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REPORT OF INVESTIGATION NO. 5

GROUND WATER CONDITIONS IN ORLANDO AND VICINITY, FLORIDA

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INTRODUCTION

This investigation was made for the purpose of mapping the locations of the numerous drainage and sanitary wells in Orlando and vicinity, to compile data concerning these wells, and to assemble geologic and hydrologic information relative to the effect of such wells on the ground-water resources of this area.

The investigation was under the general supervision of O. E. Meinzer, Geologist in Charge of the Division of Ground Water, U.S. Geological Survey, and Herman Gunter, Director, of the Florida Geological Survey, and under the immediate supervision of V. T. Stringfield and H.H. Cooper, Jr., of the U.S. Geological Survey. Captain A.B. DeWolf, of the Corps of Engineers, U.S. Army, made preliminary arrangements for the investigation and gave many helpful suggestions.

During the field work much valuable assistance was given by Lt. Col. J.P. Larsen and Mr. D.D. Riddle of the U.S. Engineers Office at the Orlando Air Base. Mr. F.L. Holland, of the Orange County Road and Bridge Department, supplied information regarding County-owned wells, and aided in the location of these wells. Mr. A.B. Herndon, City Engineer, and Mr. Jesse Burkett, of the Orlando City Engineers Office, furnished information concerning City-owned drainage and sanitary wells, and furnished pumping equipment and operators during the well exploration. Valuable suggestions were made by Messrs. J.B. Miller and Fred Eidsness of the Bureau of Sanitary Engineering, Florida State Board of Health. Well logs and cuttings of numerous wells were supplied by Mr. Clyde Freeman, of Libby and Freeman Company, and Mr. J.E. Cousins, of Layne-Atlantic Company. Mr. Freeman also gave freely of his time to aid in the location of many of the wells. The altitudes of the measuring points on many wells used for water-level observa-

tion were determined by leveling parties supplied by the U. S. Engineer Department.

TOPOGRAPHY AND DRAINAGE

Orange County may be roughly divided into three physiographic regions. The eastern part of the County, between the St. Johns and Econlockhatchee Rivers, is a relatively flat lowland ranging in altitude from about 10 feet along the St. Johns River to as much as 60 feet in the area just east of the Econlockhatchee River. This lowland contains many swamps and marshy areas. Most of the lowland is drained by eastward flowing tributaries of the St. Johns River, but the extreme western part is drained by short tributaries of the Econlockhatchee.

The region west of the Econlockhatchee River, extending nearly to Orlando, consists of a series of northwest trending, parallel, elongate ridges and intervening elongate low areas. Altitudes in this region range from 50 to 80 feet. The northern portion of the region is drained by a branch of the Econlockhatchee, and the southern portion is drained into Lake Hart, Lake Mary Jane, and other smaller lakes.

Except for the lowland area in the headwater region of the Wekiva River, most of Orange County west of the region of parallel ridges is a rolling upland which extends northward and westward into Seminole and Lake Counties, and southward and westward into Osceola and Polk Counties. Within Orange County, the upland ranges in altitude from 70 to 140 feet and has a maximum local relief of about 50 feet. This upland area contains numerous closed depressions, many of which contain lakes or ponds. Some of the depressions,

especially the steep-walled ones, appear to have originated as the result of local subsidence of underlying formations consequent to the collapse of caverns and solution channels in the substratal marls and limestones. There is very little surface drainage in the upland area. With the exception of drainage into Howell Creek and Wekiva River, which flow northward and eastward to the St. Johns River, and of drainage into Shingle and Reedy Creeks, which flow southward to the Kissimmee River Basin, all natural drainage is into the closed depressions. Probably many of these depressions are drained by seepage through pervious material into the underlying limestones.

GEOLOGY

GEOLOGIC FORMATIONS

GENERAL

Orange County is mantled by unconsolidated sand and clay, and although the topography varies from a gently undulating lowland to a rolling upland, there are very few exposures of the underlying formations. The closed depressions in the upland, which might be expected to provide exposures, are either filled with water or mantled by sand. Sandy, phosphatic limestone of the Hawthorn formation is exposed at Rock Spring, about five miles north of Apopka, and red clays, which are probably residual from the Hawthorn, are exposed in several clay pits in the northwestern part of the County.

In the absence of sufficient exposures, information regarding the characteristics of underlying formations must be obtained from studies of well cuttings.

Such studies indicate that the formations penetrated by wells in Orange County and adjacent regions are, in ascending order: middle Eocene limestone, Ocala limestone (upper Eocene), Hawthorn formation (lower Miocene), marl beds which may be of Choctawhatchee age (upper Miocene), and surficial sand and clay (Pleistocene and Recent).

EOCENE

In publications that appeared prior to 1937, all Eocene limestones penetrated by wells in central Florida were generally referred to the Ocala. Although it was generally recognized that the lower part of the section penetrated contained beds older than typical Ocala limestone, the term Ocala had not been restricted, and the contact between the Ocala and underlying beds had not been defined. Stringfield (1936) stated:

> "The lithology of the Ocala and the underlying Eocene rocks is similar, and it is therefore necessary to distinguish the two units on the basis of a study of the fossils collected from the well cuttings. No diagnostic fossils have been reported near the contact, and the lower limit of the Ocala has therefore not been definitely determined."

Stubbs (1937) tentatively assigned a middle Eocene age to a zone which he called the "Coskinolina Zone." According to Stubbs, this zone ". . . . lies directly below the Ocala formation" and well cuttings from it ". . . . revealed a predominance of the Foraminifer Coskinolina and an absence of typical Ocala Foraminifera." The forms referred to Coskinolina by Stubbs

are now recognized as Dictyoconus cookei (Moberg). Cole (1941 and 1942), reporting on wells in Polk and Levy Counties, used the uppermost occurrence (within the Eocene) of Dictyoconus cookei (Moberg) to define the upper limit of the middle Eocene. At the same time, he divided the middle Eocene into seven zones, the uppermost of which he called the Dictyoconus cookei zone. Later (1944) Cole included this zone, with others, in the Lisbon formation as extended westward from Mississippi and Alabama.

MIDDLE EOCENE

Logs of three wells in Orange County that are 1,000 feet or more in depth indicate that the middle Eocene limestone is at least 750 feet thick and that it may be roughly divided into two distinct portions.

The lower portion is at least 550 feet thick and consists of light to dark brown, porous, recrystallized, dolomitic limestone, with a few irregularly spaced beds or lenses of dense, reddish brown, cherty limestone. Disseminated throughout this lower portion are numerous minute inclusions of pyrite, and a few molds and casts of small molluscs. Owing to recrystallization, however, the fossils cannot be identified.

The upper portion is about 200 feet thick and consists almost entirely of porous, white to cream, highly fossiliferous, foraminiferal limestone, in which Dictyoconus cookei is very abundant. Interbedded through this upper portion are thin beds of light buff, porous, recrystallized limestone.

The permeability of the middle Eocene limestones allows circulation of water, and the circulating water has formed caverns and channels which are often

encountered in drilling. The recrystallization so prevalent in these limestones is due to the precipitation of material from mineralized solutions and the deposition of this material in interstices in the rocks.

OCALA LIMESTONE

The term, Ocala Limestone, is here applied to the Eocene limestone above the top of the middle Eocene as defined by Cole (1941 and 1942). The Ocala is penetrated by most wells in Orange County, but a few scattered wells, which appear to have been drilled in sinkholes or solution cavities, enter middle Eocene beds immediately beneath the Hawthorn. In such wells the interval normally occupied by the Ocala and upper beds of the middle Eocene consists of a heterogeneous mixture of Hawthorn marl and limestone with irregularly disseminated small fragments of Ocala and middle Eocene limestone (see well 82 in figure 3). The logs of wells that penetrate the Ocala indicate that it ranges in thickness from 4 to 120 feet. As the contact between the Ocala and the underlying middle Eocene limestone appears to be conformable, the variations in thickness of the Ocala suggest that it was subjected to surface erosion prior to the deposition of the Hawthorn.

The Ocala in Ocala in Orange County is similar to the Ocala exposed in other parts of Florida and consists of white to cream, porous, relatively pure limestone, composed almost entirely of foraminifera tests. It also contains molds and casts of larger molluscs and echinoids. The permeability of this limestone allows free circulation of water, and the solvent action of the water has resulted in the formation of subterranean cavities and channels.

MIOCENE

UPPER MIOCENE

There is some uncertainty regarding the presence of upper Miocene deposits in Orange County. Cooke and Mossom (1929) do not map, or mention the occurrence of, deposits of this age in this area. Stringfield (1933) mentions the occurrence of the upper Miocene Choctawhatchee formation in Orange County but does not give information concerning its thickness or areal extent.

A few of the wells in the County penetrate 30 to 40 feet of shell marl immediately under the surficial sand. This marl contains molluscs and foraminifera which appear to be contemporaneous with Choctawhatchee forms, but proof of this age relationship will require detailed examination of many well cuttings. The shell marl may represent highly fossiliferous portions of the Hawthorn, or it may actually be a deposit of Choctawhatchee time. As the shell marl has been reported in only a few wells, its areal extent is not known. In the profiles accompanying this report (figs. 1, 2, and 3) this marl is tentatively referred to the Hawthorn formation.

HAWTHORN FORMATION

The Hawthorn formation, which unconformably overlies the Ocala limestone, consists of a series of sandy, phosphatic marl beds and interbedded layers of limestone. It ranges in thickness from 45 to nearly 200 feet. The thickness is dependent upon the surface elevation and the irregularities in the surface of the Ocala.

The lower part of the Hawthorn is predominantly a light buff to greenish gray, silty, granular limestone which contains many small brown phosphatic grains. This limestone appears to be interbedded with thin layers of sandy phosphatic marl.

The upper part of the Hawthorn consists of alternating beds of gray, sandy, phosphatic marl and very fine, thinly laminated, calcareous clay. A well indurated, coarsely conglomeratic limestone is penetrated at irregular intervals in many of the wells. This conglomerate consists of a gray limestone matrix containing quartz sand, phosphate pebbles, fish teeth, and rounded, solution-pitted fragments of bluish-gray limestone.

The only indurated rock exposed in Orange County is a part of the Hawthorn formation. Rock Spring, about five miles north of Apopka, issues from a cave-like opening at the base of a vertical bluff in which a thickness of about 15 feet of buff to brown, sandy, phosphatic limestone is exposed. Wekiva Spring, about three miles northeast of Apopka, also issues from an opening in the Hawthorn formation, but the opening is below the water level. Elsewhere in the northwestern part of Orange County, red clays, which are probably residual from the Hawthorn, are exposed in several clay pits.

Some of the sand and limestone beds of the Hawthorn formation are fairly permeable and will therefore yield small quantities of water to wells. However, the Hawthorn also contains relatively impervious layers of marl and clay which act as confining beds for the artesian water in the Ocala and middle Eocene limestones. Although Rock Spring and Wekiva Spring issue from openings in the Hawthorn, this

formation may not be the source of the water. Probably the water flowing from these springs comes from the Ocala and middle Eocene limestones, and flows to the surface through crevices and solution channels in the Hawthorn.

PLEISTOCENE AND RECENT

Overlying all other formations in most of Orange County and large portions of adjacent counties is a covering of unconsolidated sand interbedded with clay, which ranges in thickness from a few inches to nearly 100 feet. The sand yields small quantities of water to shallow driven wells.

STRUCTURAL GEOLOGY

Orange County lies on the southeast slope of the Ocala uplift, where the general dip of the Ocala and middle Eocene limestones is southward and eastward. Structural features cannot be determined from the altitude of the upper surface of the Ocala because this surface is irregular owing to solution and erosion. However, the top of the middle Eocene is more regular, and its shape, as determined from studies of well logs, suggests that a minor structural basin exists in the vicinity of Orlando. Other minor structural features may exist, but they cannot be determined until more subsurface data is obtained.

GROUND WATER

GENERAL CONDITIONS

Small supplies of water are obtained from shallow wells ending in the surficial sand, but the water

from these wells is often colored and is susceptible to pollution by seepage from the surface. Also, some wells obtain moderate quantities of water from pervious layers of the Hawthorn formation. However, the principal water-bearing formations of Orange and adjacent counties are the Ocala and middle Eocene limestones.

The water in the Ocala and middle Eocene limestones is under artesian pressure, that is, when the confining beds are perforated it will rise in the well to a level higher than the top of the water-bearing bed. In the lowlands along the St. Johns River, in eastern Orange County and northeastern Seminole County, and around the margins of Lake Apopka, the water in wells penetrating the Eocene limestones will rise above the land surface. Also water in wells penetrating these limestones will rise above the surface in the lowlands of Osceola County in the headwater region of the Kissimmee River. Some of the drainage wells in Orlando and vicinity have flowed during periods of heavy rainfall. In the summer of 1930, well 47, a drainage well northwest of Orlo Vista, began to flow and flooded the highway to a depth of about two feet. At the same time, some of the wells in southeastern Orlando ceased to drain water and allowed streets to become flooded.

Measurements made during the last fourteen years show that the water levels in Orlando and vicinity fluctuate considerably. Factors contributing to these fluctuations are: variations in rainfall in areas where the formations are recharged naturally or artificially through wells; changes in the rate of pumping from wells; and changes in atmospheric pressure. Fluctuations of the water levels in three wells in Orange County are shown graphically in Figure 4. In

this graph, measurements of water levels are indicated by small circles, and the probable general trends are represented by broken lines. The rainfall values shown on this graph represent averages of the monthly totals recorded at Weather Bureau Stations at Orlando and Orlando Air Base in Orange County, and at Lakeland, Winter Haven, and Lake Alfred, in Polk County. These rainfall stations were selected because the water-level fluctuations in Orlando and vicinity are related to variations in rainfall not only at Orlando but also over the natural recharge area which extends over Polk County and parts of Orange, Highlands, and Lake Counties.

The highest stage for which water-level measurements are available occurred in the summer of 1934, and the second highest in the summer of 1930. The lowest stage for which measurements are available occurred in the spring of 1933, but measurements made during the summer of 1943 indicate a stage nearly as low as that of 1933.

Automatic water-level recording instruments have been installed on well 47, near Orlo Vista, and on wells 223 and 224 at the Orlando Air Base. It is intended that these recorders be maintained indefinitely to obtain continuous records of water-level fluctuations.

PIEZOMETRIC SURFACE

The height to which water will rise above mean sea level in tightly cased wells penetrating the Ocala and mid-Eocene limestones in Florida and part of Georgia is shown by the contour lines in Figure 5. The imaginary surface represented by these contour lines is called the piezometric surface. In order to

plot a map of the piezometric surface for a given area, measurements of the static water levels, in feet above or below a fixed reference point, are made on a number of wells throughout the area. The altitudes of the reference points are determined and the water-level measurements are added to or subtracted from these altitudes to obtain the altitude of the water levels in the wells. These water-level altitudes are then used as controls in plotting the contour lines representing the piezometric surface.

As the water levels fluctuate the piezometric surface changes in shape and altitude, and when represented for any one time shows only approximately the conditions for any other time. Although the general form of the surface is constant, variations in local conditions may cause some change in details from time to time. In general, areas where the piezometric surface is high are regarded as areas of recharge and areas where it is low are regarded as areas of discharge. The horizontal movement of the water in the aquifer is in general from the high areas of the piezometric surface toward the low areas in directions normal to the contour lines. Thus it can be seen from Figure 5 that the movement of the water in Orange County is in general toward the northeast.

The lake region of Orange County is part of a large recharge area which extends over most of Polk County and into the lake region of northwestern Highlands County and south-central Lake County.

Water-level measurements have been made in Orlando and vicinity at various times in the past. From measurements made by Stringfield in 1930 and 1931, and measurements made during this investigation, maps representing the piezometric surfaces for

May 1930, August 1931, and August 1943 have been plotted. A study of these (Figs. 6-10) shows that the general shape of the piezometric surface is persistent, but that it varies from time to time in altitude and in local details. A notable characteristic of the piezometric surfaces shown in Figures 7 and 9 is the shelf-like feature in the vicinity of Orlando. This feature results from local recharge through the drainage wells.

The piezometric surface for August 1930 is representative of high water levels, and its most striking feature is the mound in southeastern Orlando. This mound is undoubtedly due to recharge through drainage wells and lakes.

Figures 7, 8, 9, and 10 represent the piezometric surface as of August 1931 and August 1943. Its general shape at these times was approximately the same except that in 1931 was higher. The mound in southeastern Orlando, so prominent in 1930, was not present in 1931 and 1943, but a small spur in the same area indicates that the shape of the surface is influenced by local recharge even at times of low water levels.

The Ocala and middle Eocene limestones have been separated geologically on differences in texture, color, and fossil content. Hydrologically, however, they appear more or less as a unit, that is the water levels in wells drilled into the upper part of these limestones rise to the same heights as in wells drilled to deeper horizons.

In order to determine and study the relationship between the water in upper and lower portions of the Eocene aquifer, two wells were drilled at the Orlando Air Base. One of these, well 223, is 453 feet

deep and is cased to 180 feet; the other, well 224, is 1,000 feet deep and is cased to 569 feet. Records from automatic water-level recorders installed on both wells indicate that the water in the two wells rises to the same level, and that the water levels are affected similarly and simultaneously by the pumping of nearby wells. This shows that the upper and lower parts of the aquifer are under equal artesian pressure, and that there is probably free vertical exchange of the water within the aquifer.

SPRINGS

Two large springs, which yield water from openings in the Hawthorn formation, occur in Orange County.

Rock Spring, about five miles north of Apopka, in the north half of section 15, T. 20 S., R. 28 E., is one of few springs in Florida which issue from an opening above the water surface. This spring issues from a cave-like opening at the base of a 15-foot vertical exposure of brown, phosphatic, sandy limestone, and flows into Rock Spring Run and thence into the Wekiva River. The discharge of the spring is about 50 to 60 second feet.

Wekiva Spring, about three miles northeast of Apopka, in the northeast portion of section 36, T. 20 S., R. 28 E., issues from an opening below the water surface and flows into the Wekiva River. The discharge from this spring is about 65 second feet.

Sanlando Spring is smaller than either of the springs mentioned above. It is in Seminole County, near the border between sections 2 and 3, T. 20 S., R. 29 E. The opening of this spring is below the water

surface, and overflow from the spring basin flows into the Little Wekiva River.

WELLS

Wells have been constructed in Orange County for two purposes: to obtain water and to dispose of water. A few wells have been constructed to serve both purposes, that is, they are used to obtain water for irrigation during dry seasons and to drain surplus water during wet seasons.

SUPPLY WELLS

With the exception of a few wells ending in the surficial sand, and a few drawing water from the pervious layers of the Hawthorn formation, the supply wells of Orange County are drilled into the Ocala and mid-Eocene limestones. Most of the privately-owned supply wells used to obtain water for domestic and irrigation purposes are less than 200 feet deep. Wells used for industrial or municipal supplies range in depth from 200 to 1,000 feet.

During the present investigation emphasis was placed on the collection of information relating to drainage and sanitary wells. Accordingly, the Table of Well Records (Table 1) accompanying this report contains information on only a few supply wells.

DRAINAGE WELLS

According to Sellards (1908, p. 62-63 and 1910, p. 71) and Stringfield (1933, p. 21), the first drainage well in Orange County was drilled about 1904. In April of that year, a sinkhole (probably Lake Greenwood), which had previously carried away surplus surface

water through its connections with underground drainage channels, became clogged, and a considerable area in southeastern Orlando was flooded by heavy rains. After several unsuccessful attempts to reopen the sink, a drainage well was drilled as an experiment. In August, a two-inch test well was drilled, and it proved successful enough to warrant the construction of larger wells. The next year two more wells, one 8-inch and one 12-inch, were completed and these drained a large part of the flooded area. These wells, however, were not sufficient to drain the area completely, so in the winter of 1906 two more 12-inch wells were constructed, and by February 1907, a fourth 12-inch well had been completed. By the end of March 1907, the water was almost back to its normal level.

In the following years many wells were drilled for drainage, not only to dispose of surplus water during storms, but also to lower and control lake levels, and to drain lowlands and swamps to make additional land suitable for cultivation. Sanitary wells were also constructed to drain away the effluent from septic tanks.

The most intensive period of drainage well construction was during the years 1926, 1927, and 1928, but such wells were still being drilled in 1943. In August 1943 at least 182 drainage wells were in operation in Orlando and vicinity. These may be grouped as follows:

90 Storm drainage wells, owned by the City of Orlando.

40 Storm, swamp, and lake drainage wells, owned by Orange County.

12 Drainage wells at the Orlando Air Base.

40 Privately- and municipally-owned drainage wells used for various purposes, including at least one used to dispose of citrus packing waste.

The wells used for storm and swamp drainage range in depth from 120 to 1,000 feet, and are cased to depths ranging from 74 to about 400 feet. They range from 5 to 18 inches in diameter.

