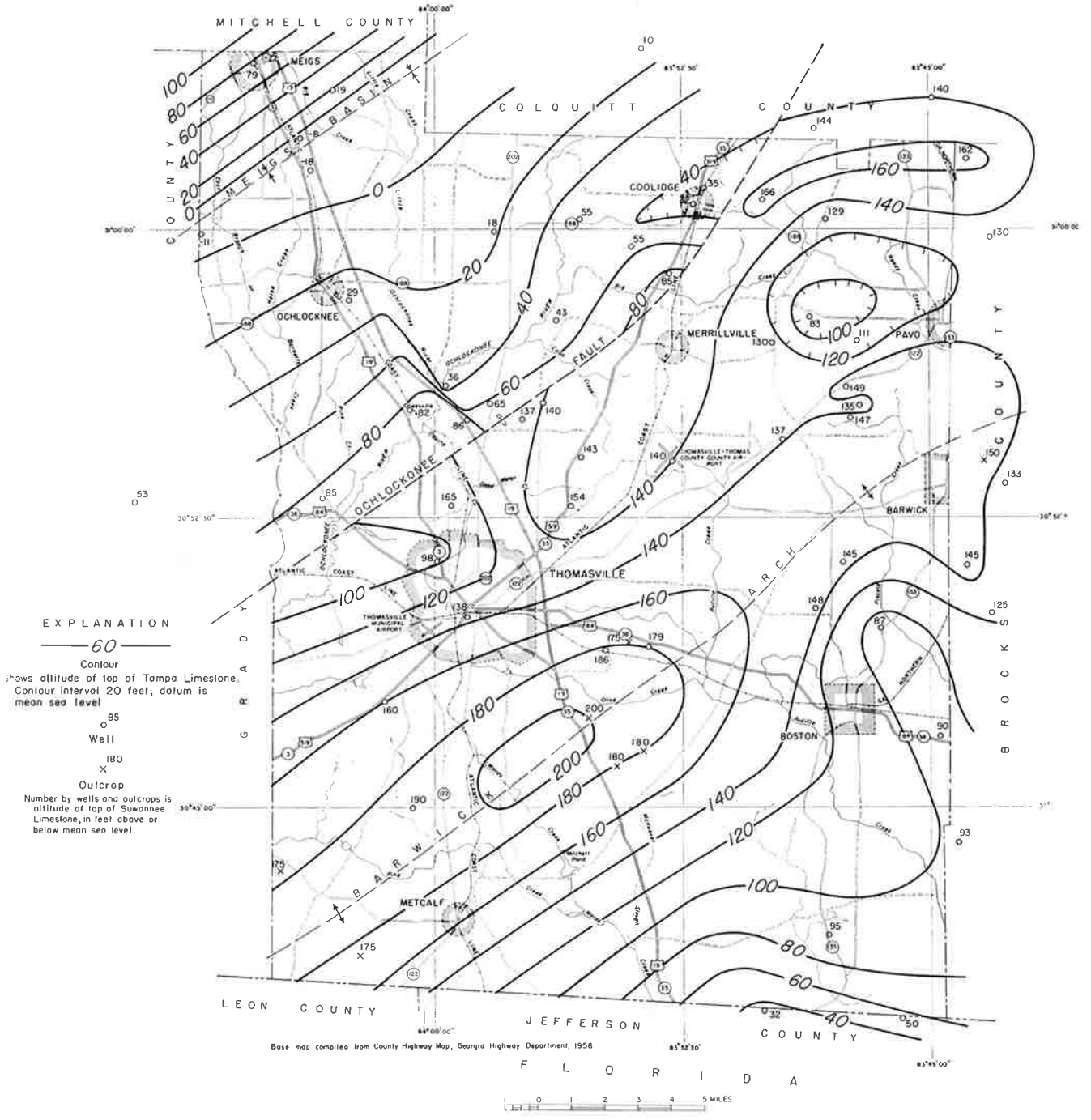

Figure 3.—Map showing configuration of the top of the Tampa Limestone.

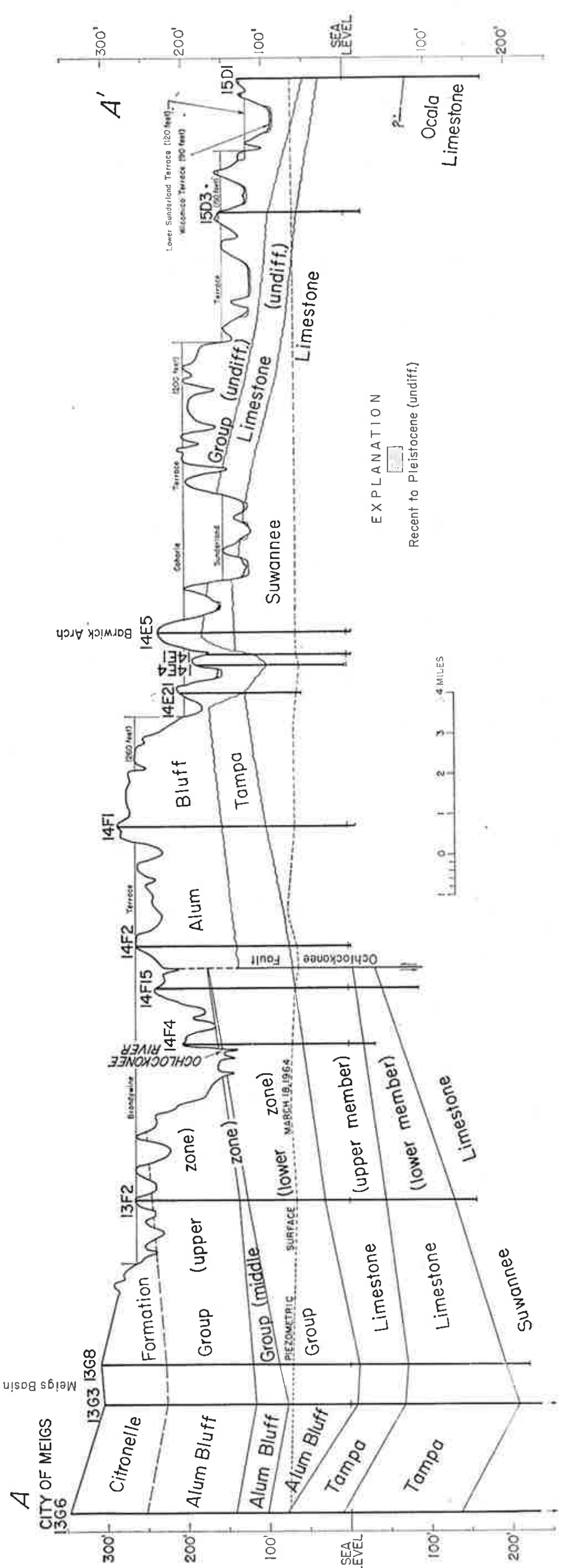

Figure 4.—Geologic section A-A'

folded along a northeast trending arch named the Barwick arch. These folds are separated by the Ochlockonee fault which has a displacement of about 100 feet in central Thomas County (fig. 4) and about 200 feet in northern Thomas County (fig. 2). Rocks on the southeast side of the fault are upthrown with the amount of displacement increasing to the northeast.

Thickening and displacement of Miocene formations show that folding and faulting occurred periodically during early and middle Miocene times and may have continued into post-Miocene time. Structural contours drawn on the top of the Suwannee Limestone (fig. 2) show that the Oligocene rocks have been displaced along the Ochlockonee fault by later (post-Suwannee) faulting. Data are not available to determine if movement began during Oligocene or earlier time. However, contours drawn on the top of the Tampa Limestone (fig. 3) show that it, too, has been displaced along the Ochlockonee fault, but the amount of displacement is about 20 to 100 feet less than the displacement in the top of the Suwannee Limestone. This difference in displacement indicates that some movement occurred along the Ochlockonee fault after deposition of the Suwannee Limestone and prior to cessation of deposition of the upper member of the Tampa Limestone. Absence of the lower marl member of the Tampa Limestone (fig. 4) east of the fault suggests that some movement occurred during early Miocene time prior to or contemporaneous with deposition of this lower member.

The upper member of the Tampa Limestone generally has about the same maximum thickness and the same lithology across the entire county suggesting that it was deposited during an interval of relative stability. However, displacement of this limestone across the Ochlockonee fault shows that faulting again occurred after its deposition.