The range of depths to which drainage wells are drilled and cased shows that surface water is being introduced into a considerable thickness of Ocala and mid-Eocene limestones and into the lower portion of the Hawthorn formation. Drillers' records indicate that some of the wells end in open cavities and that others penetrate only permeable limestone. In either case the drained water mingles with, and becomes part of, the ground water, and moves in the direction of the slope of the piezometric surface. At a time when a large quantity of water is entering a well, a slight mound is created in the piezometric surface in the immediate vicinity of the well so that the drained water moves for short distances in all directions from the well.

The capacity of a drainage well is dependent upon the diameter of the well, the permeability of the receiving formation, and the head under which water flows into the well. The capacities of the wells in Orlando and vicinity range from less than one hundred to as much as several thousand gallons a minute. Well 50, at the southeast edge of Lake Lawne, is reported to

have a capacity of 9,500 gallons a minute (Stringfield, 1933, p. 22).

SANITARY WELLS

The term, sanitary well, is used to designate a well which receives sewage or the effluent from septic tanks or sewage treatment plants. There are at least eighteen sanitary wells in Orlando and vicinity. Seventeen of these, owned by the City of Orlando, are used to drain septic tanks at eleven scattered localities in the City. Records of total depths and depths of casing are not available on all these wells, but those for which records are available range in depth from 231 to 863 feet, and are cased to depths ranging from 67 to nearly 400 feet. The casings in these wells range from 8 to 12 inches in diameter.

In addition to the seventeen wells owned by the City, another owned by the Army receives effluent from the sewage treatment plant of the Orlando Air Base. This well is 431 feet deep and is cased to a depth of 183 feet with 10-inch casing.

As these sanitary wells are widely separated, and as they range greatly in total depth and depth of casing, it is evident that septic tank and sewage treatment effluent is being introduced into a considerable area and thickness of Ocala and mid-Eocene limestone. A few of the wells which are not deeply cased probably introduce some effluent into the lower part of the Hawthorn formation.

EXPLORATION OF DRAINAGE AND SANITARY WELLS

One of the most frequently asked questions concerning drainage and sanitary wells is "Where

does all the water go?" The water entering such wells mingles with, and becomes part of, the ground-water supply, but it is desirable to know at what levels the water is being absorbed by the underlying formations. Although drillers' records show how much of a well is cased and how much is uncased, no information has been available to indicate the depths of the strata that actually absorb drainage water and sewage effluent. To obtain such information eight wells in the vicinity of Orlando were explored with a deep-well current meter.

METHOD

The deep-well current meter used consists of a screw-propeller-type rotor mounted, with its axis vertical, on a pointed bearing inside a cylindrical brass case. The upper end of the rotor axis is an eccentric shaft which touches a contact wire each time the rotor revolves, thus opening and closing an electric circuit. The contact wire is attached to a binding post which is insulated from the meter case. The meter is enclosed in a five-foot length of three-inch pipe, which protects it and prevents it from being carried into caverns by the velocity of the water. The assembly is lowered into the well at the end of a double-conductor cable. This cable consists of steel wire wrapped around a core of insulated copper wire. The copper wire is connected to the binding post on the contact chamber and forms one side of the electric circuit; the steel wire is connected with the three-inch pipe, which is in contact with the case of the meter, and forms the other side of the circuit. The electric current is provided by a dry-cell battery, and a headphone connected into the circuit produces a sound each time the rotor revolves. Water flowing through the meter will cause the rotor to revolve at a rate proportional to the velocity of the water.

In use, the meter assembly is lowered into a well a few feet at a time, and the revolutions of the rotor at the several depths are timed with a stop watch. The rate of revolution at the various depths indicates approximately the relative mean velocities of water at those depths. The interpretation of the observations is based on the expression, $q = av$, in which q is the quantity of water per unit of time, a is the cross section area of the well, and v is the mean velocity of the water passing through the well. Throughout that portion of a well which is lined with tight casing of the same diameter the velocity should be the same, inasmuch as the quantity of water moving through that portion must be the same at all depths and the cross-section area is constant. However, in the uncased portions of a well differences in velocities at various depths may be due either to differences in the cross-section area of the well or to differences in the quantity of water moving through it.

The observed relative velocities in drainage and sanitary wells are not as consistent as those in flowing wells because the current meter ensemble was designed to measure upward flow of water instead of downward flow, and because the fall of water from the mouth of the well apparently produces turbulence to a considerable depth.

A progressive decrease in velocity with increasing depth indicates that the water entering the well is being absorbed by the surrounding formations. When a level is reached below which the velocity is consistently zero, it seems reasonable to assume that the water entering the mouth of the well is not passing below that level and must therefore be leaving the well and entering the formations above.

VELOCITY MEASUREMENTS IN WELLS

During this investigation, five sanitary wells (Nos. 9, 19, 80, 110, and 146c) and three drainage wells (Nos. 91; 93, and 94) were explored, and the results are shown graphically in Figure 11. In this figure are shown the reported drilled depth of each well, the reported depth of casing, and the velocities of the current meter plotted according to depth. In all cases, it was impossible to explore the total drilled depth because in some wells obstructions prevented the passage of the current meter, and in others the lower portion was apparently filled with sediment. However, in wells 80, 93, and 94, practically the entire drilled depth was explored.

Well 9, in southeastern Orlando, at the southwest edge of Lake Davis, receives effluent from a septic tank. This well is reported to have been drilled to a depth of 811 feet and cased with 8-inch casing to a depth of 67 feet. At the time of exploration, an obstruction was encountered in the well at a depth of about 610 feet so that no velocity measurements were made below that depth. A gradual decline in velocity was noted between depths of 60 and 160 feet, and below 160 feet the velocity was consistently zero. It appears, therefore, that the septic tank effluent entering this well is being absorbed by the formations between altitudes of 10 feet above and 90 feet below sea level.

Wells 19 and 146c are on the south side of South St., west of Fern Creek, at the South Street Imhoff tank of the city of Orlando. With two other wells, they receive effluent from this tank. Well 19 is reported to be 865 feet deep and cased to 408 feet with 8-inch casing. The downward flow through the casing of this well was apparently irregular, probably due to

changes in the diameter of the casing, or to defects in the casing resulting from corrosion. Below the bottom of the casing, the velocity was irregular but gradually decreased to zero between the bottom of the casing and a depth of 468 feet and remained so through the rest of the depth explored. Thus, it seems that this well is introducing septic tank effluent into the limestone in the interval between 325 and 400 feet below sea level. If the irregularities in flow through the casing are due to defects caused by corrosion, there may also be some effluent leaving the well above the bottom of the casing.

The depth of well 146c and the depth to which it is cased are not definitely known, but it is reported to have been drilled to about 700 feet. This well is located about 50 feet south of well 146b, and its mouth is at a lower elevation than the mouth of that well. These two wells are connected by underground cavities or channels in such a way that when well 146b is receiving large quantities of effluent well 146c becomes filled to overflowing, and the effluent flows upward through it and drains through a ditch into Fern Creek and thence into Lake Greenwood, which is drained by a group of five wells. At the time of exploration, this upward flow was taking place in well 146c, and the flow measured was upward instead of downward. However, from a depth of 130 feet down to 215 feet, where an obstruction was encountered, there was no flow. The lack of flow at this depth is believed to indicate that the formations below 130 feet are not receiving effluent in appreciable quantities.

Well 110 is in west-central Orlando, near the intersection of Amelia Avenue and Westmoreland Drive. It is one of two wells in this locality used to drain a septic tank located beneath Amelia Avenue.

This well is 500 feet deep and is cased to a depth of 131 feet with 12-inch casing. Below the bottom of the casing, the velocity of downward flow varied greatly, probably due to variations in the diameter of the well. However, it became zero at a depth of 165 feet and remained so through the rest of the explored depth, indicating that the effluent introduced into the well is entering the formations in the interval between 25 and 60 feet below sea level.

Well 80 is on the north edge of a small lake northwest of the Orlando Air Base Sewage Treatment Plant, and receives effluent from this plant. It is 431 feet deep, 10 inches in diameter, and cased to a depth of 183 feet. No progressive decrease in velocity was noted in this well. Instead, the rotor of the meter continued to revolve throughout the explored depth and varied through a wide range near the bottom. Accordingly, it is probable that the entire uncased portion of this well is introducing sewage plant effluent into a 225-foot thickness of Ocala and middle Eocene limestone between 75 and 300 feet below sea level.

Well 91 is at the Orlando Air Base, in the east side of A Avenue at the intersection of Sixth Street. It is 800 feet deep, and the 6-inch casing extends to a depth somewhere between 150 and 180 feet. This well is used for general drainage of streets and storm runoff. The velocities observed within the casing of the well were much more irregular than in other wells. This may have been due to the fact that the diameter of the casing was only slightly larger than that of the meter tube, so that changes in the position of the meter assembly may have caused the flow to be more irregular or turbulent. An obstruction was encountered at a depth of 312 feet, and some flow was indicated at this depth. Hence, the lower limit of the downward move-

ment of the water is below the depth of 312 feet, which is 215 feet below sea level.

Well 92, also at the Orlando Air Base, is at the northwest corner of A and First Avenues, about 250 feet south-southwest of well 91. Like well 91, this well receives general street drainage and storm runoff. It is reported to have been drilled to a depth of 350 feet and is cased with 12-inch casing. The depth of the casing is not known, but changes in velocity observed during the exploration suggest that it is about 175 feet. Below 175 feet, the velocities observed were irregular, and no zone of zero velocity was found in the explored portion of the well. As an obstruction was encountered at 319 feet, the lower limit of flow in this well is not known.

Well 94 is on the northwest edge of a small lake, north of the Orlando Air Base Laundry. Waste water from the laundry is emptied into the lake, which in turn overflows into the well. This well is 482 feet deep and is cased for 221 feet with 8-inch casing. Exploration revealed a progressive decrease in velocity from a depth of 200 feet to 390 feet, below which it remained at zero. Seemingly, therefore, this well is introducing laundry waste into the surrounding formations through an interval between the altitudes of 100 and 275 feet below sea level.

POSSIBILITY OF POLLUTION

The possibility of pollution of the ground-water supply by the use of drainage wells has been mentioned by Sellards (1908, pp. 64-67, and 1910, p. 169) and Stringfield (1933, pp. 22-23).

In regions underlain by porous or cavernous

limestone, the use of sinkholes or drainage wells to dispose of sewage or surplus surface water constitutes a threat to supply wells drawing water from the limestone. Water which drains from roadside ditches or street gutters, and especially that discharged from septic tanks, is almost certain to be polluted, and the freedom of circulation allowed by cavernous limestones may permit such waters to enter supply wells without being subjected to filtration. This threat is especially great for wells located down the slope of the piezometric surface from the drainage wells.

Recent outbreaks of typhoid fever and gastroenteritis have resulted from pollution of private and municipal water supplies in Fillmore and Olmstead Counties, Minnesota. The pollution of these supplies was traced to sinkholes and stone quarries through which partly treated sewage and excreta were being introduced into the limestone aquifer which yielded water to the supply wells (Kingston, 1943). Several cases of pollution in Orange County, seemingly due to drainage wells, have been reported but are not supported by factual data.

The purpose of this investigation has been to obtain geologic and hydrologic information relating to the possibilities of pollution. Further chemical and bacteriological investigations are desirable, and it is expected that the State Board of Health will make such studies.

There has been a somewhat prevalent idea that all the drainage wells in Orange County were relatively shallow and that therefore deeper wells should be safe from pollution. Data herewith presented indicate that drainage wells as deep as 1,000 feet, and sanitary wells exceeding 850 feet, are in use. The depth of casing in these wells ranges from 67 to 400

feet. Exploration of several wells indicates that water from them is entering the surrounding formations at depths ranging from 70 to at least 400 feet, and that in the deeper wells it may go to greater depths.

Geologic studies have indicated that the formations penetrated by the drainage wells are porous and contain ramifying solution channels. The interconnected pores and solution channels allow free circulation of the water. Equal artesian pressures in the lower and upper portions of the aquifer will permit interchange of water between the upper and lower parts of the formation. The general horizontal direction in which this water moves after entering the aquifer is determined by the shape of the piezometric surface.

The piezometric surface in Orange County has a general northeastward slope. However, the concentration of drainage wells in and around Orlando appears to contribute to the recharge in sufficient quantities to cause a local flattening of this surface, and at times of heavy rainfall, create a small mound in it in southeastern Orlando. Within the flattened area of the piezometric surface, there is probably free intermingling of the drainage water with the ground water, and from this area the water moves down the slope of the piezometric surface. Therefore, it seems that the areas most susceptible to pollution are those surrounding the wells, and adjacent areas down the slope of the piezometric surface. Wells drilled in the regions up the piezometric slope from the areas in which drainage and sanitary wells are concentrated should be relatively free from pollution.

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TABLE 1

Geologic formations penetrated by wells in Orange County

Age	Formation	Thickness	Character
Recent and Pleistocene		0-100	Chiefly unconsolidated sand interbedded with clay. Yields water to shallow wells.
Upper Miocene?	Choctawhatchee?	30-40	Light to dark gray shell marl.
Lower Miocene	Hawthorn	45-200	Interbedded marl, sandy phosphatic marl, conglomeratic limestone, clay, and silty limestone. Water under artesian pressure.
Upper Eocene	Ocala Limestone	0-120	White to cream, porous foraminiferal limestone. Important artesian aquifer.
Middle Eocene	Undifferentiated	200	White to cream porous foraminiferal limestone.
		550-?	Light buff to brown, porous to dense, recrystallized limestone. Important artesian aquifer.

TABLE 2

WELL RECORDS

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
1	Orlando, in north side of Evans Ave., 100 feet west of Orange Ave.	City of Orlando	J. R. Matthews	---	409
2	Orlando, in north side of Winter Park Ave., 200 feet west of Orange Ave.	City of Orlando	J. R. Matthews	Mar. 1927	495
3	Orlando, in west side of Dade St., 100 feet north of Princeton Ave.	City of Orlando	F. J. Raehn	Jan. 1927	414
4	Orlando, south edge of South St., at intersection of Garland St.	City of Orlando	---	---	432
5	Orlando, southwest corner of Division and Carter Sts.	City of Orlando	F. J. Raehn	Feb. 1926	400
6	Orlando, west side of Parramore St., 100 feet north of Long St.	City of Orlando	F. J. Raehn	May 1926	217
7	Orlando, northeast corner of Gore Ave. and Parramore St.	City of Orlando	F. J. Raehn	---	300
8	Orlando, north side of Washington St., about 40 feet west of Kentucky Ave.	City of Orlando	---	Nov. 1926	348
9	Orlando, southwest side of Lake Davis, between Brookvilla and Summerlin Sts.	City of Orlando	H. Raehn	June 1930	811
10	Orlando, southeast edge of Lake Cherokee, at Cherokee Drive and Osceola St.	City of Orlando	---	Dec. 1924	345
11	Orlando, in Harding Ave., just west of Delaney St.	City of Orlando	F. J. Raehn	July 1928	483
12	Orlando, northwest edge of Lake Davis, between Daniels and Summerlin Sts.	City of Orlando	Henry Raehn	Dec. 1929	364
13	Orlando, northeast corner, Boston Ave. and Long St.	City of Orlando	Henry Raehn	May 1929	377
14	Orlando, northeast corner of Princeton Ave. and Northumberland St.	City of Orlando	---	Dec. 1926	405
15	Orlando, west side of Cornell St. and Spruce Ave.	City of Orlando	---	Feb. 1927	431
16	Orlando, just east of Eola Drive, south of Pine St.	City of Orlando	F. J. Raehn	Aug. 1927	465
17	Orlando, near center of north edge of Lake Formosa.	City of Orlando	J. R. Matthews	Sept. 1926	430
18	Orlando, northwest edge of Lake of the Woods.	City of Orlando	F. J. Raehn	May 1926	353
19	Orlando, south side of South St. at Fern Creek.	City of Orlando	F. J. Raehn	---	865

Depth of casing (feet)	Diam. of casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
130	12	Top of iron manhole rim, level with street.	95.95	38	Drainage	
155	12	Top of iron manhole rim, level with street.	97.5	16	Drainage	
158	10 & 12	Top of iron manhole rim, level with street.	97.81	10	Drainage	
---	5	Lower edge of straight-edge laid over manhole, level with driveway.	105.33	25	Drainage	
---	12	Top of iron manhole rim, level with street.	104.3	14	Drainage	
---	12	Top of iron manhole rim, level with sidewalk.	106.50	11	Drainage	
158	12	Top of iron manhole rim, level with land surface.	107.42	26	Drainage	
90	12	Top of iron manhole rim, level with service station driveway.	103.96	17	Drainage	
67	8	Top of iron manhole rim, level with land surface.	73.54	10	Sanitary (Septic tank drainage)	FGS No. W-139.
83	10	Top of iron manhole rim, level with land surface.	74	38	Drainage (Lake control)	
153	12	Top of iron manhole rim, level with street.	100.8	21	Drainage	
77	12	Top of concrete manhole, rim, level with top of street curb.	73.41	5	Drainage (Lake control)	
113	12	Top of iron manhole rim, level with street.	101.03	3	Drainage	
120	12	Top of iron manhole rim, level with street.	96.16	7	Drainage	
158	12	Top of iron manhole rim, level with street.	---	4	Drainage	
213 285 417	12 10 8	Top of iron manhole rim, level with top of street curb.	---	1	Drainage	
129 370 385	12 10 8	Surface	---	None	Drainage	
100 253	12 10	Top of iron manhole rim, level with land surface.	---	1	Drainage (Lake control)	
408	8	Surface.	74	None	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
20	Orlando, in south side of Oregon Ave. at intersection of Spokane St.	City of Orlando	F. J. Raehn	Apr. 1926	313
21	Orlando, northwest of Sunset Lake, south of South St. extended.	City of Orlando	F. J. Raehn	Oct. 1926	213
22	Orlando, east side of Lake Lancaster, in lawn on east side of street, 1051 Lancaster Dr.	City of Orlando	F. J. Raehn	Oct. 1926	183
23	Orlando, west side of Atlanta Ave., north of Miller Ave. extended.	City of Orlando	F. J. Raehn	Oct. 1926	228
24	Orlando, about 25 feet east of MacRae St. at intersection of Guava Ave.	City of Orlando	J. R. Matthews	Oct. 1926	408
25	Orlando, in north side of Jefferson St., just west of Terry St., 10 feet south of No. 140.	City of Orlando	---	Dec. 1926	405
26	Orlando, in ditch on east side of Harrison St., about 500 feet south of Par Ave.	City of Orlando	J. R. Matthews	Mar. 1926	203
27	Orlando, in east side of Shine St., just south of Marks St.	City of Orlando	F. J. Raehn	Apr. 1926	219
28	Orlando, in south side of Minnesota Ave., just east of Mills St.	City of Orlando	F. J. Raehn	July 1926	469
29	Orlando, northwest portion of intersection of Helen St. and Winter Park Ave.	City of Orlando	J. R. Matthews	Sept. 1926	169
30	Orlando, east side of Westmoreland Dr. opposite Jefferson St.	City of Orlando	F. J. Raehn	Mar. 1926	408
31	Orlando, south edge of Sturtevant St. just west of Lucerne Terrace.	City of Orlando	F. J. Raehn	Feb. 1927	451
32	Orlando, south side Lake Davis at Brookvilla St.	City of Orlando	F. J. Raehn	---	415
33	Orlando, in south side of Steele Ave., about 45 feet east of Amherst St.	City of Orlando	---	Feb. 1927	439
34	Orlando, center of Westmoreland Dr. at northermost intersection of Yale Ave.	City of Oralndo	J. R. Matthews	Nov. 1926	454
35	One mile west of Pinecastle, north side of road. Southwest corner, NE 1/4 sec. 23, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	Oct. 1927	160
36	1 1/2 miles southwest of Pinecastle, south side of road. NW1/4NW1/4 sec. 26, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	Nov. 1927	457

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
113	12	Top of iron manhole rim, level with street.	104.93	7	Drainage	
80	12	Top of iron manhole rim, approximately 1.5 feet above land surface.	---	2	Drainage (Lake control)	
130	12	Top of iron manhole rim, level with land surface.	74.22	7	Drainage (Lake control)	
146	12	Top of iron manhole rim, level with land surface.	---	4	Drainage	
124	12	Top of iron manhole rim, 0.5 feet below land surface.	---	2	Drainage	
108 180	12 10	Top of iron manhole rim, level with street.	---	1	Drainage	
100	12	Surface.	---	1	Drainage	
124	12	Top of iron manhole rim, level with street.	---	4	Drainage	
125	12	Top of iron manhole rim, level with street.	---	4	Drainage	
120	12	Top of iron manhole rim, level with street.	97.89	3	Drainage	
109	---	Top of iron manhole rim, level with top of street curb.	---	3	Drainage	
		Top of iron manhole rim, level with surface.	99.15	8	Drainage	
102 387	12 10	Surface.	---	None	Sanitary (Septic tank drainage)	
97 390	12 10	Surface.	---	1	Drainage	
172 292	12 10	Top of iron manhole rim, level with street.	98.50	3	Drainage	
123	8	Top of iron manhole rim, level with surface of road.	97.35	16	Drainage	FGS NO. W-53.
99	12	Top of iron manhole rim, level with surface of road.	99.00	19	Drainage	FGS No. W-54.

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
37	2 miles southwest of Pinecastle, south side of road. NW1/4NE1/4, sec. 27, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	Nov. 1927	375
38	1/2 mile west of Orlando city limits, west side of road. SE1/4SE1/4NW1/4, sec. 33, T. 22 S., R. 29 E.	Orange County	J. R. Matthews	Nov. 1927	141
39	4 miles southwest of Orlando, in drainage ditch 1,150 feet southeast of road. SE1/4SE1/4SE1/4, sec. 8, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	Dec. 1927	417
40	3 1/2 miles southwest of Orlando, west side of road. SE1/4NE1/4, sec. 5, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	Dec. 1927	415
41	2 miles south of Pinecastle, north side of road at south edge of Lake Bearhead. SE1/4SE1/4 sec. 25, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	Jan. 1928	455
42	1 1/2 miles east of Conway, west side of road, east edge of Lake Barber. NE1/4NW1/4SW1/4, sec. 9, T. 23 S., R. 30 E.	Orange County	J. R. Matthews	Aug. 1928	422
43	1/4 mile north of Conway, 25 feet west of Highway 29, just north of Frederica Drive intersection. SW1/4NW1/4NE1/4, sec. 9, T. 23 S., R. 30 E.	Orange County	R. L. Smith	June 1928	427
44	3 miles southwest of Orlando, in ditch 600 feet southeast of road. SE1/4NE1/4NE1/4, sec. 8, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	June 1928	463
45	1/2 mile northeast of Conway, in Sims' Orange Grove. NW1/4NW1/4 NW1/4, sec. 9, T. 23 S., R. 30 E.	Orange County	R. L. Smith	July 1928	452
46	1 3/4 miles east of Conway, north side of road. SE1/4NE1/4NE1/4, sec. 10, T. 23 S., R. 30 E.	Orange County	J. R. Matthews	Aug. 1928	422
47	About 1 mile northwest of Orlo Vista, in edge of sink on west side of road, 1,320 feet north of NE cor. of SE1/4 sec. 26, T. 22 S., R. 28 E.	Orange County	R. L. Smith	Aug. 1928	350
48	1 1/2 miles west of Orlando, west side of road. NW1/4NE1/4 sec. 16, T. 22 S., R. 29 E.	Orange County	R. L. Smith	Sept. 1928	123
49	2 miles southeast of Orlando, southeast side of Lake Rabama. NE1/4NE1/4 sec. 5, T. 23 S., R. 30 E.	Orange County	R. L. Smith	Nov. 1928	421

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
271	8 & 6	Top of iron manhole rim, level with surface of road.	99.19	13	Drainage	FGS No. W-55.
74	8	Top of iron manhole rim, level with surface of road.	98.71	40	Drainage	FGS No. W-56.
211	12	Top of iron manhole rim, approximately 4 feet above surface.	97.02	10	Drainage	FGS No. W-57.
94	8	Top of iron manhole rim, level with surface of road.	98.28	5	Drainage	FGS No. W-58.
383 139	6 8	Top of iron manhole rim, approximately 1 foot above land surface.	94.50	6	Drainage (Lake control)	FGS No. W-83.
137	12	Top of iron manhole rim, approximately 4.5 feet above land surface.	100.83	10	Drainage (Lake control)	FGS No. W-82.
169	8	Top of iron manhole rim, level with top of road curb.	104.23	20	Drainage	FGS No. W-79.
105	12	Top of iron manhole rim, about 4 feet above land surface.	96.95	14	Drainage	FGS No. W-81.
161	8	Surface.	---	None	Drainage (Lake control)	FGS No. W-80.
137	12	Top of iron manhole rim, approximately level with land surface.	98.5	11	Drainage	FGS No. W-88.
312 328	8 6	Top of casing, 10 feet above surface.	82.12	31	Observation	FGS No. W-89. Water-level recorder installed
75	8	Top of iron manhole rim, approximately 2 feet below level of road surface.	98.23	5	Drainage	FGS No. W-90.
162	8	Top of wall of catch basin, level with land surface.	111.79	4	Drainage (Lake control)	FGS No. W-91.

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
50	2 miles west of Orlando, southeast edge of Lake Lawne. NE1/4NW1/4 sec. 20, T. 22 S., R. 29 E.	Orange County	J. R. Matthews	Jan. 1929	383
51	1 mile west of Fairvilla, 590 feet east of intersection north side of road. NE1/4NW1/4 sec. 16, T. 22 S., R. 29 E.	Orange County	R. L. Smith	Dec. 1928	199
52	1/2 mile southwest of Orlando, west side of Bumby Ave. between Henderson St. and Carlton Drive. SE1/4NE1/4NW1/4 sec. 6, T. 23 S., R. 30 E.	Orange County	---	---	435
53	1 mile west of Fairvilla, north side of road, 70 feet east of intersection. NE1/4NW1/4 sec. 16, T. 22 S., R. 29 E.	Orange County	---	1930	416
54	Winter Park, southeast corner of Center St. and Wellbourne Ave.	Town of Winter Park	W. A. Neal	Oct. 1928	400
55	Maitland, north shore of Lake Sybilla. SW1/4SW1/4 sec. 25, T. 21 S., R. 29 E.	Orange County	J. R. Matthews	Nov. 1930	388
56	Apopka, at east side of Highland Ave., 200 feet north of Fourth St.	Town of Apopka	---	Apr. 1926	423
57	Fisherman's Paradise, east shore of Lake Apopka, Sec. 30, T. 21 S., R. 28 E.	J. E. Jackson	R. L. Smith	---	465
58	Winter Garden, south end of Lake Apopka in orange grove just west of old city docks.	Harold Tilden	---	---	130
59	Oakland, at wagon shed in garden east of R. L. Smith residence. NE1/4SE1/4 sec. 20, T. 22 S., R. 27 E.	R. L. Smith	R. L. Smith	---	300
60	1/4 mile south of State Road 22, 2 miles east of Winter Garden. NE1/4NW1/4 sec. 24, T. 22 S., R. 27 E.	H. C. Tilden	---	1925	500
61	Ocoee, south side of State Road 22. SW1/4 sec. 18, T. 22 S., R. 28 E.	---	---	---	500(?)
62	Sand Lake, east shore, NE1/4NW1/4 sec. 11, T. 24 S., R. 28 E.	V. Hollingsworth	---	1931	484
63	3 1/2 miles southwest of Taft. NE1/4SW1/4 sec. 22, T. 24 S., R. 29 E.	Irlo Bronson	---	---	300(?)

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point		No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
		Description	Alt. above mean sea level (feet)			
100	16	Top of north wall of catch basin.	93.30	3	Drainage (Lake control)	FGS No. W-92.
100	8	Top of concrete manhole, approximately 2 feet below road surface.	98.57	13	Drainage	FGS No. W-93.
113	12	Rim of manhole, level with sidewalk.	98	14	Drainage	
---	12	Top of concrete manhole, approximately 2 feet below road surface.	98.46	17	Drainage	
81	10	Top of iron manhole rim, level with top of street curb.	86.74	13	Drainage	FGS No. W-86
110	12	Top of iron manhole rim, level with surface.	77.72	10	Drainage (Lake control)	FGS No. W-156
124	12	Top of iron manhole rim, level with top of street curb.	118.40	21	Drainage	FGS No. W-29
---	4	Top of 4-inch well casing, same altitude as surface.	70.8	3	Domestic	
---	4	3/4-inch pipe, 3 feet above surface.	74.4	7	Irrigation	
---	4	Top of concrete wall, 7.45 feet above top of casing.	108.59	4	Irrigation & Drainage	
---	16	Top of casing, approximately level with surface.	121.90	1	Drainage	
---	8	Top of concrete structure at edge of well, level with surface.	122.52	17	Irrigation & Drainage	
173	10 & 12	Top of concrete manhole, level with surface.	99.36	5	Drainage (Lake control)	FGS No. W-218
---	10	Top of casing.	81.5	4	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
64	3 miles southwest of Taft. NE1/4SW1/4 sec. 23, T. 24 S., R. 29 E.	Irlo Bronson	---	---	300(?)
65	Bithlo, in old concrete block building, 2 miles south of Cheney Highway. SW1/4NE1/4 sec. 27, T. 22 S., R. 32 E.	Townsite Corp.	---	1926	211
66	2 1/2 miles east of Fort Christmas, on south side of Cheney Highway. NE1/4NW1/4 sec. 36, T. 22 S., R. 33 E.	---	---	---	200(?)
67	Pinecastle Air Base, NW1/4SW1/4 sec. 28, T. 23 S., R. 30 E.	U. S. Army	Libby and Freeman	May 1943	445
68	Pinecastle Air Base, NE1/4SW1/4 sec. 28, T. 23 S., R. 30 E.	U. S. Army	Libby and Freeman	May 1943	---
69	Pinecastle Air Base. Center of NW1/4 sec. 32, T. 23 S., R. 30 E.	U. S. Army	Libby and Freeman	Apr. 1943	406
70	Pinecastle Air Base, NE1/4SW1/4 sec. 32, T. 23 S., R. 30 E.	U. S. Army	Libby and Freeman	May 1943	420
71	2 miles southwest of Pinecastle. NE1/4NW1/4 sec. 29, T. 23 S., R. 30 E.	Albert Basler	---	---	235
72	1 1/2 miles south of Pinecastle. NE1/4NE1/4 sec. 36, T. 23 S., R. 29 E.	Hamer Farm	Henry Raehn (?)	---	350(?)
73	Taft. NE1/4SW1/4 sec. 1, T. 24 S., R. 29 E.	Julia R. Hellas	Libby and Freeman	1942	149
74	Taft. SE1/4SE1/4 sec. 1, T. 24 S., R. 29 E.	Orange County	---	---	---
75	1 mile southwest of Orlando. NE1/4NW1/4 sec. 10 T. 23 S., R. 29 E.	Perfection Dairy	G. M. Arie	---	180
76	1 mile southwest of Orlando. NE1/4NW1/4 sec. 10, T. 23 S., R. 29 E.	Perfection Dairy	John Cornell	---	180
77	Orlando, corner of Cypress and Rio Grande Sts.	A. Hanson	---	---	93
78	Orlando, south side of Cypress St. between Kentucky Ave. and Rio Grande St.	City of Orlando	---	---	---
79	1/2 mile southwest of Pinecastle, north side of Lancaster Road, 0.2 mile west of railroad. SW1/4SW1/4 sec. 24, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	June 1926	165

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
---	10	Top of 2 x 4 across wooden structure, slightly above land surface.	86.19	5	Drainage	
205	10	Top of concrete rim around well pit.	68.96	3	None	
---	4	Top of 2-inch pipe, 1 foot above surface.	15	1	None	
145	8	Surface.	93.8	None	Supply	FGS No. W-727
---	---	----------	---	None	Supply	
160	8	Top of casing, 1.5 feet above surface.	---	1	Supply	FGS No. W-746
168	8	----------	---	None	Supply	FGS No. W-747
---	8	Top of 8-inch casing, 1 foot above surface.	---	1	Drainage	
---	4	----------	---	None	Domestic	Gasses at times.
120±	3	----------	----	None	Irrigation	
---	---	----------	---	None	Drainage	Well abandoned and filled up, 1943.
120	4	----------	---	None	Supply (Dairy)	Produces methane.
100	6	----------	---	None	Supply (Dairy)	Produces methane.
80	2	----------	---	None	Irrigation	Produces air under pressure.
---	10	Top of brick curb around wall, about 1 foot above surface.	103.16	6	Drainage	
146	12	Top of concrete manhole rim, slightly below level of road.	97.97	2	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
80	Orlando Air Base, northeast side of lake, northwest of sewage plant. NE1/4SW1/4 sec. 20, T. 22 S., R. 30 E.	U. S. Army	Stevens Southern	Mar. 1943	431
81	Orlando Air Base, 150 feet north of laundry. SE1/4NE1/4 sec. 19, T. 22 S., R. 30 E.	U. S. Army	Stevens Southern	Feb. 1943	828
82	Orlando Air Base, 75 feet south of laundry. NE1/4SW1/4 sec. 19, T. 22 S., R. 30 E.	U. S. Army	Stevens Southern	Mar. 1943	855
83	Orlando Air Base, northwest corner of landing field, 875 feet south of NE cor. sec. 29, T. 22 S., R. 30 E.	U. S. Army	Stevens Southern	July 1942	481
84	Orlando Air Base, 925 feet northwest of control tower. SE1/4NW1/4 sec. 29, T. 22 S., R. 30 E.	U. S. Army	Henry Raehn	July 1929	312
85	Orlando Air Base, 150 feet northwest of control tower, 1200 feet northwest of center of sec. 29, T. 22 S., R. 30 E.	U. S. Army	Layne-Atlantic Co.	Apr. 1941	449
86	Orlando Air Base, 300 feet southsoutheast of NW cor. of SE1/4 sec. 29, T. 22 S., R. 30 E.	U. S. Army	Layne-Atlantic Co.	Apr. 1941	559
87	Orlando Air Base, approximately 150 feet northwest of center of sec. 29, T. 22 S., R. 30 E.	U. S. Army	Libby and Freeman	Oct. 1941	518
88	Orlando Air Base, east side of A Ave., between 4th and 5th Sts. SE1/4NE1/4 sec. 30, T. 22 S., R. 30 E.	U. S. Army	Layne-Atlantic Co.	Jan. 1942	1049
89	Orlando Air Base, east side of Forrest Ave., 800 feet north of Robinson Ave., South 1/2 NE1/4 sec. 30, T. 22 S., R. 30 E.	U. S. Army	---	---	372
90	Orlando Air Base, 300 feet east of B St., 900 feet south of Cheney Highway. NE1/4NE1/4 sec. 30, T. 22 S., R. 30 E.	U. S. Army	Stevens Southern	Sept. 1940	512
91	Orlando Air Base, in east edge of A Ave., just north of 6th St. NE1/4NE1/4 sec. 30, T. 22 S., R. 30 E.	U. S. Army	---	---	800
92	Orlando Air Base, northwest corner A Ave. and 1st St. NE1/4NE1/4 sec. 30, T. 22 S., R. 30 E.	U. S. Army	---	---	350
93	Orlando Air Base, Signal Hill, west edge of small lake. NW1/4NW1/4 sec. 28, T. 22 S., R. 30 E.	U. S. Army	Gray Well & Pump Co.	May 1942	500

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
183	10	Top of concrete box around well, level with surface.	111.68	None	Sanitary (Sewage plant drainage)	FGS No. W-294
170 360	8 6	Top of 1/2-inch tee in airline, 1.38 feet above floor of pumphouse.	112.58	6	Supply (Laundry)	FGS No. W-726
383 140	6 8	Top of 1/2-inch tee in airline, 1.31 feet above floor of pumphouse..	114.67	7	Supply (Laundry)	FGS No. W-738
150	18	Top of iron manhole rim, level with surface.	103.04	7	Drainage	FGS No. W-609
142	12	Top of iron manhole rim, level with surface.	103.45	7	Drainage	
205	---	Top of iron manhole rim, level with surface.	105.53	1	Drainage	FGS No. W-542
302	12	Top of iron manhole rim, level with surface.	103.41	8	Drainage	FGS No. W-543
238	12	Top of iron manhole rim, level with surface.	103.02	1	Drainage	FGS No. W-141
192	12	Top of iron manhole rim, level with surface.	101.40	7	Drainage	FGS No. W-135
---	12	Top of iron manhole rim, level with surface.	102.70	None	Drainage	
160	12	Top of concrete manhole, directly over well.	109.36	8	Drainage	
150-180	6	Top of iron manhole rim, level with street.	100.87	8	Drainage	
---	12	Top of iron manhole rim, level with concrete floor of automobile wash rack.	101.24	8	Drainage	
280	12	----------	---	None	Drainage	FGS No. W-601

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
94	Orlando Air Base, northwest edge of small lake, north of laundry. SE1/4NE1/4 sec. 19, T. 22 S., R. 30 E.	U. S. Army	Stevens Southern	Mar. 1943	482
95	Orlando, southwest corner of 19th Ave. and Tallokas St. NE1/4NW1/4 sec. 2, T. 23 S., R. 29 E.	City of Orlando	R. L. Smith	---	---
96	Orlando, northwest edge of Park Lake at Broadway.	City of Orlando	---	---	---
97	Orlando, west side of Irma St., about 200 feet south of Marks St.	City of Orlando	F. J. Raehn	---	154
98	Orlando, in north edge of Colonial Dr., 500 feet east of Orange Ave.	City of Orlando	F. J. Raehn	Dec. 1923	424
99	Orlando, northwest corner of Jefferson and Garland Sts. 40 feet west of fire hydrant.	City of Orlando	J. C. Dibble	Aug. 1937	584
100	Orlando, northeast corner of playground, south of Alexander Place at Revere St.	City of Orlando	J. R. Matthews	Mar. 1934	461
101	Orlando, south side of Harwood Ave. east of Highland St.	City of Orlando	J. C. Dibble	Nov. 1936	750
102	Orlando, east side of Chapman St., just south of South St.	City of Orlando	J. R. Matthews	Nov. 1934	566
103	Orlando, south side of Holden St., opposite Terry St.	City of Orlando	Henry Raehn	Aug. 1935	757
104	Orlando, Griffin Park, in lawn on south side of Callahan Drive, 200 feet west of Dunbar Court.	City of Orlando	Gray Well & Pump Co.	Apr. 1940	507
105	Orlando, 5 feet east of well 104.	City of Orlando	Gray Well & Pump Co.	Apr. 1940	437
106	Orlando, in south edge of Patrick St., about 50 feet east of Bryan St.	City of Orlando	J. C. Dibble	Jan. 1938	483
107	Orlando, north edge of Kaley Ave., about 400 feet west of Fern Creek Ave.	City of Orlando	Gray Well & Pump Co.	---	524
108	1/2 mile south of Orlando city limits, NE1/4NE1/4 sec. 11, T. 23 S., R. 29 E.	Southern Fruit Distributors Corporation	Layne-Atlantic Co.	Nov. 1940	499
109	Orlando, in Amelia Ave., west of Westmoreland Drive.	City of Orlando	F. J. Raehn	Aug. 1922	389
110	Orlando, north side of Amelia Ave., about 200 feet west of Westmoreland Drive.	City of Orlando	J. C. Dibble	July 1936	501
111	Orlando, northeast corner of intersection of Annie St. and Bradshaw Terrace.	City of Orlando	F. J. Raehn	Feb. 1925	397

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
221	8	Top of wood platform, directly over well, level with land surface.	109.70	9	Drainage	FGS No. W-438
---	6	Top of iron manhole rim, level with surface.	104.67	3	Drainage	
---	---	Top of iron manhole rim, level with surface.	---	3	Drainage	
121	12	Top of iron manhole rim, level with street curb.	89.67	6	Drainage	
---	12	Top of iron manhole rim, level with street.	96.48	6	Drainage	
222	12	Surface.	107	1	Drainage	FGS No. W-351
115	12	Top of iron manhole rim, level with land surface.	106.44	3	Drainage	FGS No. W-271
215	12	Top of Harwood Ave. curb, level with surface.	---	1	Drainage	FGS No. W-313
167	12	Surface.	---	1	Drainage	FGS No. W-312
138	12	Top of iron manhole rim, level with street curb.	---	3	Drainage	FGS No. W-272
132	12	Top of iron manhole rim, level with lawn.	---	2	Drainage	FGS No. W-508
---	6	Top of iron manhole rim, level with lawn.	106.55	8	Drainage	Relief well for 104.
142	12	Top of iron manhole rim, level with street.	109	6	Drainage	
212 199	12 10	----------	---	None	Drainage	FGS No. W-509
---	10	Top of 10-inch casing, approximately 1 foot above land surface.	105.97	8	Drainage (citrus waste)	FGS No. W-529
---	---	----------	---	None	Sanitary (Septic tank drainage)	
131	12	Top of manhole rim, level with surface.	102.43	1	Sanitary (Septic tank drainage)	
90	12	----------	---	None	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
112	Orlando, south side of 18th St., just east of Avondale.	City of Orlando	---	July 1925	513
113	Orlando, west side of Cathcart St., about 100 feet north of Livingston Ave.	City of Orlando	F. J. Raehn	May 1924	548
114	Orlando, south side of east Central Ave. at Fern Creek.	City of Orlando	---	June 1925	349
115	Orlando, northwest corner of Church and Parramore St.	City of Orlando	---	---	170
116	Orlando, east side of Hampton St., about 40 feet south of Colonial Drive.	City of Orlando	---	Jan. 1924	260
117	Orlando, north side of Concord Ave., about 75 feet west of railroad crossing.	City of Orlando	F. J. Raehn	Feb. 1924	460
118	Orlando, south side of Conway Road, just west of intersection with Hyer St.	City of Orlando	---	---	---
119	Orlando, west side of Cornell St., about 200 feet north of Bay Run St.	City of Orlando	F. J. Raehn	Jan. 1925	375
120	Orlando, west side of Garland Ave., between Livingston Ave. and Alexander Place.	City of Orlando	F. J. Raehn	Nov. 1926	196
121a	Orlando, north of Greenwood Ave., on slope above Lake Greenwood.	City of Orlando	---	1904(?)	140(?)
121b	Orlando, approximately 20 feet southeast of well 121a.	City of Orlando	---	1904	140(?)
121c	Orlando, approximately 40 feet west-southwest of well 121a.	City of Orlando	F. J. Raehn	Sept. 1924	605
122	Orlando, west side of Shine St., south of Hillcrest Ave.	City of Orlando	F. J. Raehn	June 1923	495
123	Orlando, south side of Piedmont St., west of Hughey St.	City of Orlando	J. C. Dibble	June 1938	484
124	Orlando, north of old city incinerator northwest of corner of Long St., and Rio Grande St.	City of Orlando	F. J. Raehn	July 1923	351
125	Orlando, south side of Jackson St., about 25 feet east of Garland St.	City of Orlando	F. J. Raehn	Mar. 1923	450
126	Orlando, north side of Lake Copeland at southwest end of Golden Oak Court.	City of Orlando	F. J. Raehn	Nov. 1926	315
127	Orlando, east end of Lake Eola.	City of Orlando	F. J. Raehn	Jan. 1925	448
128a	Orlando, 100 feet south of Ivanhoe Blvd. between Legion Place and Glendonjo Drive.	City of Orlando	F. J. Raehn	Apr. 1923	410