Southeast of the Ochlockonee fault the Tampa Limestone was uplifted at the end of early Miocene time, and, at a few places (fig. 4), deep channels were incised through the Tampa and into the upper part of the Suwannee. Sands and clays of the Alum Bluff Group of middle Miocene, which were deposited over this irregular surface, filled the channels.

Northwest of the Ochlockonee fault the Alum Bluff Group is divisible into three mappable zones: A sandy marl lower zone; a sandy limestone middle zone; and a fuller's earth clay upper zone. Thickening of the middle zone in the Meigs basin (fig. 4) suggests that some movement occurred contemporaneously with its deposition. Within the Meigs basin commercial deposits of attapulgite and fuller's earth clay occur in the upper part of the upper zone. These clay beds are absent east of the Ochlockonee fault. Data are inadequate to determine if they were never deposited or if they were deposited, uplifted by later folding and faulting, and then eroded. However, beds of the Alum

Bluff Group have been folded since their deposition (fig. 5) and at places faulted. Many of these

Figure 5.—Folding of beds in the Alum Bluff Group.

folds and faults were probably caused by differential compaction within the Alum Bluff Group, and some probably are caused by continuing solution and collapse of the underlying limestones, but many of these structures could have been caused by continued movement along the Ochlockonee fault during middle Miocene to post-Miocene time.

General absence of the Citronelle Formation southeast of the Ochlockonee fault and downwarping within the Meigs basin of the top of the Alum Bluff Group indicate that folding and possibly faulting occurred again during post-Miocene time.

The Ochlockonee fault, Meigs basin, and Barwick arch trend parrallel to the Chattahoochee anticline (fig. 6) as it was redefined by Sever (1964b). All these structures are oriented parallel to structural trends in the Appalachian Tectonic Province and may have been caused by structural movement within the Province during Miocene time. The Brevard fault zone on figure 6 shows the structural trend of the Appalachian Tectonic Province in Georgia.

These structural trends are almost normal to the general northwesterly structural trend in Florida which is shown by the Ocala uplift on figure 6. The close spacing of contour lines north of Thomasville in figure 3 suggests that there may be minor northwest-trending structures intersecting the major northeast-trending structures within the area.

QUALITY OF GROUND WATER

The quality of ground water is generally controlled by the lithology of the aquifer, or rock in which the water is contained. Water obtained from a limestone aquifer will contain dissolved calcium and bicarbonate because limestone is composed of the mineral calcium carbonate. If the rock is dolomite, a magnesium carbonate, its water will contain dissolved magnesium and bicarbonate. If the limestone is sandy its water may contain dissolved silica. Additional minerals known to affect the quality of water in aquifers in Thomas County are common salt, a sodium chloride; gypsum, a calcium sulfate; pyrite, an iron sulfide; and glauconite, a potassium iron silicate.

The water from municipal and industrial wells in Thomas County contains dissolved mineral concentrations that are well below the recommended limits for drinking water as listed in the U. S. Public Health Service Drinking Water Standards, 1962 (table 2). The concentrations of dissolved minerals in ground water from municipal and industrial wells in Thomas County are summarized in table 2. The concentrations of dissolved minerals in ground water from each aquifer are summarized in table 3. Chemical analyses of water from municipal wells show the water to be moderately hard to very hard with the hardest water coming from wells at Thomasville and Coolidge, the cities located nearest the Ochlockonee fault.

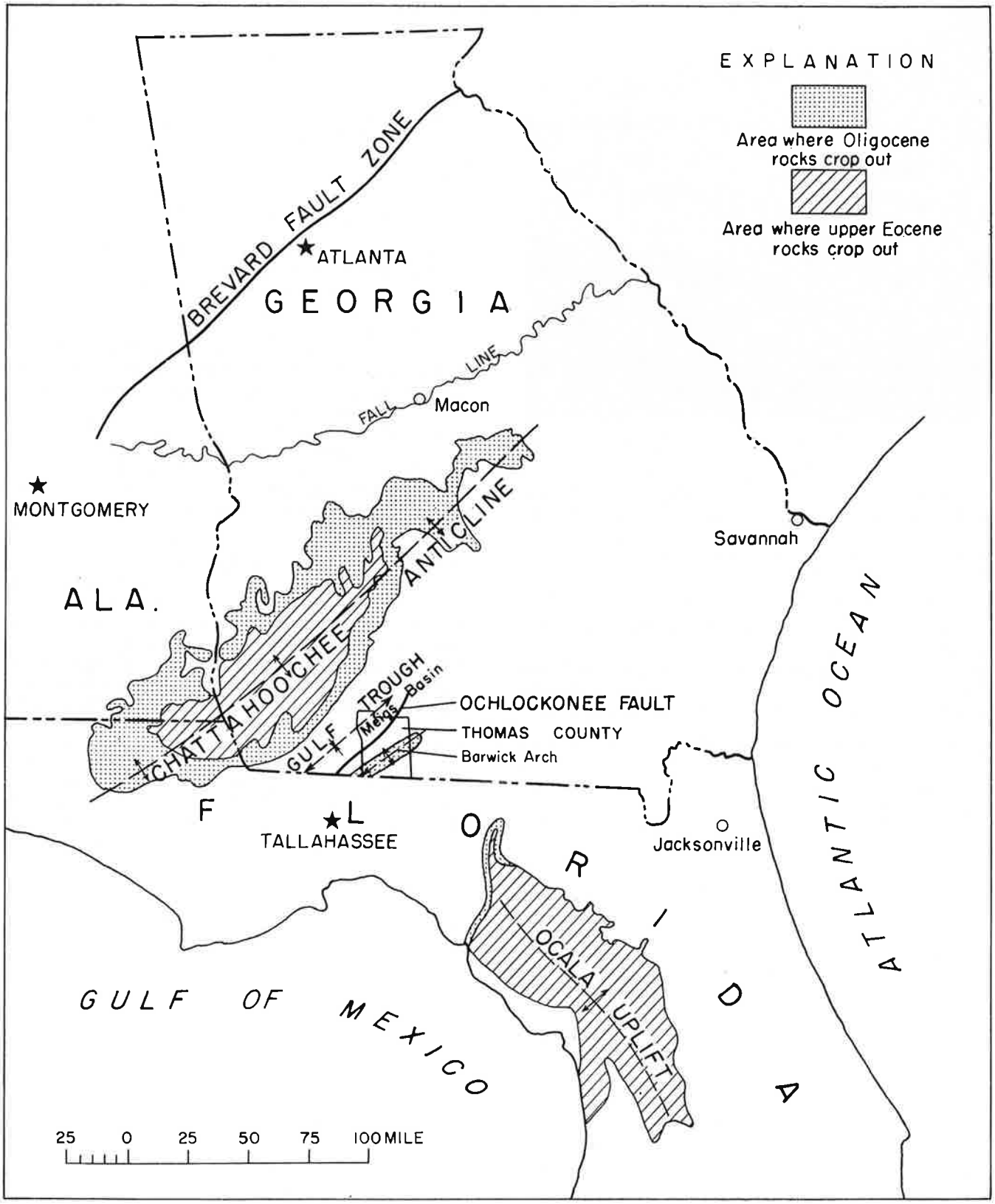

Figure 6.—Regional geologic structures in southwestern Georgia and adjacent areas.

Table 2.—*Chemical analyses of water from Municipal and Industrial Wells, Thomas County, Ga.*

(Analysed by U. S. Geological Survey)

Owner	Well number	Aquifer	Date of collection	Depth of well (feet)	Temperature (°F)	Parts per million: Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180° C)	Hardness as $CaCO_3$: Calcium Magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH	Color	Remarks
City of Barwick	16F10	Suwannee Limestone	1-7-64	308	70	20	0.03	40	9.7	3.1	0.5	158	7.1	3.8	0.3	0.3	168	140	10	260	7.7	5	
City of Boston	15E5	do	do	235	70	21	.10	41	11	3.2	.6	168	6.8	4.0	.2	.3	176	147	10	275	7.7	5	
City of Coolidge	15G7	do	1-6-64	383	74	25	.09	65	31	22	3.5	148	185	15	.7	.1	438	288	166	615	8.0	5	
City of Ochlocknee	13F22	Tampa and Suwannee Limestone	do	450	64	36	.06	32	16	20	3.8	162	42	10	.9	.0	242	146	13	360	7.8	5	
City of Pavo	16F4	Suwannee Limestone	do	305	69	39	.03	33	13	2.9	.6	165	.2	2.7	.3	.0	182	136	3	245	7.6	5	
City of Thomasville	14E12	Ocala Limestone	5-8-58	400	76	22	.00	47	20	7.8	1.0	158	8.2	9.0	.4	.0	288	130	70	418	7.8	2	
City of Meigs	13G6	Tampa, Suwannee, and Ocala Limestone and upper part of Lisbon Formation	4-21-64	832	77	38	.08	16	6.8	32	9.7	152	4.8	5.0	.8	.2	207	68	0	271	8.5	5	GGS No. 59
Thomasville-Thomas County Airport	14F12	Ocala and Suwannee Limestone	1-6-64	300	70	21	.08	34	13	2.9	.6	154	6.2	3.5	.2	.3	162	137	11	250	7.6	5	GGS No. 19
Waverly Petroleum Products Company	13G3	do	1-24-64	905	75	29	.05	22	13	12	3.6	152	3.6	4.0	.3	.0	162	107	0	245	7.9	5	GGS No. 495