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point		No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
		Description	Alt. above mean sea level (feet)			
110	10	Top of iron manhole rim, level with surface.	103.56	5	Drainage	
---	6	Top of iron manhole rim, level with surface.	96.06	2	Drainage	
80	12	Surface.	---	1	Drainage	
---	6	----------	---	None	Drainage	
---	12	Top of iron manhole rim, level with street.	102.81	4	Drainage	
142	8	Top of iron manhole rim, level with top of street curb.	102.27	5	Drainage	
---	12	Top of iron manhole rim, about 0.5 foot above surface.	---	2	Drainage	
126	12	----------	---	None	Drainage	
110	12	----------	---	None	Drainage	
---	---	Top of casing, south side level with land surface.	---	1	Drainage	
---	---	Top of casing, level with land surface.	---	1	Drainage	
---	12	Top of terra cotta tile used as manhole.	82.31	4	Drainage	
---	10	Surface.	---	1	Drainage	
173	12	----------	---	None	Drainage	FGS No. W-373
---	10	Surface.	---	1	Drainage	
---	12	----------	---	None	Drainage	
257	10	Surface.	---	1	Drainage	
104	12	Surface.	---	1	Suppl & Drainage	
---	10	Top of iron manhole rim, approximately level with surface.	82.24	None	Sanitary (Septic tank drainage)	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
128b	Orlando, about 50 feet east of 128a.	City of Orlando	---	---	384
129	Orlando, north side of Lake Lorna Doone.	City of Orlando	F. J. Raehn	Sept. 1926	382
130	Orlando, Rollins Ave., under bridge across canal between Lake Rowena and Lake Estelle.	City of Orlando	J. R. Matthews	Sept. 1926	430
131	Orlando, west side of Garden Plaza between Marks St. and Illinois Ave.	City of Orlando	---	---	496
132	Orlando, in vacant lot 73 feet south of Palmer St. curb, and 43 feet west of Hyer St. curb.	City of Orlando	F. J. Raehn	---	392
133	Orlando, north side of Park Lake Ave. east of Summerlin St.	City of Orlando	F. J. Raehn	Sept. 1937	534
134	About 1 mile northwest of Fairvilla. NW1/4 sec. 9, T. 22 S., R. 29 E., north of Bay Lake.	---	---	---	---
135	Orlando, Parramore St. at Robinson Ave.	City of Orlando	F. J. Raehn	Sept. 1924	421
136	Orlando, in west edge of Westmoreland Drive, 200 feet north of Church St.	City of Orlando	F. J. Raehn	Sept. 1923	---
137	Orlando, about 100 feet west of Westmoreland Drive, between Miller and Indiana Aves.	City of Orlando	---	---	---
138	Orlando, about 50 feet north of Columbia Ave. about midway between Westmoreland Drive and Kentucky Ave.	City of Orlando	F. J. Raehn	Aug. 1924	460
139	Orlando, north side of South St., just east of Mills St.	City of Orlando	F. J. Raehn	---	884
140	Orlando, north side of Jefferson St., just west of Terry St., 10 feet north of well 25.	City of Orlando	Gray Well & Pump Co.	Apr. 1940	287
141	Orlando, north side of Washington Ave. at extension of Coburn Ave.	City of Orlando	F. J. Raehn	July 1926	195
142	Orlando, at intersection of Washington and Garland Sts.	City of Orlando	F. J. Raehn	---	926
143	Orlando, west side of Lee St., about 75 feet north of Washington St.	City of Orlando	F. J. Raehn	Aug. 1928	487
144	Orlando, north side of Ridgewood Ave., about 200 feet west of Shine St.	City of Orlando	F. J. Raehn	Aug. 1924	231
145a	Orlando, in south edge of Lake Greenwood.	City of Orlando	---	---	863
145b	Orlando, 6 feet east of well 145a.	City of Orlando	---	---	230

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
---	12	----------	---	None	Sanitary (Septic tank drainage)	
92	12	----------	---	None	Drainage	
129 370 385	12 10 8	----------	---	None	Sanitary (Septic tank drainage)	
---	8	Rim of iron manhole ring, level with surface.	---	2	Drainage	
---	12	Top of iron manhole rim, level with surface.	75.73	None	Drainage	
---	10	----------	---	None	Drainage	
---	8	----------	---	None	Drainage	
136	12	----------	---	1	Drainage	
170	10	Top of iron manhole rim, level with street.	---	1	Drainage	
---	---	----------	---	None	Drainage	
145	12	Top of iron manhole rim, level with land surface.	---	2	Drainage	
---	12	Top of iron manhole rim, level with street curb.	74.17	5	Drainage	
175	6	Surface.	---	1	Drainage	Relief well for well No. 25
97	12	Top of iron manhole rim, level with street curb.	101.21	3	Drainage	
---	---	----------	---	None	Drainage	
153	12	Surface.	---	1	Drainage	
132	12	Top of manhole rim, level with driveway.	99.06	1	Sanitary (Septic tank drainage)	
---	12	----------	---	None	Drainage	
---	---	----------	---	None	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
146a	Orlando, at South St. septic tank, south edge of South St. west of Fern Creek.	City of Orlando	F. J. Raehn	May 1925	---
146b	Orlando, at South St. septic tank, south of South St., west of Fern Creek.	City of Orlando	F. J. Raehn	Dec. 1930	863
146c	Orlando, at South St. septic tank, south of South St., west of Fern Creek.	City of Orlando	F. J. Raehn	---	645
147	Orlando, south side of South St., opposite center of Bryan St.	City of Orlando	---	---	186
148	Orlando, in Brookvilla St., at south edge of Lake Davis.	City of Orlando	---	---	---
149	Orlando, center of Delaney Park, west of Osceola St.	City of Orlando	---	---	460
150	Orlando, in Westmoreland Drive, on south side of Conley St.	City of Orlando	---	---	---
151	Orlando, on west side of Clear Lake St., south of Jackson St.	City of Orlando	---	---	400
152	Orlando, west edge of Lake Eola, Eola Park.	City of Orlando	---	---	---
153	Orlando, northwest edge of Lake Dot, east of Lake Dot Circle.	City of Orlando	---	---	---
154	2 miles southwest of Orlando. SE1/4NW1/4 sec. 10, T. 23 S., R. 29 E.	Agnes H. Dougherty	R. L. Smith	1932	140
155	2 miles southwest of Orlando. NE1/4NE1/4 sec. 16, T. 23 S., R. 29 E.	Agnes H. Dougherty	Henry Raehn	1936	368
156	2 miles southwest of Orlando. NE1/4NW1/4 sec. 15, T. 23 S., R. 29 E.	Agnes H. Dougherty	Henry Raehn	July 1934	466
157	1 1/2 miles south of Pinecastle. NW1/4SE1/4 sec. 25, T. 23 S., R. 29 E.	Walter A. Graham	J. R. Matthews	1914	282
158	1/2 mile northeast of Taft. NW1/4NW1/4 sec. 1, T. 24 S., R. 29 E.	---	---	---	---
159	1 mile west of Pinecastle. NE1/4SW1/4 sec. 23, T. 23 S., R. 29 E.	Orange County	---	---	---

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
---	---	----------	---	None	Sanitary (Septic tank drainage)	
---	8	----------	---	None	Sanitary (Septic tank drainage)	
---	8	----------	---	None	Sanitary (Septic tank drainage)	
99	12	----------	---	None	Drainage	
---	---	----------	---	None	Sanitary (Septic tank drainage)	
---	12	----------	---	None	Sanitary (Septic tank drainage)	
---	---	----------	---	None	Sanitary (Septic tank drainage)	
---	8	Top of iron manhole rim, level with surface.	102.89	None	Sanitary (Septic tank drainage)	
---	---	----------	---	None	Sanitary (Septic tank drainage)	
---	---	----------	---	None	Sanitary (Septic tank drainage)	
---	6	----------	---	None	Supply (Farm)	
---	12	Top of casing, about 4 feet below land surface.	---	1	Drainage	FGS No. W-307
92	12	Top of east wall of concrete catch basin, about level with surface.	---	1	Drainage	FGS No. W-314
100	6	Top of south wall of catch basin, 2 feet below surface.	---	1	Drainage	
---	6	Top of east wall of catch basin.	---	1	Drainage	
---	6	Top of catch basin wall, 2 feet above surface.	---	1	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
160	Orlando Country Club, between ponds near highway. SW1/4NE1/4 sec. 22, T. 22 S., R. 29 E.	Orlando Country Club	---	---	---
161	Orlando Country Club, just west of Spring Lake. NE1/4SW1/4 sec. 22, T. 22 S., R. 29 E.	C. G. Magruder	Stevens Southern	May 1938	375
162	Southeast side of Lake Fairview. SW1/4 sec. 10, T. 22 S., R. 29 E.	Nydegger Invest. Co.	C. E. Spear	1907	260
163	One mile northwest of Fairvilla. NE1/4NW1/4 sec. 9, T. 22 S., R. 29 E.	R. D. Eunice	Libby & Freeman	Aug. 1941	250
164	Orlando, 1517 Smith Ave.	Nellie B. Forbes	---	1924	387
165	Orlando, Dubsdread Country Club, at clubhouse.	Dubsdread Country Club	---	1935	280
166	Orlando, Dubsdread Country Club, south end of Eagle Blvd.	Dubsdread Country Club	Raehn	1925	300(?)
167	Orlando, Dubsdread Country Club, north of Par Ave.	Dubsdread Country Club	---	---	---
168	Orlando, south side of 18th St. at extension of Woods Ave.	Orange County	---	---	---
169	Orlando, north side of 24th St., 200 feet east of Kentucky Ave.	Orange County	---	---	---
170	Orlando, east side of Nashville St., south of 24th St.	Orange County	---	---	---
171	Orlando, north edge of Angel Lake, at Parramore St.	Orange County	---	---	---
172	1 mile west of Orlando, north edge of Lake Mann. NE1/4SE1/4 sec. 29, T. 22 S., R. 29 E.	Orange County	Henry Raehn	---	240
173	1 mile west of Orlando, southeast side of Lake Mann. NE1/4SE1/4 sec. 32, T. 22 S., R. 29 E.	Orange County	Henry Raehn	---	253
174	1 mile west of Orlando, south side of Lake Mann. NE1/4SE1/4 sec. 32, T. 22 S., R. 29 E.	Orange County	Layne-Atlantic Co.	Aug. 1941	398
175	2 miles southwest of Orlando, southeast side of north part of Lake Katherine. SE1/4NE1/4 sec. 9, T. 23 S., R. 29 E.	Orange County	---	---	---
176	2 miles southwest of Orlando, east side of southern part of Lake Katherine. SE1/4NE1/4 sec. 9, T. 23 S., R. 29 E.	Orange County	---	---	---
177	Orlando, west side of Fern Creek Ave., south of Grant Ave., NE1/4 SE1/4 sec. 1, T. 23 S., R. 29 E.	Orange County	Henry Raehn	---	412

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point		No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
		Description	Alt. above mean sea level (feet)			
---	6	Surface.	---	1	Drainage	
172	12	Top of concrete manhole, about level with general land surface.	92.37	4	Drainage	
60	12	Top of handrail around well, 5.14 feet above top of casing.	---	3	Drainage (Lake control)	
115	4	----------	---	None	Supply (Dairy)	
80	8	----------	---	None	Drainage	
130(?)	6	----------	---	None	Supply	
---	10	----------	---	None	Drainage	
---	---	----------	---	None	Drainage	
---	8	----------	---	None	Drainage	
---	8	Top of iron manhole rim, level with surface.	104.74	5	Drainage	
---	8	----------	---	None	Drainage	
---	8	Top of iron manhole rim, about level with surface.	100.98	6	Drainage	
68	12	Top of brick wall over well, about 7 feet below general land surface.	---	1	Drainage	
72	12	----------	---	None	Drainage	Abandoned in 1941.
140	16	Top of wood cover over catch basin, level with land surface.	94.75	4	Drainage (Lake control)	
---	8	Top of concrete manhole, directly over the well, about level with land surface.	---	2	Drainage (Lake control)	
---	8	Top of concrete manhole, directly over the well, about level with surface.	---	3	Drainage (Lake control)	
212	10	Top of iron manhole rim, about 2 feet above land surface.	---	4	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
178	1/2 mile south of Orlando, at east edge of road, west of Lake. NE1/4NW1/4 sec. 12, T. 23 S., R. 29 E.	Orange County	J. R. Matthews	---	190
179	Belle Isle, southeast side of southwest portion of North Lake Conway. SW1/4 sec. 18, T. 23 S., R. 30 E.	Orange County	---	---	---
180	2 miles south of Conway, at east end of Middle Lake Conway. Center of sec. 20, T. 23 S., R. 30 E.	Orange County	---	---	---
181	2 miles southeast of Orlando, south of Lake Rabama. SE1/4NE1/4 sec. 5, T. 23 S., R. 30 E.	Lysinda Groves	---	---	---
182	2 miles east of Orlando, at north edge of Little Lake Barton. NW1/4SE1/4 sec. 21, T. 22 S. R. 30 E.	Orange County	---	---	---
183	Orlando Air Base, west side of Lake Barton. NE1/4NW1/4 sec. 28, T. 22 S., R. 30 E.	Orange County	---	---	---
184	Apopka, at south side of McClures Fernery, 300 feet west of Highland Ave.	City of Apopka	J. R. Matthews	---	600
185	Apopka, on Dream Lake.	Florida Utilities Corp.	W. E. Cornell	1935	357
186	Apopka, on Dream Lake.	Florida Utilities Corp.	Layne-Atlantic Co.	Feb. 1941	583
187	1 1/2 miles west of Clarcona. SW1/4NW1/4 sec. 4, T. 21 S., R. 28 E.	R. H. Seegar	W. E. Cornell	1938	161
188	1 1/2 miles west of Clarcona. SW1/4SW1/4 sec. 9, T. 21 S., R. 28 E.	R. H. Seegar	Arie	---	498
189	3 miles northwest of Clarcona, Johnson Fish Camp. SW1/4NE1/4 NW1/4 sec. 31, T. 21 S., R. 28 E.	V. S. Johnson	---	---	165
190	Orlando, east edge of lawn at 2029 E. Illinois Ave., north of Illinois Ave. between Hampton St. and Garden Plaza.	City of Orlando	---	---	493
191	Orlando, south end of Charles Court.	City of Orlando	---	---	---

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
116	12	Top of brick manhole, level with road surface.	101.37	3	Drainage (Lake control)	
---	12	Top of brick manhole, about 3 feet above land surface.	92.02	4	None	County records indicate a 12-inch well, 158 feet deep, cased to 150 feet, was drilled on Lake Conway in Jan. 1925 by J.R. Matthews. This is believed to be 179 or 180.
---	12	----------	---	None		
---	6	----------	---	None	Drainage (Lake control)	
---	10	----------	---	None	Drainage (Lake control)	
---	12	----------	---	None	Drainage (Lake control)	
---	12	Top of iron manhole rim, level with surface.	118.78	2	Drainage	
120	8	----------	---	None	Supply (Municipal)	
200+	12	----------	---	None	Supply ((Municipal)	
63	3	----------	---	None	Supply (Farm)	
200(?)	12	----------	---	None	Irrigation	
---	4	----------	---	None	Supply (Domestic)	
---	8	Top of iron manhole, level with surface.	104.03	2	Drainage	
---	---	----------	---	None	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
192	Orlando, center of Lee St., at south edge of Jefferson St.	City of Orlando	---	---	---
193	Orlando, in street near curb, southwest corner of Church and Lake Sts.	City of Orlando	---	---	---
194	Orlando, in south edge of Mariposa St., between Osceola and Lake Sts.	City of Orlando	---	---	416
195	Orlando, north side of South St., in center of Summerlin St. extended.	City of Orlando	---	---	---
196	Orlando, about 150 feet south of Marks St., about 150 feet east of Irma St.	City of Orlando	---	---	---
197	Gotha, west side of Lake Olivia. SW1/4SW1/4 sec. 33, T. 22 S., R. 28 E.	Orange County	J. R. Matthews	May 1931	402
198	Orlando, just south of south city limits, at north end of Lake Holden. NW1/4SE1/4 sec. 2, T. 23 S., R. 29 E.	Orange County	---	---	---
199	Dr. Phillips, NE1/4SE1/4 sec. 34, T. 23 S., R. 28 E.	Dr. Phillips	Libby & Freeman	June 1943	358
200	About 1 mile west of Fairvilla. SE1/4NW1/4 sec. 16, T. 22 S., R. 29 E.	Fred Ewen	Libby & Freeman	June 1941	310
201	About 1 1/2 miles west of Orlando. SE1/4NW1/4 sec. 29, T. 22 S., R. 29 E.	Dr. Jos. Safian	Libby & Freeman	1941	240
202	About 1 1/2 miles west of Orlando. SW1/4NW1/4 sec. 16, T. 22 S., R. 29 E.	Bandy's Dairy	Libby & Freeman	---	140
203	About 1 1/2 miles west of Orlando. NW1/4SE1/4 sec. 29, T. 22 S., R. 29 E.	Earl Parker	Libby & Freeman	---	140
204	About 1 1/2 miles southwest of Orlando. NW1/4NW1/4 sec. 4, T. 22 S., R. 29 E.	Earl Brookland	Libby & Freeman	1941	195
205	About 1 1/2 miles southwest of Orlando. NE1/4SE1/4 sec. 5, T. 22 S., R. 29 E.	L. B. McLeod	Libby & Freeman	1942	35
206	About 2 miles southwest of Orlando. NW1/4NW1/4 sec. 9, T. 23 S., R. 29 E.	Roscoe A. Mach	Libby & Freeman	June 1942	150

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
---	---	----------	---	None	Drainage	
---	---	Top of iron manhole rim, level with street.	93.02	3	Drainage	
---	6	----------	---	None	Drainage	
---	---	----------	---	None	Drainage	
---	---	----------	---	None	Drainage	
338	12	Top of iron manhole over well, level with surface.	96.81	2	Drainage (Lake control)	
---	12	----------	---	None	Drainage (Lake control)	
124	4	Top of 4-inch casing, about 1.5 feet above land surface.	---	1	Supply (Domestic)	FGS well No. W-368
120 176	3 2	----------	---	None	Supply (Domestic)	Originally 165 feet deep and water was polluted. Reported to be all right since deepening.
145	2	----------	---	None	Supply (Domestic)	Originally 140 feet deep and produced gas. Gas stopped when well deepened and cased to 145 feet.
97	3	----------	---	None	Supply (Domestic)	Produces gas.
115	3	----------	---	None	Supply (Domestic)	When drilled this well produced gas under 22 pounds pressure. Still bubbles small quantities.
110	3	----------	---	None	Supply (Domestic)	
33	2	----------	---	None	Supply (Domestic)	Driven well.
90	3	----------	---	None	Supply (Domestic)	Produces inflammable gas.

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
207	About 2 miles east of Orlando. NW1/4 sec. 27, T. 22 S., R. 30 E.	Dr. Marvin	Libby & Freeman	Oct. 1941	159
208	About 2 miles east of Orlando. NW1/4SE1/4 sec. 21, T. 22 S., R. 30 E.	Madge Carrington	Libby & Freeman	1940	250
209	Pinecastle, center of sec. 24, T. 23 S., R. 29 E.	Pinecastle Boat Co.	Libby & Freeman	---	106
210	About 6 miles east of Orlando. SW1/4NE1/4 sec. 18, T. 22 S., R. 31 E.	Turner & Gee Co.	Libby & Freeman	---	---
211	Orlando, Orlando Country Club. NW1/4 sec. 22, T. 22 S., R. 29 E.	Orlando Country Club	Farm & Home Mach. Co.	---	649
212	About 2 miles southwest of Orlando. SW1/4SW1/4 sec. 5, T. 22 S., R. 29 E.	L. B. McLeod	Libby & Freeman	1940	---
213	About 2 miles southwest of Orlando. NE1/4NE1/4 sec. 7, T. 22 S., R. 29 E.	L. B. McLeod	Stevens Southern	1940	450
214	About 2 miles southwest of Orlando. SE1/4NE1/4 sec. 7, T. 22 S., R. 29 E.	L. B. McLeod	Stevens Southern	1940	450
215	About 2 miles southwest of Orlando. SE1/4 sec. 5, T. 22 S., R. 29 E.	L. B. McLeod	Libby & Freeman	1940	60
216	Orlando, 1111 Virginia Drive, north of Virginia Drive, about 400 feet west of Orange Ave.	Polar Water Co.	H. H. Hewitt	1939	300(?)
217	Orlando, Orange and Highland Aves., at southwest corner of brewery.	Atlantic Co.	H. Raehn	---	550
218	Orlando, Orange and Highland Aves., south of brewery near railroad.	Atlantic Co.	H. Raehn	---	603
219	Winter Park, just north of Swope Ave., near Atlantic Coast Line railroad. SE1/4NW1/4 sec. 6, T. 22 S., R. 30 E.	Florida Utilities Corp.	---	---	451
220	Winter Park, southeast of Ice Plant, south of Cole Ave. SE1/4NW1/4 sec. 6, T. 22 S., R. 30 E.	Florida Utilities Corp.	---	---	487
221	Winter Park, just north of Swope Ave., near Atlantic Coast Line railroad, west of well 219. SE1/4 NW1/4 sec. 6, T. 22 S., R. 30 E.	Florida Utilities Corp.	Gray Well & Pump Co.	1942	460

Depth of Casing (feet)	Diam. of Casing. (inches)	Measuring Point		No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
		Description	Alt. above mean sea level (feet)			
110	3	----------	---	None	Supply (Domestic)	Produces gas.
170	2	----------	---	None	Supply (Domestic)	Produces gas at irregular intervals.
94	3	----------	---	None	Supply (Domestic)	Gasses occasionally.
---	---	Top of 3-inch casing, about level with general land surface.	56.22	1	Supply (abbatoir)	
105 336	6 4	----------	---	None	Supply (Domestic)	Originally 369 feet deep. Became polluted after drilling of well No. 161 and was deepened.
125	12	----------	---	None	Drainage	
125	12	----------	---	None	Drainage	
125	12	----------	---	None	Drainage	
60	3	----------	---	None	Supply (Domestic)	Driven well.
154	4	----------	---	None	Supply (commercial sale of distilled and mineral water)	
75	6	----------	---	None	Drainage (for brewhouse)	
75	6	----------	---	None	Drainage (for brewery cellars)	
81 152	12 6	----------	---	None	Supply (Municipal)	
100	8	----------	---	None	Supply (Municipal)	
101 271	18 16	----------	---	None	Supply (Municipal)	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
222	1 mile west of Plymouth on north side of Hwy. 441. NW1/4SW1/4 sec. 36, T. 20 S., R. 27 E.	Frederick Weis, Plymouth Gardens Tourist Camp.	W. E. Cornell	Sept. 1943	394
223	Orlando Air Base, about 800 feet north of laundry. SE1/4SE1/4 sec. 19, T. 22 S., R. 30 E., 15 feet west of well 224.	U. S. Army	Layne-Atlantic Co.	Aug. 1943	453
224	Orlando Air Base, about 800 feet north of laundry. SE1/4SE1/4 sec. 19, T. 22 S., R. 30 E., 15 feet east of well 223.	U. S. Army	Layne-Atlantic Co.	Aug. 1943	1003
225	About 3 miles south of Taft, approximately 75 yards west of highway. NE1/4SE1/4 sec. 23, T. 24 S., R. 29 E.	Irlo Bronson	---	---	---
226	Orlando, Seybold Baking Company, north side of Marks St., west of railroad.	Seybold Baking Co.	Cohoon Mach. Co.	July 1940	160
227	Orlando, in post office lawn, east of Court St., about 150 feet south of Robinson Ave.	Orlando Post Office	Farm & Home Mach. Co.	Nov. 1942	283
228	Orlando, in post office lawn, west of Main St., 150 feet south of Robinson Ave.	Orlando Post Office.	---	1940	290
229	Pinecastle, SW1/4SE1/4 sec. 24, T. 23 S., R. 29 E.	John Keene	Raehn	1925(?)	285
230	2 miles northwest of Apopka. SE1/4 sec. 33, T. 20 S., R. 28 E.	Baxter Long	Henry Raehn	Feb. 1930	318
231	At underpass on highway at northwest edge of Winter Park.	State Road Dept.	May Brothers	Jan. 1937	977
232	Orlando, southwest edge of Lake Underhill. SW1/4 sec. 29, T. 22 S., R. 30 E.	Orlando Utilities Com.	Gray Well & Pump Co.	---	908
233	Orlando, at plant of Florida Public Service Corp. west Robinson Ave.	Florida Public Service	Layne-Atlantic Co.	Oct. 1940	1050
234	North side of Lake Buchanan. NE1/4SW1/4 sec. 10, T. 23 S., R. 29 E.	Hoequist Airport	---	---	---
235	Northwest side of Lake Jessamine. SW1/4 sec. 14, T. 23 S., R. 29 E., north of well 236.	Jesse Bumby	---	---	---
236	Northwest side of Lake Jessamine. SW1/4 sec. 14, T. 23 S., R. 29 E., south of well 235.	Jesse Bumby	---	---	---
237	Southeast edge of Pocket Lake. SW1/4SW1/4 sec. 14, T. 23 S., R. 29 E.	---	---	---	---

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
67	6	Surface.	130	1	Supply (Domestic)	FGS well No. W-812
180	6	Top of casing, about 1.5 feet above land surface.	114.40	8	Observation	FGS well No. W-804 Recorder installed.
140 496	6 4½	Top of casing, about 1.5 feet above land surface.	114.36	5	Observation	FGS well No. W-806 Recorder installed.
---	10	----------	---	None	Drainage	
70	5	----------	---	None	Supply (cooling system)	Produces combustible gas.
153	6	----------	---	None	Drainage	
---	6	----------	---	None	Supply (cooling system)	
56	6	----------	---	None	Drainage	
71	8	----------	---	None	Drainage	FGS well No. W-121
---	---	----------	---	None	Drainage	FGS well No. W-342
450	12	----------	---	None	Supply (Municipal)	FGS well No. W-367
165 486	18 12	----------	---	None	Supply	FGS well No. W-527
---	6	----------	---	None	Drainage	
---	12	----------	---	None	Drainage	
---	12	----------	---	None	Drainage	
---	6	----------	---	None	Drainage	

TABLE 2 - WELL RECORDS

Well Number	Location	Owner	Driller	Date Completed	Depth of Well (feet)
238	Southwest corner of Middle Lake Conway. NE1/4NE1/4 sec. 25, T. 23 S., R. 29 E.	Matchett	---	---	---
239	Northwest side of Middle Lake Conway. NW1/4 sec. 20, T. 23 S., R. 30 E.	Crittenden	---	---	---
240	Orlando, southwest corner of City Hall, north side of South St.	City of Orlando	---	---	---
241	Orlando, northwest side of Lake Dot, east of Lake Dot Circle.	City of Orlando	---	---	---
242	About 6 miles east of Orlando. SW1/4 sec. 26, T. 22 S., R. 30 E.	U. S. Army	Layne-Atlantic Co.	Sept. 1943	455
243	Orlando, west of Parramore St., at Otey Place.	U. S. Dept. Agr.	Farm & Home Mach. Co.	---	195
244	Orlando, at Coca-Cola Plant, north side of Gore Ave., east of Atlantic Ave.	Coca Cola Co.	Cohoon Mach. Co.	1938	119
245	Orlando, about 300 feet west of Magnolia Ave., about 300 feet north of Colonial Drive.	City of Orlando	---	---	---
246	Orlando, southwest edge of Lake Underhill. SW1/4 sec. 29, T. 22 S., R. 30 E.	Orlando Utilities Com.	---	---	---
	LAKE COUNTY				
17	Tavares, 200 North Central Ave.	A. K. Arrington	---	---	150
	OSCEOLA COUNTY				
3	1 mile southwest of Kissimmee. NW1/4NE1/4 sec. 32, T. 25 S., R. 29 E.	A. P. Tate	---	---	400(?)
	SEMINOLE COUNTY				
35	Southeast edge of Lake Jessup, about 4 miles northeast of Oviedo.	C. S. Lee	---	---	---
36	Sanford, East Celery Ave., north side Celery Ave., at east side of driveway across road from residence of John Brumley. Sec. 28, T. 19 S., R. 31 E.	John Brumley	---	1913	90
37	About 3 miles southwest of Sanford. NE1/2 sec. 11, T. 20 S., R. 30 E.	City of Sanford	Layne-Atlantic Co.	Apr. 1943	160

Depth of Casing (feet)	Diam. of Casing (inches)	Measuring Point: Description	Measuring Point: Alt. above mean sea level (feet)	No. of water-level measurements through Oct. 1943 (see Table 2)	Use	Remarks
---	6	----------	---	None	Drainage	
---	8	----------	---	None	Drainage	
---	10	----------	---	None	Drainage	
---	10	----------	---	None	Drainage	
191	8	Surface.	---	1	Supply	FGS well No. W-809
128	2½	----------	---	None	Supply (cooling system)	Produces inflammable gas.
92	3	----------	---	None	None	Polluted. Not used.
---	10	----------	---	None	Drainage	
---	---	----------	---	None	Supply (Municipal)	
---	4	Top of flange, about 3 inches above land surface.	79.25	1	Irrigation	
---	4	Top of northeast corner of concrete irrigation box, about 1 foot above land surface.	67.16	2	Irrigation	
---	4	Top of mouth of valve.	18.72	10	Observation	Recorder installation.
80	4	Top of horizontal 2-inch pipe, over concrete irrigation pipe.	14.89	1	Irrigation	
90	12	----------	---	None	Supply	FGS well No. W-765

TABLE 3

WATER LEVELS IN FEET WITH REFERENCE TO MEASURING POINT

(See Table 2 for altitudes of measuring points. Water levels in wells 1 to 66 through 1934 are from U. S. Geological Survey Water-Supply Paper 773-C and have been adjusted for differences in measuring points.

TABLE 3

WATER LEVELS IN FEET WITH REFERENCE TO MEASURING POINT

Well No.	Date	Water level
Orange County		
	1930	
1	Aug. 4	-29.1
	8	-29.44
	21	-30.9
	25	-29.9
	Sept. 2	-31.3
	8	-30.6
	15	-30.4
	1931	
	May 13	-31.90
	Jul. 14	-34.2
	18	-34.22
	Aug. 8	-34.57
	14	-34.42
	15	-34.42
	1932	
	Jan. 6	-35.9
	Feb. 9	-36.5
	Mar. 9	-36.7
	Apr. 5	-37.16
	Jun. 16	-36.40
	Jul. 4	-36.86
	Aug. 2	-36.90
	Sept. 7	-36.76
	10	-37.0
	Nov. 18	-37.21
	1933	
	May 11	-38.62
	25	-38.8
	Nov. 28	-34.6
	1934	
	Jan. 4	-35.7
	Mar. 21	-36.2
	May 17	-34.1
	Jun. 18	-27.8
	Jun. 19	-28.3
	1943	
	May 18	-38.38
	25	-37.73
	Jun. 10	-38.36
	17	-38.46
	25	-38.63
Orange County (Cont'd.)		
	1943	
1	Aug. 19	-37.50
	Oct. 28	-36.61
	1930	
2	Aug. 5	-30.7
	8	-30.9
	21	-31.5
	25	-31.8
	Sept. 2	-32.8
	8	-32.1
	15	-32.8
	1931	
	Jul. 14	-35.8
	Aug. 8	-36.2
	1933	
	May 11	-40.2
	1943	
	May 17	-39.98
	18	-39.95
	25	-39.18
	Jun. 10	-39.83
	17	-39.93
	25	-40.03
	1930	
3	Aug. 4	-31.0
	8	-31.37
	21	-32.0
	25	-32.0
	Sept. 2	-33.2
	8	-32.4
	15	-33.10
	1931	
	Aug. 8	-36.5
	1943	
	Jun. 25	-40.48
	Aug. 19	-39.30
	1930	
4	Aug. 6	-38.4
Orange County (Cont'd.)		
	1930	
4	Aug. 8	-37.48
	21	-39.0
	25	-38.7
	Sept. 2	-40.0
	8	-39.0
	15	-39.9
	1931	
	Jul. 13	-43.6
	Aug. 8	-43.95
	14	-43.70
	15	-43.70
	1932	
	Jan. 6	-44.9
	Feb. 9	-46.2
	Mar. 9	-45.6
	Apr. 5	-45.41
	Jun. 16	-45.04
	Jul. 14	-45.51
	Aug. 2	-45.78
	Sept. 7	-45.86
	10	-45.6
	Nov. 18	-47.1
	1933	
	May 11	-47.5
	1943	
	Jun. 21	-47.4
	25	-47.35
	Aug. 19	-46.17
	1930	
5	Aug. 5	-35.71
	8	-36.03
	21	-37.8
	25	-37.35
	Sept. 2	-38.7
	8	-39.1
	1931	
	Jul. 13	-42.4
	Aug. 8	-42.75
	14	-42.40

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1931	
5	Aug. 15	-42.35
	Sept. 10	-45.00
	1933	
	May 11	-46.6
	1943	
	May 25	-45.50
	Jun. 10	-46.36
	1930	
6	Aug. 5	-39.0
	8	-37.55
	1931	
	Jul. 13	-44.0
	21	-43.6
	Aug. 8	-44.3
	1943	
	May 17	-47.78
	25	-47.31
	Jun. 10	-48.03
	17	-48.13
	25	-48.21
	Aug. 19	-46.9
	1930	
7	Aug. 5	-38.6
	8	-38.15
	21	-39.6
	Sept. 2	-40.7
	8	-39.9
	15	-40.7
	1931	
	Jul. 13	-44.75
	21	-44.30
	Aug. 8	-45.00
	14	-44.70
	15	-44.70
	1932	
	Sept. 10	-47.55
	1933	
	May 11	-49.2
	25	-49.4
	Nov. 27	-45.0
	1934	
	May 18	-43.9
	Jun. 16	-31.7
	18	-35.7
	19	-36.5
	Orange County (Cont'd.)	
	1934	
7	Jun. 20.	-37.2
	21	-37.7
	23	-37.8
	26	-38.7
	1943	
	May 18	-48.78
	25	-48.32
	Jun. 10	-48.99
	1930	
8	Aug. 8	-34.92
	Sept. 2	-37.4
	8	-37.9
	15	-37.47
	1931	
	Jul. 13	-41.2
	20	-40.57
	Aug. 8	-41.42
	14	-41.17
	15	-41.12
	1933	•
	May 10	-45.77
	1934	
	Jun. 18	-35.
	26	-35.1
	1943	
	May 10	-44.69
	25	-44.86
	Jun. 17	-45.61
	25	-45.74
	Aug. 19	-41.3
	1930	
9	Aug. 8	- 1.20
	15	- 0.4
	Sept. 2	- 4.0
	15	- 3.8
	1943	
	May 17	-14.01
	22	-14.10
	25	-14.10
	Jun. 10	-14.75
	17	-14.9
	25	-14.94
	1930	
10	Aug. 4	- 3.53
	Orange County (Cont'd.)	
	1930	
10	Aug. 8	- 4.73
	Sept. 2	- 7.50
	8	- 5.50
	15	- 7.30
	1931	
	May 1	- 9.1
	13	- 8.9
	15	- 9.42
	Jul. 10	-11.6
	13	-11.8
	29	-11.45
	31	-11.58
	Aug. 5	-11.8
	7	-11.85
	8	-11.9
	14	-11.2
	15	-11.4
	18	-11.7
	1932	
	Jan. 6	-13.23
	Feb. 9	-14.05
	Apr. 5	-13.95
	Jun.	-14.20
	Jul. 14	-13.9
	Aug. 2	-13.
	Sept. 7	-13.
	10	-14.1
	Nov. 18	-14.57
	1933	
	May 11	-15.9
	25	-16.0
	Nov. 24	-11.8
	28	-12.0
	1934	
	Jan. 4	-12.4
	Jun. 5	-11.3
	19	- 2.5
	26	- 4.7
	1943	
	May 17	-15.89
	25	-14.85
	Jun. 10	-15.56
	1930	
11	Aug. 5	-32.8
	8	-32.57
	21	-34.3

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1930	
11	Sept. 2	-35.1
	1931	
	Aug. 8	-39.25
	14	-38.90
	15	-38.90
	1932	
	Feb. 9	-41.4
	Mar. 9	-41.2
	Apr. 5	-41.68
	Jun. 16	-40.41
	Jul. 14	-41.31
	Aug. 2	-41.25
	Sept. 7	-41.21
	10	-41.5
	Nov. 10	-41.72
	1933	
	May 11	-43.1
	25	-43.2
	Nov. 28	-39.1
	1943	
	Jun. 25	-42.67
	Aug. 19	-41.55
	1943	
12	May 17	-15.15
	25	-14.23
	Jun. 10	-14.94
	25	-15.15
	Aug. 19	-13.82
	1943	
13	Jun. 15	-42.71
	17	-42.78
	25	-42.86
	1926	
14	Dec.	-32.5
	1943	
	May 18	-38.51
	25	-37.70
	Jun. 1	-38.16
	10	-38.26
	17	-38.46
	25	-38.58
	1927	
15	Feb.	-38.
	Orange County (Cont'd.)	
	1943	
15	May 18	-41.10
	25	-40.31
	Jun. 10	-40.40
	1927	
16	Aug.	-22.5
	1926	
18	May	-27.
	1926	
20	Apr.	-42.
	1943	
	May 17	-47.68
	25	-46.76
	Jun. 10	-47.45
	17	-47.50
	25	-47.69
	Aug. 19	-46.56
	1926	
21	Oct.	-40.
	1943	
	May 27	-42.19
	1926	
22	Oct.	- 8.
	1943	
	May 14	-16.96
	25	-15.25
	Jun. 10	-15.85
	17	-16.00
	25	-16.14
	Aug. 19	-15.00
	1926	
23	Oct.	-45.
	1943	
	May 18	-48.94
	25	-38.57
	Jun. 10	-39.32
	1926	
24	Oct.	-23.
	1943	
	Jun. 16	-34.90
	Orange County (Cont'd.)	
	1926	
25	Dec.	-43.
	1926	
26	Mar.	-36.
	1926	
27	Mar.	-41.
	1943	
	May 17	-46.83
	25	-45.89
	Jun. 10	-46.59
	1926	
28	Jul.	-34.
	1943	
	May 17	-42.96
	25	-42.09
	Jun. 10	-42.77
	1943	
29	Jun. 16	-40.35
	25	-40.47
	Aug. 19	-39.28
	1926	
30	Mar.	-46.
	1943	
	May 17	-48.85
	25	-48.45
	1927	
31	Feb.	-40.
	1943	
	May 17	-40.89
	25	-40.29
	Jun. 10	-40.84
	17	-40.96
	25	-41.04
	Aug. 19	-39.93
	Oct. 20	-38.20
	1927	
33	Feb.	-40.
	1926	
34	Nov.	-35.