Table 3.—*Chemical quality of water from aquifers, Thomas County, Ga.*

Aquifer System	Formation	Temperature (°F)	Parts per million: Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium Magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Color	Remarks
Pliocene	Citronelle Formation	64	5.1	0.50	6.8	3.6	41	0.2	7	0.2	60	0.0	43	184	32	26	295	5.6	5	Nitrate, sodium, and chloride contents of this water suggest that it may be polluted.
Miocene	Middle Zone of Alum Bluff Group	70	41	.04	20	3.9	3.6	1.6	88	.8	2.0	.5	.1	129	66	0	120	7.3	5	
Do	Upper member of Tampa Limestone (NW of fault)	69	36	.15	36	18	8.3	2.1	192	3.8	5.7	.4	.0	203	152	0	302	7.7	5	Average of 3 analyses
Principal Artesian	Suwannee Limestone (SE of fault)	70	21	.05	39	11	3.1	.6	162	6.8	3.6	.2	.3	167	140	10	260	7.6	5	Average of 4 analyses
Do	Suwannee Limestone (NW of fault)	74	24	.05	58	28	22	3.8	144	162	14	.7	.1	385	258	140	570	8.2	5	Average of 2 analyses
Do	Ocala Limestone	76	22	.02	45	18	7.8	1.0	156	80	8.5	.4	.1	270	260	130	70	8.4	5	Average of 3 analyses
Do	Upper part of Lisbon Formation	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	No analysis available. Water probably is slightly mineralized but usable.
Early Tertiary	Lower part of Lisbon Formation	----	----	11	----	----	----	----	254	----	310	----	----	----	48	29	----	----	----	
Do	Tallahatta Formation	----	30	.10	244	68	5,320	----	276	1,871	7,300	.0	.0	24,218	788	----	----	7.5	----	

RECHARGE AND THE PIEZOMETRIC SURFACE

The piezometric surface shown in figures 1 and 4 is an imaginary surface representing the static water levels (in feet above mean sea level datum) in wells tapping the Suwannee Limestone as measured in March 1964. It is useful in showing areas of recharge and discharge. Ground water flows from areas of high piezometric elevations toward areas of low piezometric elevations in a direction generally normal to each contour. The general directions of ground-water flow in the Suwannee Limestone in Thomas County are shown by arrows on figure 1.

Rainfall recharges the Suwannee Limestone in Thomas County southeast of the Ochlockonee fault where the limestone is at or very near the land surface by direct inflow through sinkholes or by percolation through the overlying sands and clays. High piezometric elevations near Barwick suggest that appreciable recharge takes place in that area. Little or none of the water recharging the Suwannee in Thomas County moves laterally across the Ochlockonee fault. Instead, it discharges down the fault into the underlying Ocala Limestone. Most of the water in the Suwannee Limestone northwest of the Ochlockonee fault entered the aquifer north of Thomas County.

Data are inadequate to construct a piezometric map of any aquifer other than the Suwannee Limestone. However, water levels in the Tampa generally are from 30 to 60 feet higher than water levels in the Suwannee, and water levels in the Ocala are about 10 to 20 feet lower than those in the Suwannee.

THOMASVILLE WELL FIELD

As the city of Thomasville has grown, the amount of water used has increased (fig. 7). The water is pumped from 5 wells spaced from 70 to 700 feet apart that tap the Ocala and Suwannee Limestones. A continuous record of the water level in a sixth well (14E15), located within the well field, was obtained using a water-level recorder. Figure 8 shows how the water level changed between October 1961 and September 1964 in response to recharge from local rainfall and discharge by pumpage. The water level generally declined in response to the pumpage, but rose in response to recharge from heavy rainfall during the periods June to September, 1962 and January to September, 1964.

Figure 9, a copy of the recorder graph of well 14E15 for December 26 to 30, 1963, shows how the water level changed in response to pumping from three of the wells at Thomasville. The water level generally oscillated with diminishing amplitude for about 2 minutes after a pump was either started or stopped. The amount and direction of change in the water level depended upon whether a pump was started or stopped, the pumping rate, and the distance from the observation well to the pumped well. Well 14E12 is located about 310 feet west of the observation well and was pumped at a rate of 1,170 gpm. Well 14E10 is located about 310 feet to the southwest and was pumped at a

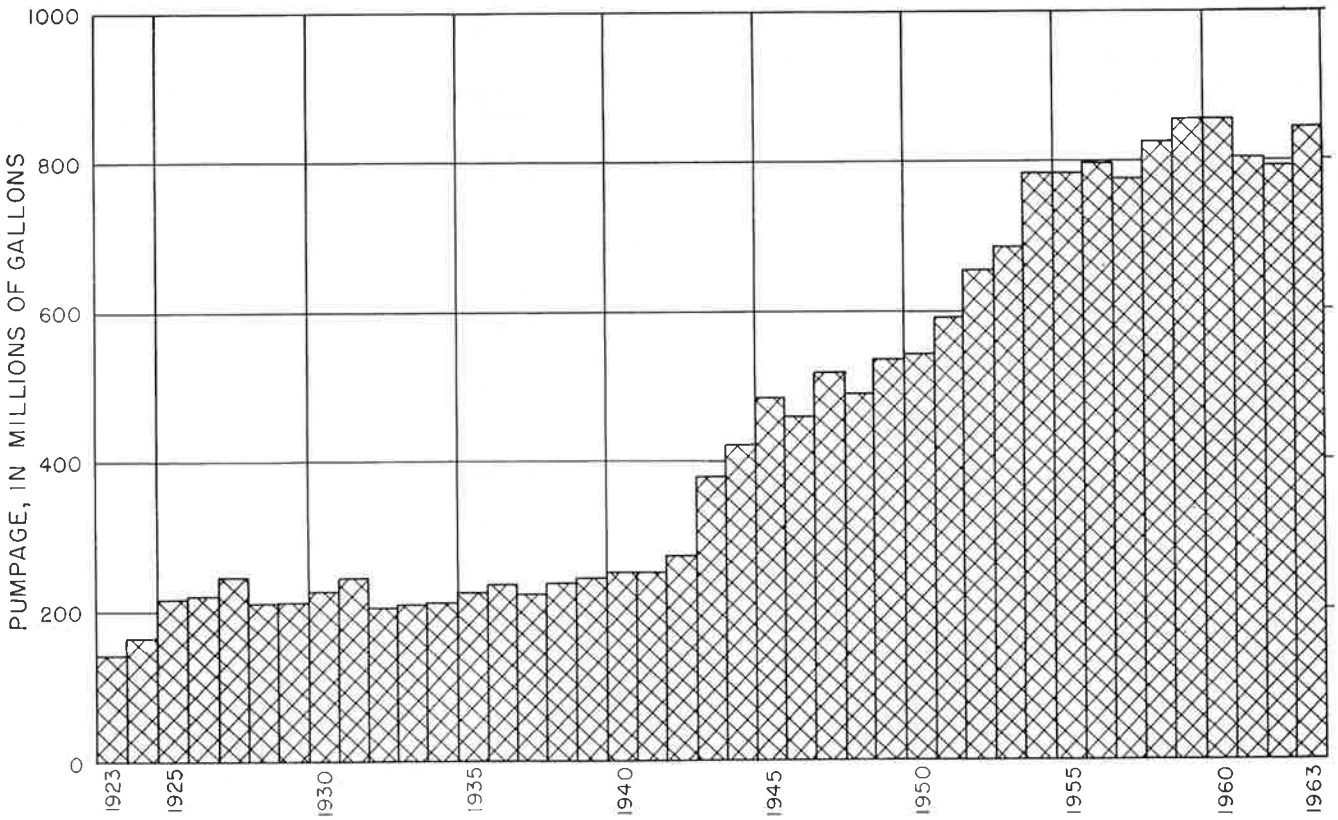

Figure 7.—Annual pumpage from the Thomasville well field 1923-1963.