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1943	
34	Jun. 25	-40.94
	Aug. 19	-39.74
	1930	
35	Aug. 9	-29.65
	28	-31.10
	Oct. 4	-32.9
	1931	
	Mar. 23	-33.85
	May 13	-32.82
	Jul. 10	-35.33
	Aug. 7	-35.65
	1932	
	Sept. 9	-37.65
	1933	
	Nov. 22	-35.45
	1934	
	May 14	-36.9
	15	-35.5
	Jun. 20	-27.9
	1943	
	May 12	-38.98
	19	-38.94
	31	-39.00
	Jun. 8	-39.20
	1930	
36	Aug. 9	-31.08
	28	-32.55
	Oct. 4	-34.42
	1931	
	Mar. 23	-35.30
	May 13	-34.33
	Jul. 10	-36.90
	Aug. 7	-37.25
	1932	
	Sept. 9	-39.25
	1933	
	May 11	-40.9
	Nov. 22	-37.1
	1934	
	Mar. 12	-38.
	May 14	-38.5
	22	-34.8
	Jun. 4	-36.5
	1943	
	May 11	-40.00

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1943	
36	May 19	-40.46
	Jun. 8	-40.60
	Jul. 1	-40.80
	Aug. 20	-38.8
	1930	
37	Aug. 9	-31.00
	28	-32.50
	Oct. 4	-34.48
	1931	
	Mar. 23	-35.55
	May 13	-34.39
	Jul. 10	-36.90
	Aug. 17	-37.25
	1932	
	Sept. 9	-39.25
	1933	
	May 10	-41.0
	Nov. 2	-37.1
	1943	
	May 11	-40.79
	Jun. 8	-40.67
	Aug. 20	-39.7
	1930	
38	Aug. 9	-28.29
	28	-30.19
	29	-30.5
	Oct. 4	-32.8
	1931	
	Mar. 23	-33.64
	May 13	-32.5
	15	-33.0
	Jul. 10	-35.8
	14	-35.80
	18	-35.84
	20	-35.49
	Aug. 3	-36.04
	7	-36.14
	14	-36.0
	1932	
	Sept. 9	-38.4
	1933	
	May 10	-40.24
	Nov. 21	-35.7
	27	-35.6
	Dec. 28	-37.0

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1934	
38	Jan. 4	-37.2
	Feb. 26	-37.6
	Mar. 12	-37.2
	21	-37.8
	May 14	-37.5
	15	-35.6
	16	-36.1
	17	-34.4
	22	-32.7
	29	-32.8
	31	-33.8
	Jun. 5	-34.8
	8	-35.1
	19	-25.9
	20	-26.2
	21	-26.9
	1943	
	May 11	-39.85
	19	-39.73
	Jul. 1	-40.23
	Aug. 20	-38.8
	Oct. 28	-36.9
	1931	
39	Aug. 3	-34.0
	7	-34.03
	1932	
	Sept. 9	-36.0
	1933	
	May 10	-38.0
	Nov. 21	-33.83
	1934	
	Mar. 12	-35.4
	1943	
	May 11	-37.59
	19	-37.43
	Jun. 23	-37.87
	Aug. 21	-36.5
	1943	
40	May 11	-35.03
	19	-34.86
	Jun. 8	-35.29
	Jul. 1	-35.44
	Aug. 20	-34.1

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1931	
41	Jul. 10	-31.75
	27	-32.00
	Aug. 7	-32.25
	1932	
	Sept. 9	-34.0
	1933	
	May 10	-35.5
	1943	
	May 11	-36.12
	1931	
42	Aug. 7	-40.1
	1933	
	Nov. 22	-40.1
	1934	
	May 18	-39.6
	Jun. 19	-34.6
	21	-35.3
	22	-35.5
	26	-36.0
	1943	
	May 12	-43.49
	Jun. 8	-43.62
	Aug. 20	-42.69
	1930	
43	Aug. 9	-37.82
	28	-39.0
	Oct. 5	-40.74
	1931	
	Mar. 23	-41.60
	May 13	-40.52
	Jul. 10	-42.87
	Aug. 7	-43.25
	1932	
	Sept. 9	-45.3
	1933	
	May 11	-46.9
	Nov. 21	-43.1
	1934	
	Mar. 12	-44.3
	May 18	-42.5
	Jun. 4	-43.0
	19	-37.3
	21	-38.2
	22	-38.1
	26	-38.9
	Orange County (Cont'd.)	
	1943	
43	May 12	-46.64
	Jun. 8	-46.76
	Aug. 20	-45.84
	1930	
44	Aug. 28	-25.42
	Oct. 4	-27.2
	1931	
	Mar. 23	-28.06
	May 13	-26.87
	Jul. 10	-30.1
	21	-29.9
	Aug. 7	-30.37
	1932	
	Sept. 9	-32.77
	1933	
	May 10	-34.7
	Nov. 21	-30.3
	1943	
	May 11	-33.57
	19	-34.45
	Jun. 23	-34.84
	Aug. 21	-33.3
	1930	
46	Aug. 9	-31.79
	28	-32.85
	Oct. 5	-34.4
	1931	
	Mar. 23	-35.8
	May 13	-34.42
	Jul. 10	-36.70
	Aug. 7	-37.00
	1932	
	Sept. 9	-38.9
	1933	
	May 11	-40.5
	Nov. 22	-36.9
	1943	
	May 12	-39.75
	1930	
47	Sept.	- 2.
	1931	
	Jul. 9	- 6.
	14	- 5.5
	Orange County (Cont'd.)	
	1930	
47	Jul. 15	- 5.5
	17	- 5.67
	19	- 5.75
	22	- 5.74
	29	- 5.70
	Aug. 9	- 6.0
	12	- 6.1
	13	- 6.2
	16	- 6.1
	1932	
	Jan. 6	-11.75
	Feb. 9	-12.89
	Mar. 8	-13.45
	Apr. 5	-14.06
	Jun 16	-12.96
	Jul. 14	-13.95
	Sept. 9	-11.3
	Nov. 18	-14.48
	1933	
	May 10	-18.0
	1943	
	Jul. 31	-16.27
	Aug. 7	-16.20
	13	-16.38
	20	-16.00
	27	-15.79
	Sept. 3	-15.79
	Oct. 17	-12.35
	20	-12.54
	24	-12.76
	30	-12.98
	1930	
48	Aug. 29	-28.1
	Oct. 4	-31.81
	1943	
	May 11	-38.88
	Jun. 8	-39.01
	23	-39.15
	1943	
49	May 12	-54.49
	Jun. 3	-54.00
	8	-50.97
	Aug. 20	-53.4

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1943	
50	Jun. 8	-29.30
	23	-29.46
	Aug. 20	-32.4
	1930	
51	Aug. 28	-29.40
	Oct. 4	-30.90
	1931	
	Mar. 22	-32.
	May 13	-29.1
	Jul. 10	-33.11
	22	-32.8
	Aug. 8	-33.6
	11	-33.51
	1932	
	Sept. 9	-36.31
	1943	
	May 11	-38.47
	Jun. 8	-38.56
	23	-38.60
	Aug. 20	-37.2
	1931	
52	Mar. 23	-34.6
	Jul. 10	-36.0
	18	-36.05
	Aug. 7	-36.3
	14	-36.4
	1932	
	Sept. 9	-38.5
	1933	
	May 11	-40.2
	1934	
	May 18	-35.6
	22	-34.9
	Jun. 19	-30.
	21	-30.8
	26	-31.5
	1943	
	May 12	-40.18
	Jun. 10	-40.14
	1931	
53	Mar. 22	-31.65
	May 13	-30.37
	Jul. 10	-32.84
	1932	
	Sept. 9	-36.1
	Orange County (Cont'd.)	
	1933	
53	May 10	-38.1
	Nov. 22	-33.3
	27	-33.4
	1934	
	May 18	-34.4
	22	-32.8
	Jun. 7	-33.7
	18	- 9.4
	20	-27.3
	26	-28.6
	1943	
	May 11	-38.32
	Jun. 8	-38.34
	23	-38.46
	Aug. 20	-37.0
	1931	
54	Jul. 16	-25.35
	Aug. 15	-25.45
	1932	
	Sept. 10	-28.1
	1933	
	May 10	-29.7
	Nov. 22	25.65
	1934	
	Mar. 21	-27.3
	May 18	-25.0
	1943	
	May 15	-23.80
	Jun. 5	-27.35
	12	-28.86
	26	-29.23
	Aug. 13	-26.94
	24	-26.75
	1931	
55	Jul. 16	-15.7
	1932	
	Sept. 10	-19.0
	1933	
	May 10	-20.6
	Nov. 22	-16.55
	1934	
	May 18	-16.0
	Jun. 18	-10.0
	1943	
	May 15	-20.63
	5	-20.33
	Orange County (Cont'd.)	
	1943	
55	May 12	-20.38
	Aug. 24	-18.98
	1931	
56	Jul. 17	-59.4
	31	-59.7
	1932	
	Jan. 6	-61.9
	Feb. 9	-63.0
	Mar. 8	-63.1
	Apr. 4	-63.28
	Jun. 16	-63.79
	Jul. 14	-63.67
	Aug. 29	-63.97
	Sept. 7	-64.08
	10	-64.0
	Nov. 18	-64.50
	1933	
	May 10	-64.0
	Nov. 27	-60.9
	1934	
	May 18	-62.3
	Jun. 7	-61.9
	29	-58.6
	1943	
	May 15	-64.87
	Jun. 5	-64.99
	12	-65.08
	Aug. 11	-64.69
	1931	
57	Aug. 13	- 1.0
	1932	
	Jan. 6	- 2.66
	Feb. 9	- 3.
	1931	
58	Jul. 14	∤ 9.3
	1932	
	Jan. 6	∤ 8.4
	Apr. 4	∤ 3.4
	Jun. 16	∤ 5.9
	Jul. 14	∤ 4.6
	Aug. 2	∤ 5.7
	Sept. 7	∤ 4.7
	1931	
59	Aug. 12	-21.3

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
Orange County (Cont'd.)		
	1933	
59	Dec. 18	-22.8
	1943	
	May 15	-28.76
	Jun. 12	-28.74
	1943	
60	Jun. 12	-45.14
	1931	
61	Jul. 14	-40.4
	1932	
	Jan. 6	-42.8
	Feb. 9	-45.2
	Apr. 4	-46.0
	Jun. 10	-44.10
	Jul. 14	-44.91
	Aug. 2	-45.3
	Sept. 2	-43.12
	9	-44.2
	1933	
	May 10	-47.15
	25	-46.8
	Nov. 23	-42.1
	1934	
	Jun. 5	-32.5
	6	-36.4
	1943	
	May 5	-47.91
	Jun. 12	-47.93
	Aug. 21	-42.10
	1931	
62	Aug. 8	-19.1
	1933	
	May 11	-24.3
	1934	
	Jun. 2	- 1.9
	1943	
	Jun. 21	-25.20
	Aug. 21	-24.14
	1931	
63	Aug. 5	-15.15
	1933	
	May 11	-17.6
	Nov. 24	-14.6
	1934	
	Jun. 4	- 8.2
Orange County (Cont'd.)		
	1931	
64	Aug. 5	-21.8
	1933	
	May 11	-24.2
	Nov. 24	-21.25
	1934	
	Jun. 4	- 5.
	1943	
	Aug. 7	- 5.2
	1933	
65	May	-22.6
	1943	
	Jun. 19	-26.89
	Aug. 2	-25.72
	1933	
66	Nov. 28	+ 7.1
	1943	
69	May 8	-37.30
	1943	
71	May 8	-30.75
	1943	
78	May 19	-44.41
	25	-43.96
	Jun. 10	-44.63
	17	-44.89
	25	-44.93
	Aug. 19	-43.5
	1943	
79	May 11	-19.55
	Aug. 20	-39.92
	1943	
81	May 13	-55.27
	22	-54.68
	28	-55.00
	Jun. 4	-55.17
	29	-55.13
	Aug. 18	-56.47
	1943	
82	May 13	-57.52
	22	-56.90
	28	-57.21
Orange County (Cont'd.)		
	1943	
82	Jun. 4	-57.42
	11	-57.51
	29	-57.48
	Aug. 18	-56.69
	1943	
83	May 14	-45.63
	21	-45.25
	Jun. 4	-45.33
	11	-45.5
	18	-45.3
	25	-43.4
	Aug. 18	-44.6
	1943	
84	May 14	-50.04
	21	-45.80
	Jun. 4	-45.81
	11	-45.9
	18	-46.2
	25	-46.3
	Aug. 18	-45.2
	1941	
85	Apr. 5	-48.
	1941	
86	Apr. 1	-45.6
	1943	
	May 14	-45.79
	21	-44.62
	Jun. 4	-45.67
	11	-45.74
	18	-46.04
	25	-46.13
	Aug. 18	-43.9
	1941	
87	Oct.	-45.
	1943	
88	May 13	-29.98
	21	-31.75
	28	-24.28
	Jun. 4	-24.34
	11	-34.56
	25	-30.3
	Aug. 18	-18.9

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1943	
90	May 13	-51.94
	21	-51.72
	28	-51.66
	Jun. 4	-51.83
	11	-51.97
	18	-52.10
	25	-52.25
	Aug. 18	-51.18
	1943	
91	May 13	-42.78
	21	-42.64
	28	-42.08
	Jun. 4	-42.58
	11	-42.73
	18	-42.5
	25	-43.32
	Aug. 18	-42.0
	1943	
92	May 14	-43.63
	21	-41.94
	28	-43.72
	Jun. 4	-43.41
	11	-43.23
	18	-43.7
	25	-43.8
	Aug. 18	-42.6
	1943	
94	May 13	-52.25
	22	-51.61
	28	-51.97
	Jun. 4	-52.17
	11	-52.25
	18	-52.40
	25	-52.56
	Jul. 30	-49.6
	Aug. 19	-48.2
	1943	
95	May 18	-46.25
	25	-45.60
	Jun. 10	-46.10
	1943	
96	May 19	-34.28
	Orange County (Cont'd.)	
96	May 25	-33.86
	Jun. 10	-34.60
	1943	
97	May 19	-31.37
	25	-31.00
	Jun. 10	-31.67
	17	-31.74
	25	-31.94
	Aug. 19	-30.52
	1943	
98	May 19	-36.85
	25	-37.63
	Jun. 10	-38.34
	17	-38.46
	25	-30.23
	Aug. 19	-37.2
	1937	
99	Aug. 11	-47.6
	1943	
100	Jun. 17	-48.36
	25	-48.11
	Aug. 19	-47.12
	1936	
101	Nov. 4	-37.
	1934	
102	Nov.	-45.5
	1943	
103	May 21	-46.34
	25	-45.95
	Jun. 10	-46.66
	1943	
104	May 21	-47.80
	25	-47.44
	1943	
105	May 21	-47.79
	25	-47.43
	Jun. 10	-48.12
	17	-48.20
	Orange County (Cont'd.)	
	1943	
105	Jun. 25	-48.25
	Jul. 1	-48.25
	Aug. 10	-47.67
	19	-46.95
	1943	
106	May 21	-49.76
	25	-49.36
	Jun. 10	-50.09
	17	-50.16
	25	-50.27
	Aug. 19	-49.15
	1943	
108	May 23	-46.88
	30	-47.31
	Jun. 6	-47.66
	13	-47.75
	20	-48.10
	27	-47.70
	Jul. 25	-47.15
	Aug. 22	-45.90
	1936	
110	Jul.	-41.
	1943	
112	May 26	-44.53
	Jun. 10	-45.05
	17	-45.18
	25	-45.29
	Aug. 19	-43.8
	1943	
113	Jun. 25	-38.16
	Aug. 19	-37.54
	1925	
114	Jun. 4	-22.
	1943	
116	May 26	-44.56
	Jun. 17	-45.23
	25	-45.43
	Aug. 19	-44.24

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1943	
117	May 27	-43.75
	Jun. 10	-44.00
	17	-44.17
	25	-44.11
	Aug. 19	-42.9
	1943	
118	May 26	-16.58
	Jun. 10	-17.12
	1943	
121a	Jun. 14	-19.30
	1943	
121b	Jun. 14	-24.80
	1943	
121c	Jun. 14	-24.42
	17	-24.85
	25	-24.71
	Aug. 19	-23.58
	1923	
122	Jun. 7	-42.
	1923	
124	Jul.	-33.
	1926	
126	Nov.	-19.
	1925	
127	Jan.	-28.
	1943	
131	May 26	-45.92
	Jun. 10	-46.60
	1924	
135	Sept.	-43.
	1943	
136	May 27	-45.85
	1943	
138	May 26	-46.76
	Jun. 10	-47.27
	Orange County (Cont'd.)	
	1943	
139	May 26	-14.85
	Jun. 10	-15.37
	17	-15.52
	25	-15.61
	Aug. 19	-14.46
	1940	
140	Apr.	-53.
	1943	
141	Jun. 17	-42.84
	25	-42.98
	Aug. 19	-41.4
	1928	
143	Jul. 1	-43.
	1924	
144	Aug. 2	-34.
	1943	
155	May 31	-31.93
	1943	
156	May 31	-34.97
	1943	
157	May 31	-34.0
	1943	
158	May 31	-38.23
	1943	
159	Jun. 8	-37.28
	1943	
160	May 31	-30.40
	1943	
161	May 31	-34.28
	Jun. 17	-34.54
	25	-34.69
	Aug. 19	-33.0
	1943	
162	May 31	-33.57
	Jun. 8	-33.65
	Orange County (Cont'd.)	
	1943	
162	Aug. 20	-32.72
	1943	
169	Jun. 1	-46.15
	10	-46.28
	17	-46.37
	25	-46.45
	Aug. 19	-45.1
	1943	
171	Jun. 1	-42.42
	10	-42.56
	17	-42.69
	25	
	Aug. 10	-42.00
	19	-41.5
	1943	
172	May 31	-34.63
	1943	
174	May 31	-33.27
	Jun. 8	-33.48
	Jul. 1	-33.65
	Aug. 2	-32.50
	1943	
175	May 31	-35.84
	Jun. 8	-36.00
	1943	
176	May 31	-35.80
	Jun. 8	-35.99
	Jul. 1	-36.24
177	Jun. 3	-39.31
	Jul. 10	-39.47
	25	-39.79
	Aug. 20	-38.68
	1943	
178	Jun. 3	-42.98
	10	-43.14
	Aug. 20	-43.23

Table 3 Cont'd Water levels, in feet, with reference to measuring point

Well No.	Date	Water level
	Orange County (Cont'd.)	
	1943	
179	Jun. 3	-33.89
	8	-34.10
	Jul. 1	-34.26
	Aug. 20	-33.26
	1943	
184	Jun. 5	-65.70
	12	-65.78
	1943	
190	Jun. 25	-46.66
	Aug. 19	-45.5
	1943	
193	Jun. 17	-34.81
	25	-34.85
	Aug. 19	-33.45
	1943	
197	Jun. 21	-23.11
	Aug. 21	-21.09
	1943	
199	Jun. 23	-47.0
	1943	
210	Aug. 21	- 3.17
222	Sept. 4	-56.8
	1943	
223	Sept. 4	-56.22
	11	-55.4
	25	-52.3
	Oct. 9	-54.6
	15	-53.80
	16	-53.92
	20	-54.61
	30	-55.72
	1943	
224	Sept. 4	-56.14
	11	-55.2
	Oct. 15	-53.83
	20	-54.65
	30	-55.27
	Orange County (Cont'd.)	
	1943	
242	Sept. 1	-38.
	Lake County	
	1943	
17	Aug. 11	-12.33
	Osceola County	
	1934	
3	Dec. 21	∤ 2.66
	1943	
	Aug. 9	∤ 2.6
	Seminole County	
	1938	
35	Nov. 18	∤16.7
	1939	
	Feb. 2	∤17.9
	1941	
	Aug. 28	∤18.9
	Nov. 20	∤19.0
	1942	
	May 30	∤18.2
	Jul. 25	∤19.0
	Aug. 18	∤18.5
	1943	
	May 8	∤16.5
	Jun. 9	∤16.6
	Jul. 30	∤17.1
	1943	
36	Aug. 26	∤ 9.7

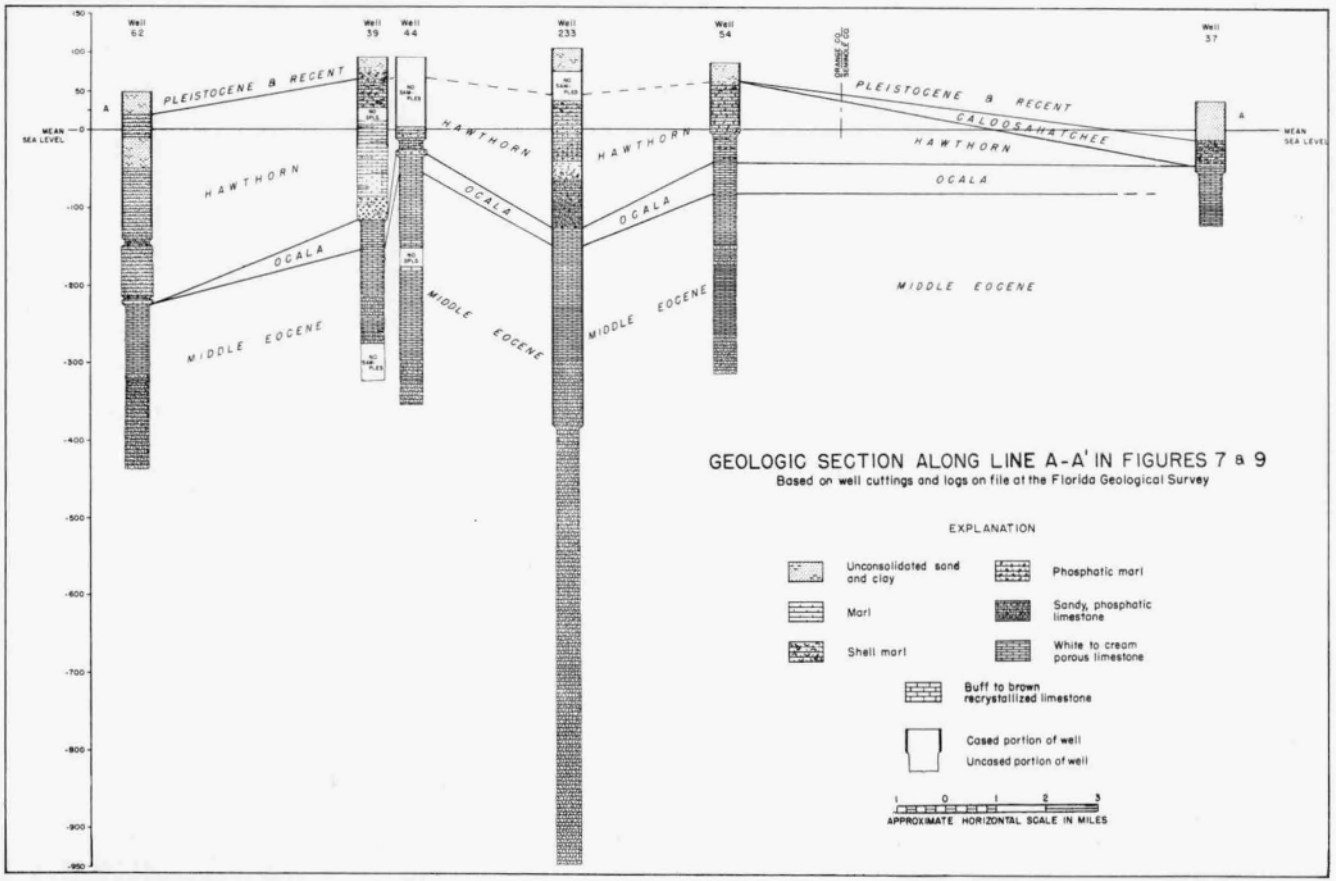

Well 62
Well 39
Well 44
Well 233
Well 54
Well 37
ORANGE CO.-SEMINOLE CO.
A
A'
MEAN SEA LEVEL
PLEISTOCENE & RECENT
HAWTHORN
OCALA
MIDDLE EOCENE
CALOOSAHATCHEE
NO SAMPLES
-50
-100
-200
-300
-400
-500
-600
-700
-800
-900
-950
GEOLOGIC SECTION ALONG LINE A-A' IN FIGURES 7 & 9
Based on well cuttings and logs on file at the Florida Geological Survey
EXPLANATION
Unconsolidated sand and clay
Marl
Shell marl
Phosphatic marl
Sandy, phosphatic limestone
White to cream porous limestone
Buff to brown recrystallized limestone
Cased portion of well
Uncased portion of well
1 0 1 2 3
APPROXIMATE HORIZONTAL SCALE IN MILES

FIGURE 1

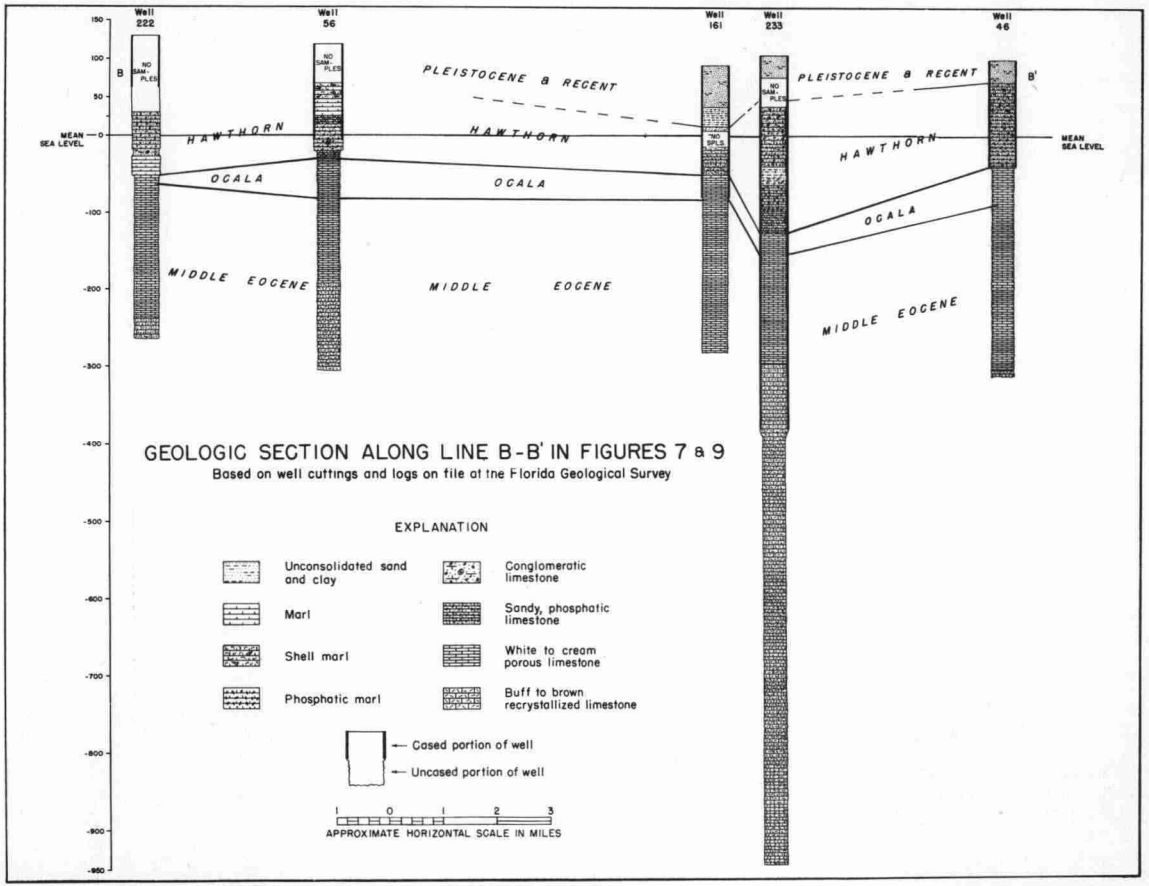

Well 222
Well 56
Well 161
Well 233
Well 46
B
B'
NO SAMPLES
PLEISTOCENE & RECENT
HAWTHORN
OCALA
MIDDLE EOCENE
MEAN SEA LEVEL
150
100
50
0
-100
-200
-300
-400
-500
-600
-700
-800
-900
-950
GEOLOGIC SECTION ALONG LINE B-B' IN FIGURES 7 & 9
Based on well cuttings and logs on file at the Florida Geological Survey
EXPLANATION
Unconsolidated sand and clay
Marl
Shell marl
Phosphatic marl
Conglomeratic limestone
Sandy, phosphatic limestone
White to cream porous limestone
Buff to brown recrystallized limestone
Cased portion of well
Uncased portion of well
1 0 1 2 3
APPROXIMATE HORIZONTAL SCALE IN MILES

FIGURE 2

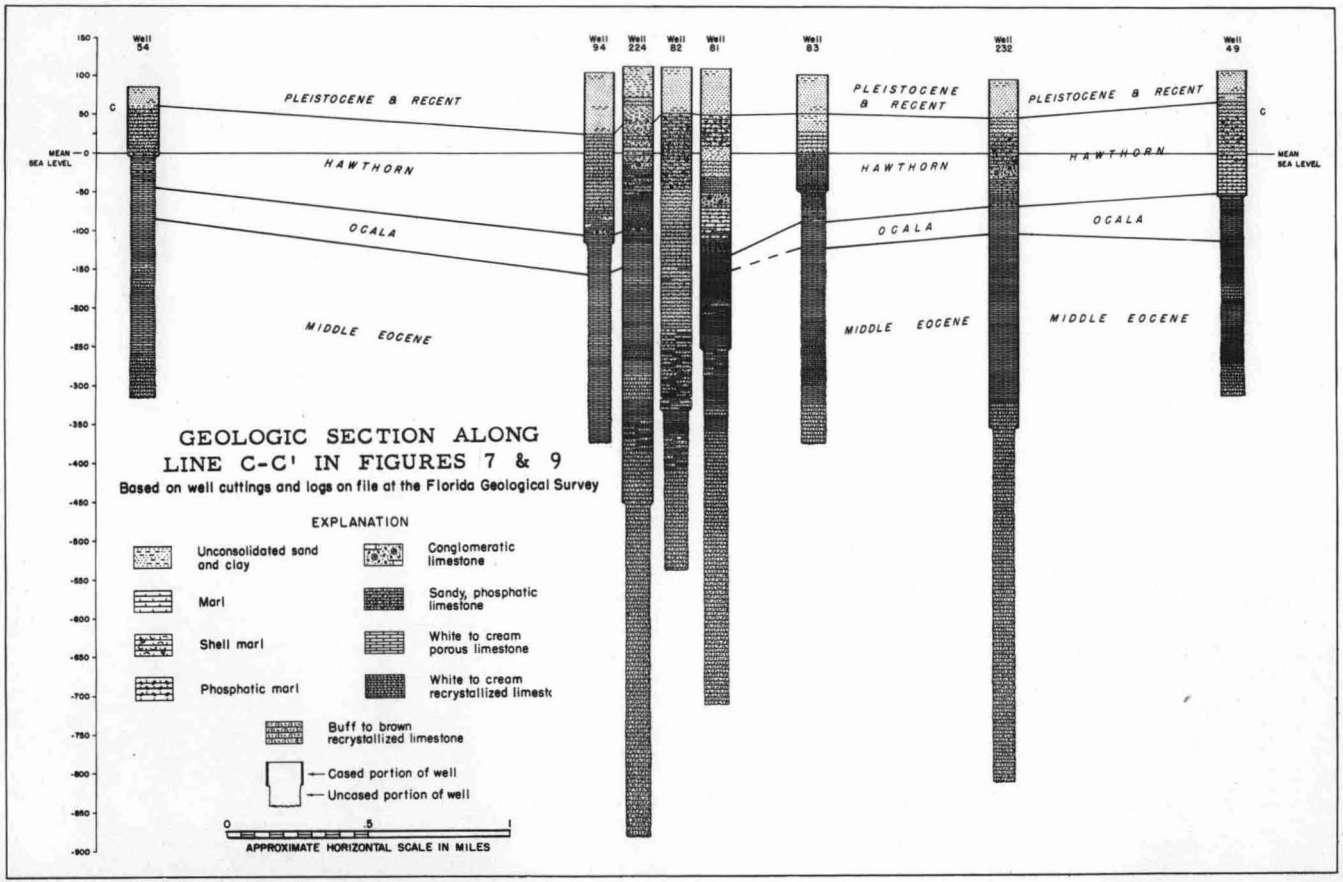
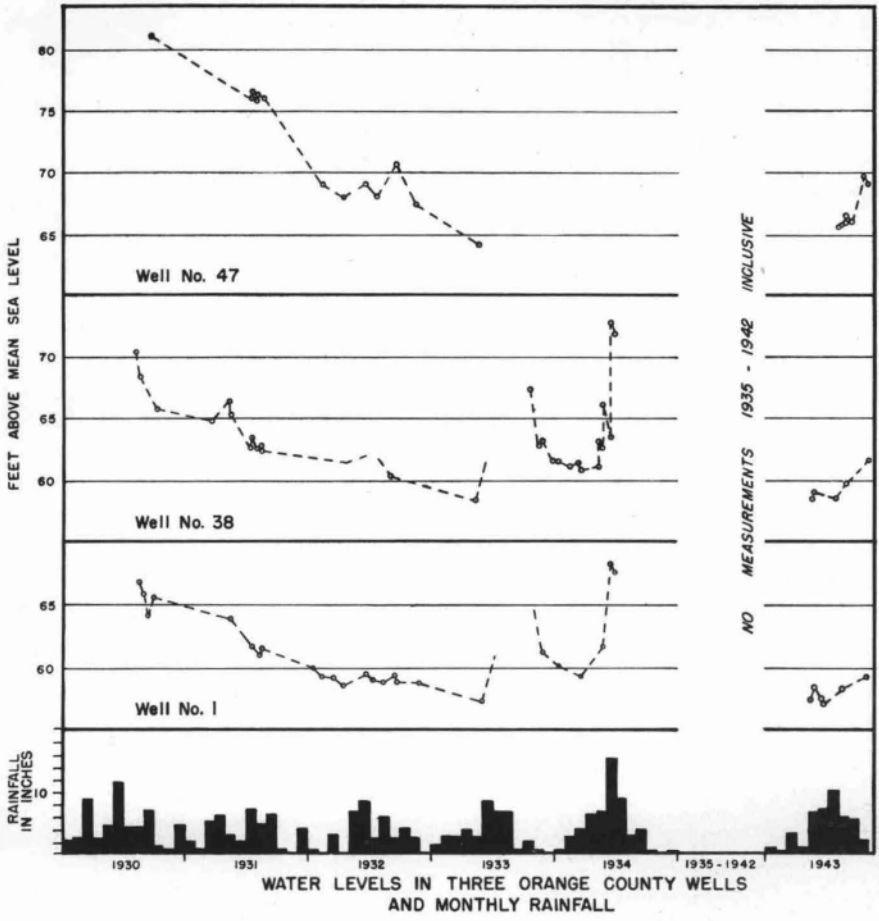
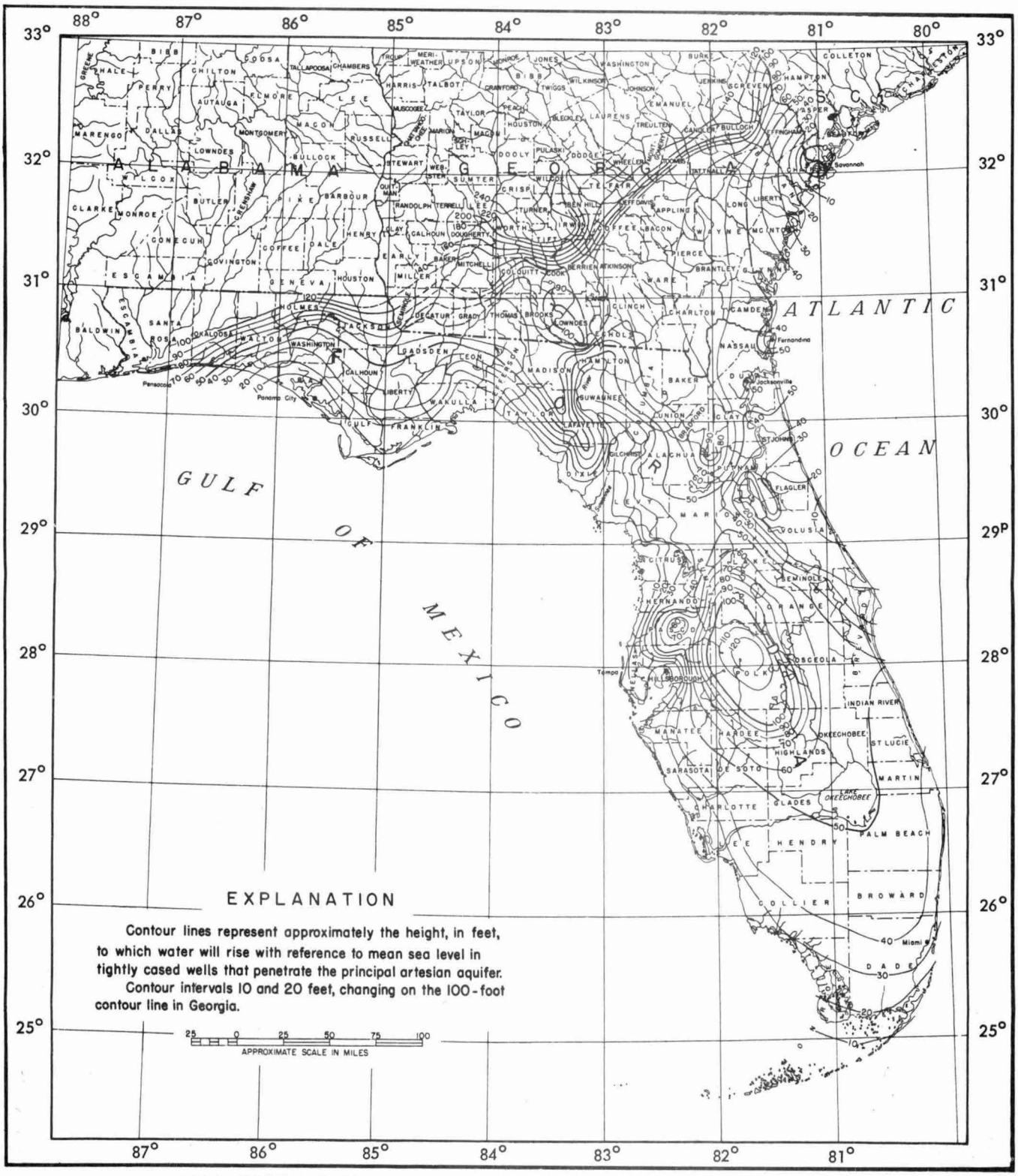

Well 54
Well 94
Well 224
Well 82
Well 81
Well 83
Well 232
Well 49
C
C'
PLEISTOCENE & RECENT
HAWTHORN
OCALA
MIDDLE EOCENE
MEAN SEA LEVEL
150
100
50
0
-50
-100
-150
-200
-250
-300
-350
-400
-450
-500
-550
-600
-650
-700
-750
-800
-850
-900
GEOLOGIC SECTION ALONG LINE C-C' IN FIGURES 7 & 9
Based on well cuttings and logs on file at the Florida Geological Survey
EXPLANATION
Unconsolidated sand and clay
Marl
Shell marl
Phosphatic marl
Conglomeratic limestone
Sandy, phosphatic limestone
White to cream porous limestone
White to cream recrystallized limest
Buff to brown recrystallized limestone
Cased portion of well
Uncased portion of well
0
.5
1
APPROXIMATE HORIZONTAL SCALE IN MILES