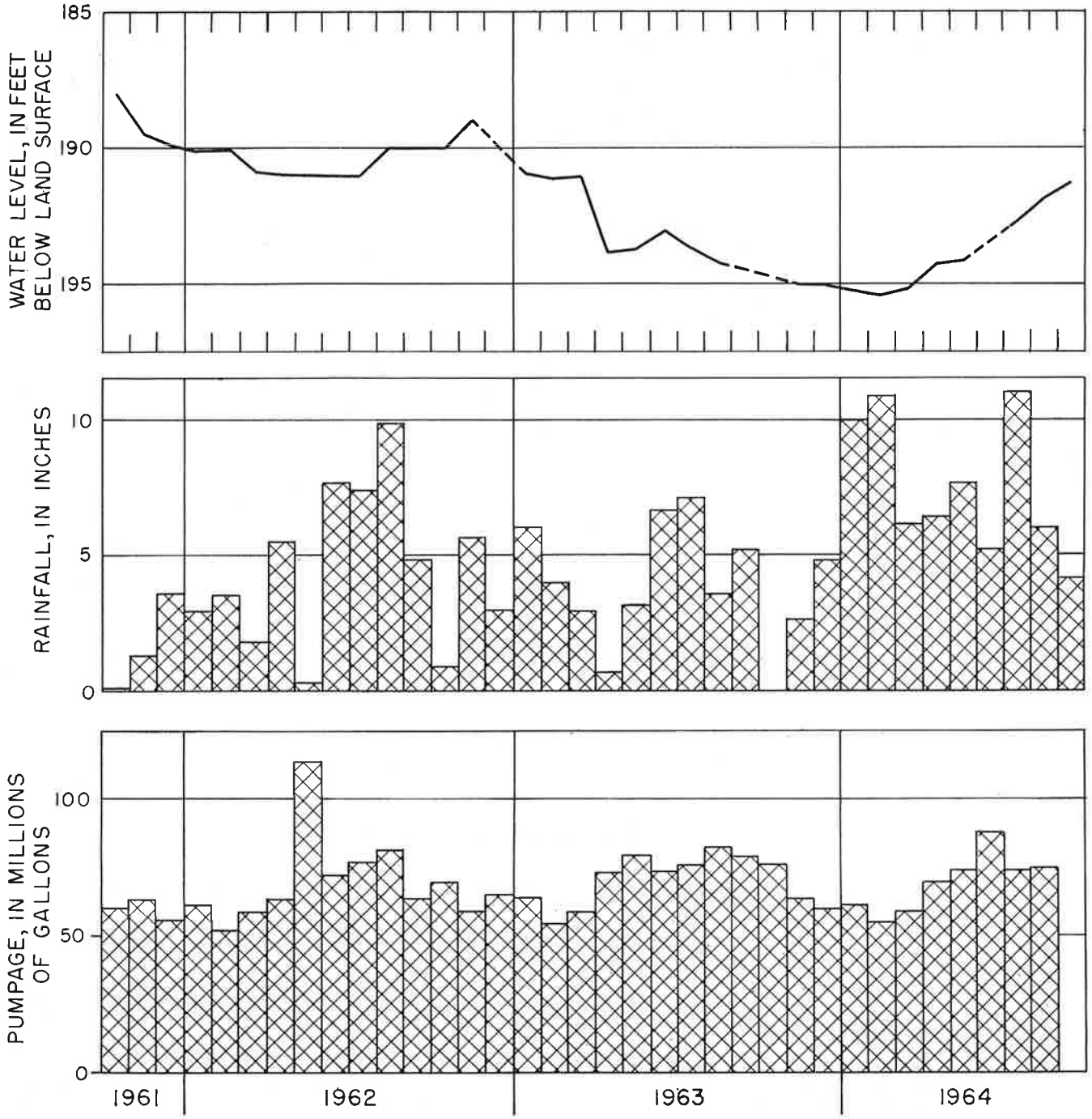

Figure 8.—Response of the water level at the Thomasville well field to rainfall and pumpage 1961 to 1964.

rate of 1,000 gpm. Well 14E14 is located about 95 feet to the southwest and was pumped at a rate of 500 gpm.

The lack of development of a drawdown cone around the Thomasville well field, and the quick response of the water level at Thomasville to local rainfall, indicate that the Ocala and Suwannee Limestones in the Thomasville area are extremely permeable. This permeability probably results from ground-water solution of the limestone along numerous joints created during folding and faulting of the rocks.

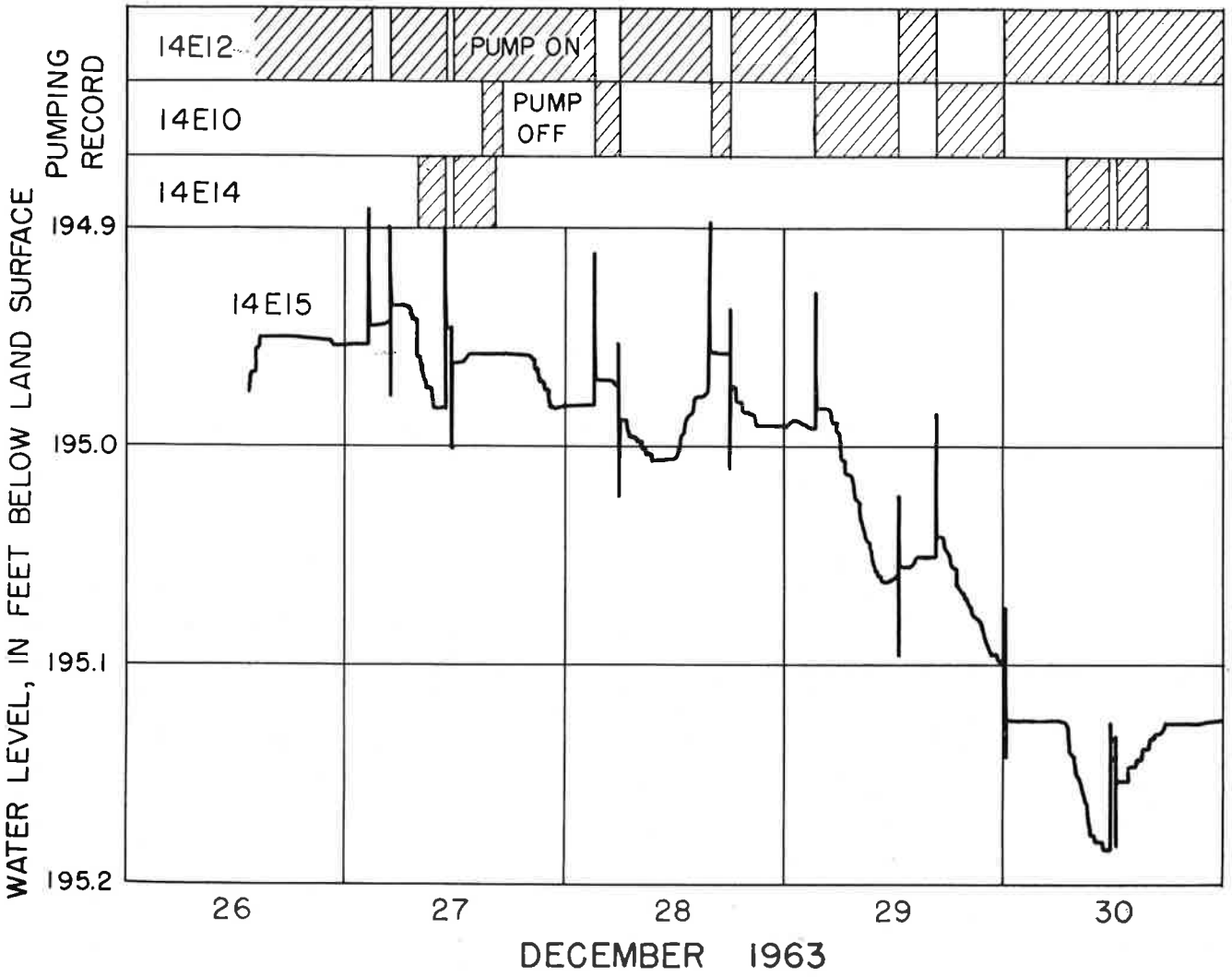

Figure 9.—Response of the water level in well 14E15 to periodic pumping of wells 14E10, 12, and 14, Thomasville well field.

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