FIGURE 3

FIGURE 4

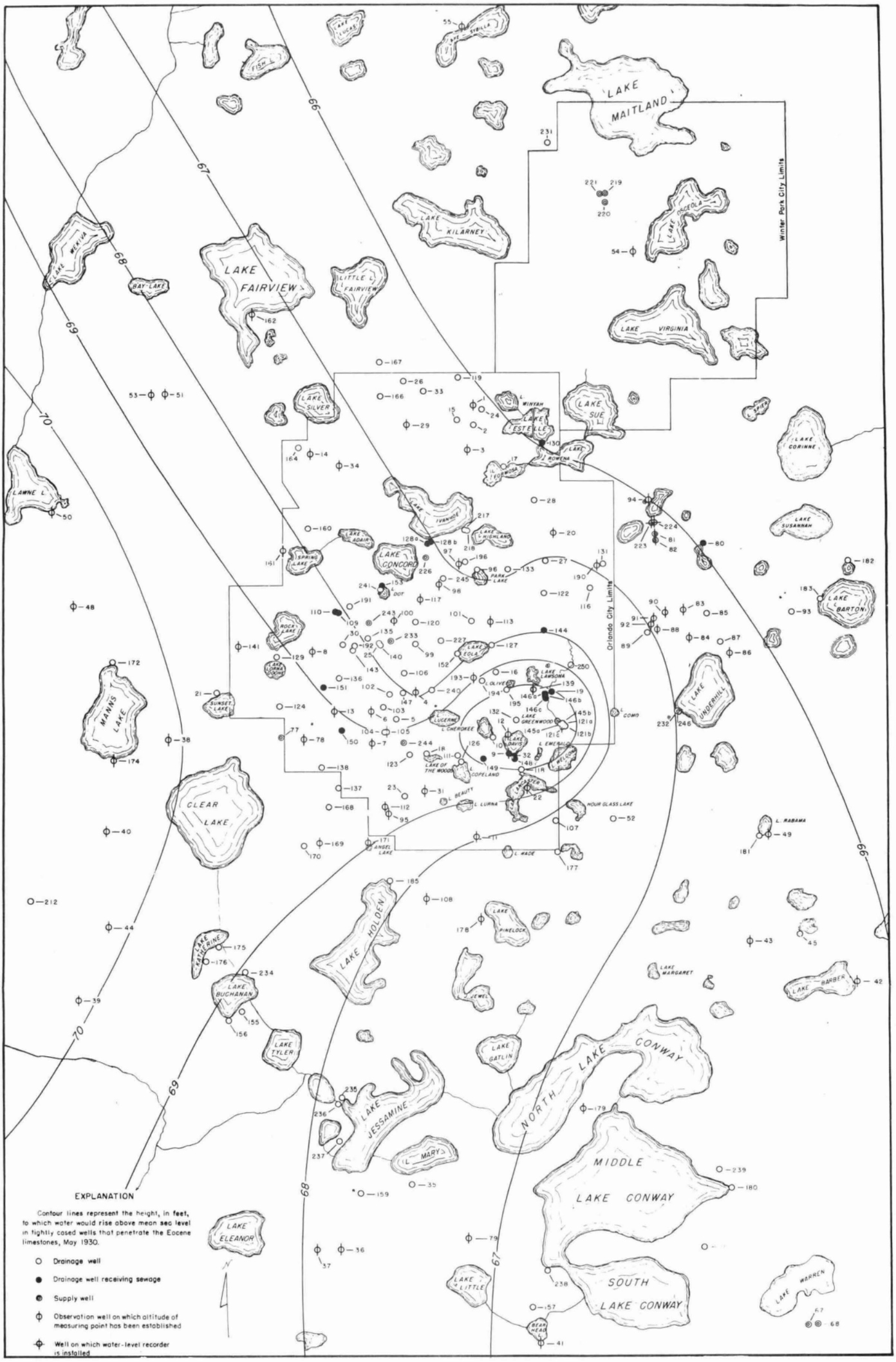


WATER LEVELS IN THREE ORANGE COUNTY WELLS
AND MONTHLY RAINFALL



MAP REPRESENTING THE PIEZOMETRIC SURFACE IN FLORIDA AND PART OF GEORGIA

FIGURE 5



MAP OF ORLANDO AND VICINITY

Representing the Piezometric Surface and Showing Locations of Wells

Contour Interval One Foot

FIGURE 6

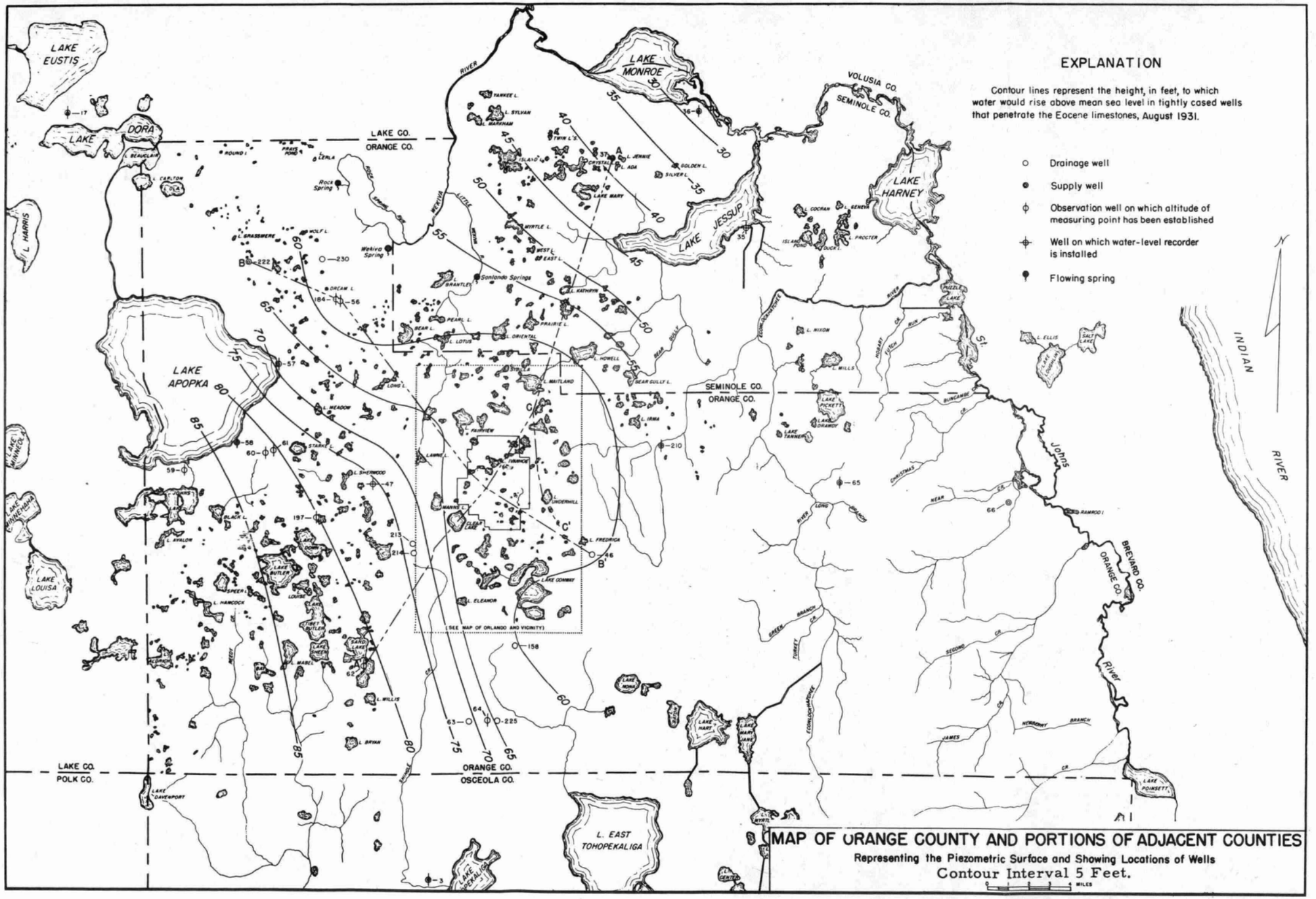
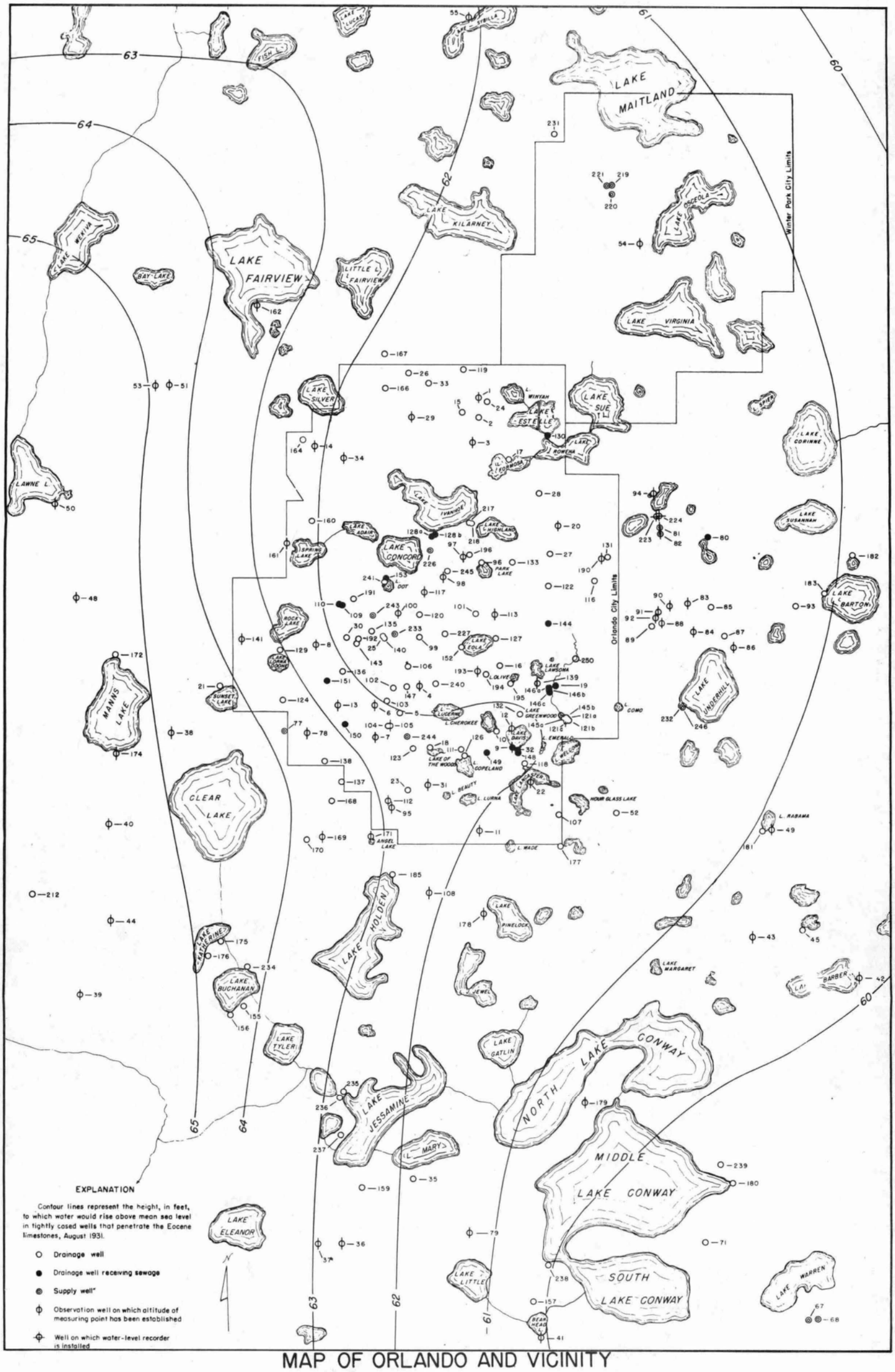

EXPLANATION
Contour lines represent the height, in feet, to which water would rise above mean sea level in tightly cased wells that penetrate the Eocene limestones, August 1931.
Drainage well
Supply well
Observation well on which altitude of measuring point has been established
Well on which water-level recorder is installed
Flowing spring
LAKE EUSTIS
LAKE DORA
LAKE MONROE
LAKE JESSUP
LAKE HARNEY
LAKE APOPKA
LAKE LOUISA
L. HARRIS
L. EAST TOHOPEKALIGA
LAKE CO.
ORANGE CO.
SEMINOLE CO.
VOLUSIA CO.
OSCEOLA CO.
POLK CO.
BREVARD CO.
INDIAN RIVER
(SEE MAP OF ORLANDO AND VICINITY)
MAP OF ORANGE COUNTY AND PORTIONS OF ADJACENT COUNTIES
Representing the Piezometric Surface and Showing Locations of Wells
Contour Interval 5 Feet.
MILES

FIGURE 7

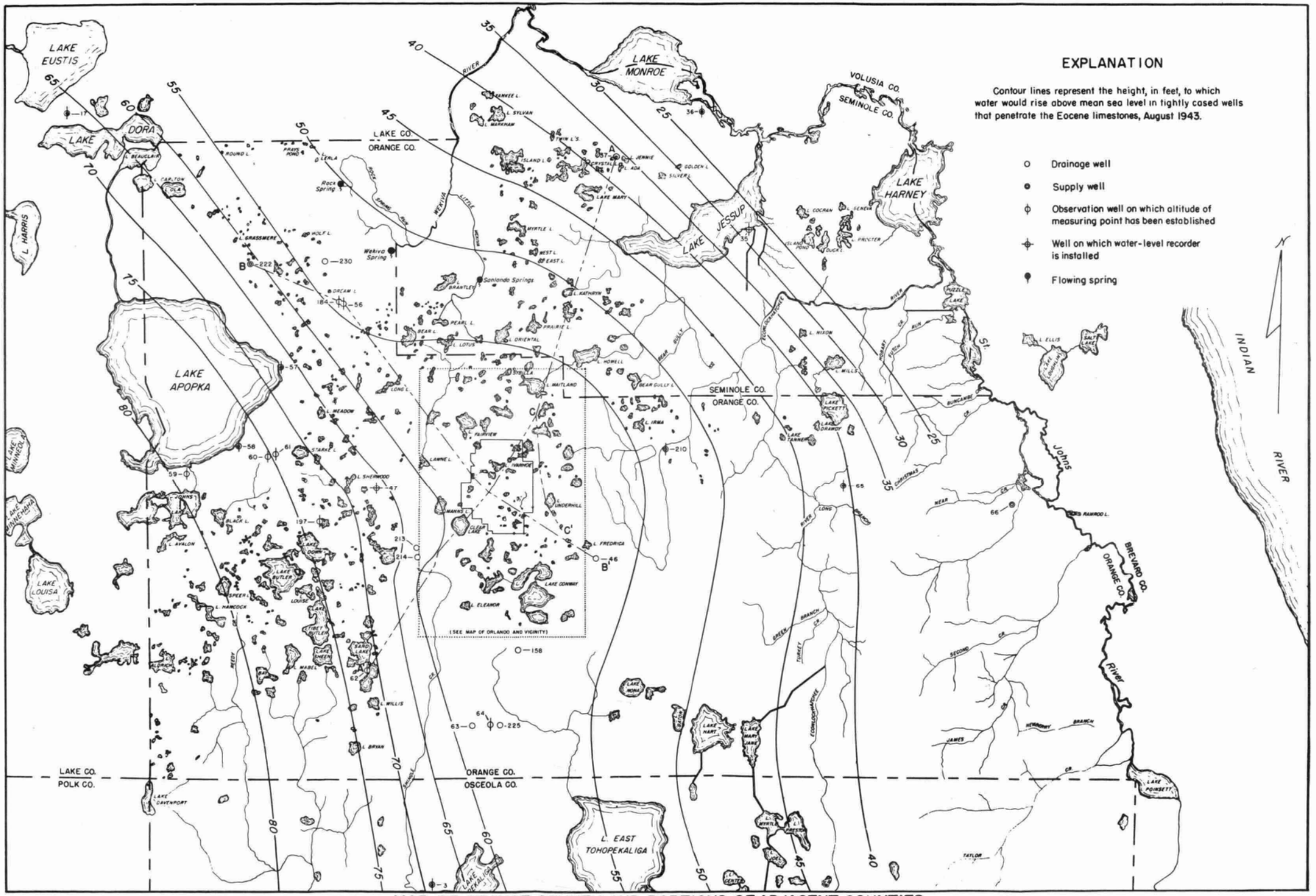


MAP OF ORLANDO AND VICINITY

Representing the Piezometric Surface and Showing Locations of Wells

Contour Interval One Foot

FIGURE 8

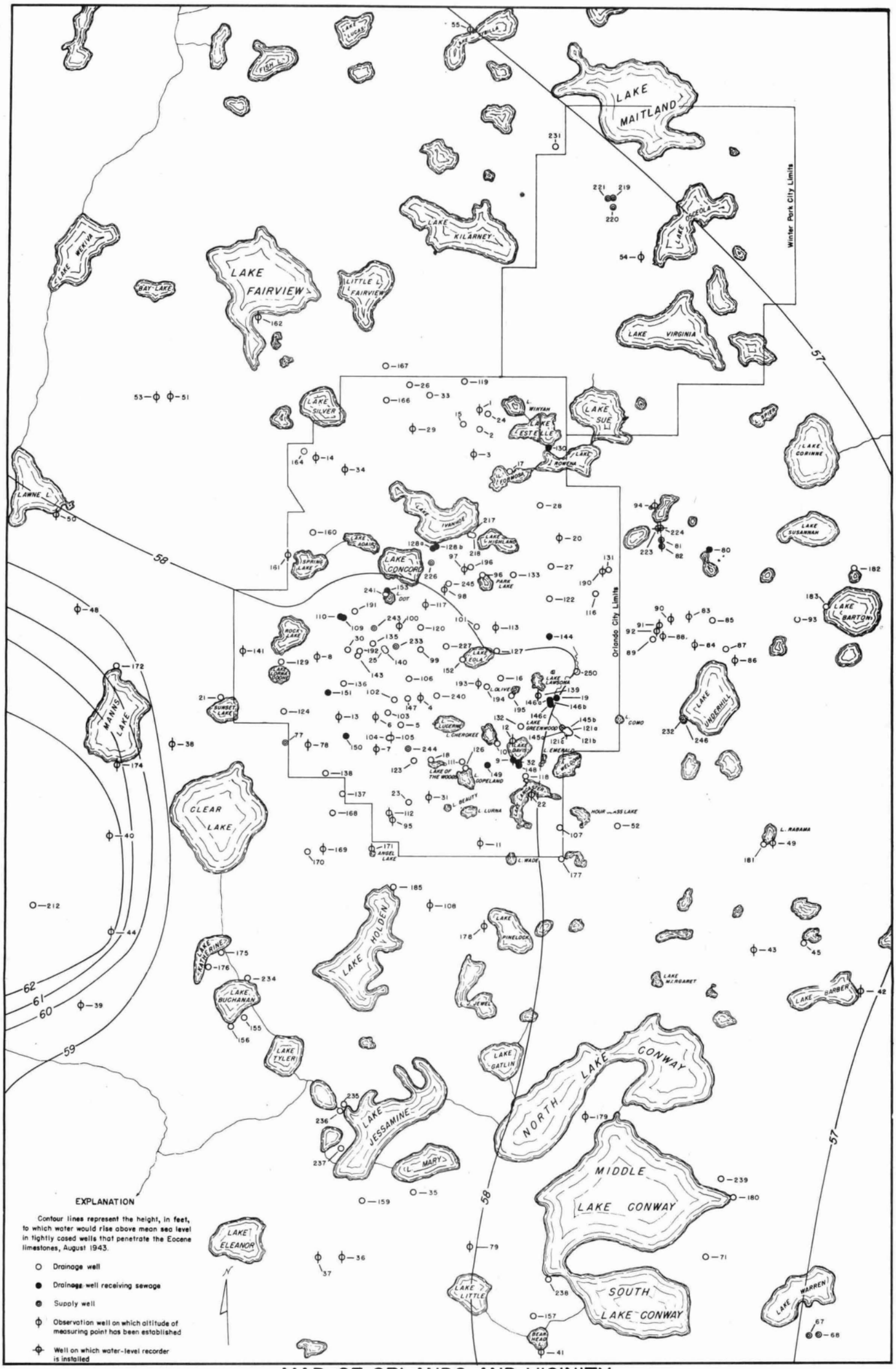


MAP OF ORANGE COUNTY AND PORTIONS OF ADJACENT COUNTIES

Representing the Piezometric Surface and Showing Locations of Wells

Contour Interval 5 Feet.

FIGURE 9

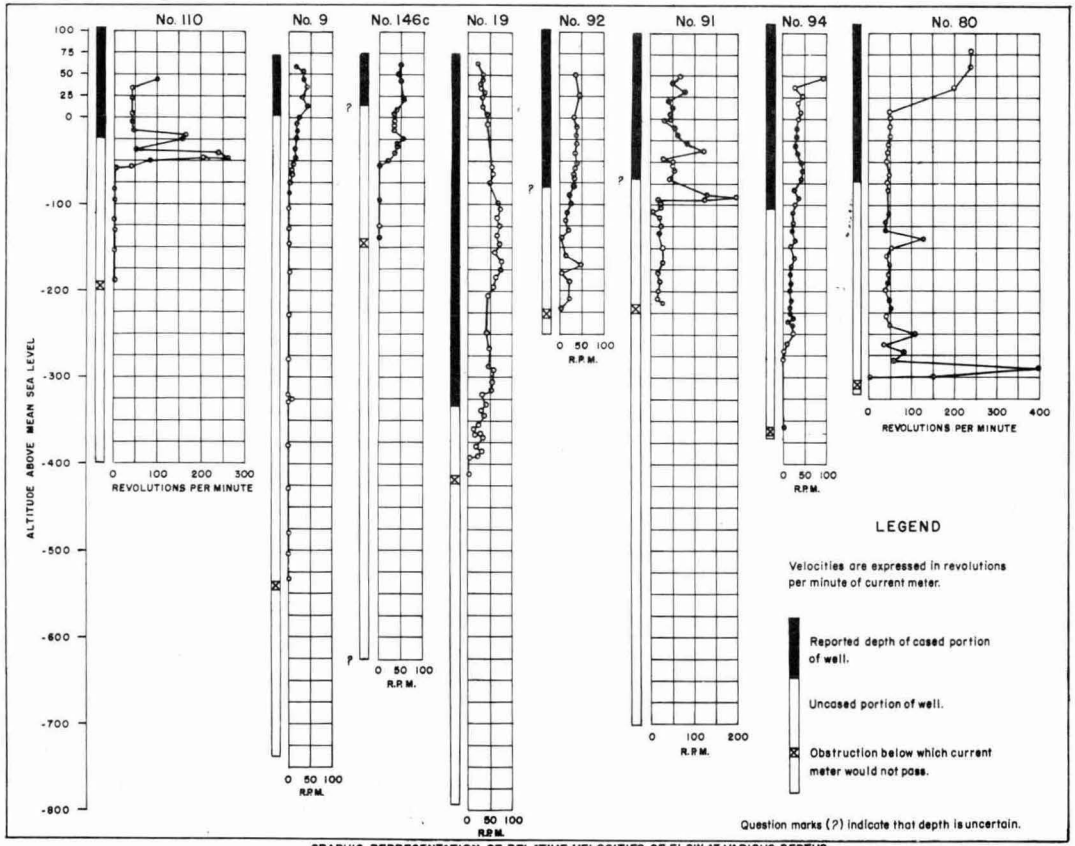


MAP OF ORLANDO AND VICINITY

Representing the Piezometric Surface and Showing Locations of Wells

Contour Interval One Foot

FIGURE 10



GRAPHIC REPRESENTATION OF RELATIVE VELOCITIES OF FLOW AT VARIOUS DEPTHS IN FIVE SANITARY AND THREE DRAINAGE WELLS.

FIGURE 11