GEOLOGICAL SURVEY CIRCULAR 20

January, 1949

PROGRESS REPORT ON THE GEOLOGY AND GROUND-WATER HYDROLOGY OF THE LOWER PLATTE RIVER VALLEY, NEBRASKA

By

Herbert A. Waite and others

WITH A SECTION ON THE CHEMICAL QUALITY OF THE GROUND WATER

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COMPILED AS PART OF PROGRAM OF INTERIOR DEPARTMENT
FOR DEVELOPMENT OF MISSOURI RIVER BASIN.

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ABSTRACT

The occurrence of abundant ground-water supplies in the lower Platte River Valley has made possible the present agricultural and industrial economy of the area. Likewise, the future development of the area is dependent on the wise use of this important resource. The current investigation, on which this report is based, is a necessary step in the planning for the greatest ultimate utilization of the water resources in the lower Platte River Valley.

The area covered by this study is the floor of the lower Platte River Valley between North Platte and Fremont and embraces about 2,500 square miles. The entire valley floor is underlain by unconsolidated Pleistocene sediments which consist of clay, silt, sand and gravel and range in thickness from less than 20 feet to nearly 200 feet. Westward from Cozad these sediments were deposited in a valley entrenched in bedrock, but east of Cozad they are continuous with similar deposits which underlie the adjacent uplands. Bedrock formations of Tertiary age are in contact with the basal Pleistocene sediments from the west end of the area to about Central City. From Central City eastward, formations of Cretaceous age immediately underlie the Pleistocene deposits.

The Pleistocene sediments and underlying pervious formations are water saturated below depths which range from less than 1 foot to about 90 feet below the surface. In general, the configuration of the water table is similar to the topography of the land surface, but the relief on the water table is considerably less by comparison. Movement of ground water is either toward the river or parallel to it. Based on present information, movement of ground water out of the valley is not indicated but additional water-level control is needed south of the valley between Grand Island and Columbus to determine the possibility of ground-water loss in this stretch of the valley.

Periodic observations of water-table fluctuations have constituted an important phase of ground-water studies in the lower Platte River Valley. Examination of water-level data collected by the Geological Survey in cooperation with the Conservation and Survey Division of the University of Nebraska indicates that water levels throughout most of the valley between Gothenburg and Grand Island declined during the 9-year

period, December 1930 to December 1939. The maximum net declines observed during this period were a little greater than 4 feet. During the period December 1939 to December 1946, water levels recovered throughout much of the same area; in local areas on the south side of the Platte River between North Platte and Overton water levels rose in excess of 10 feet as a result of seepage losses from canals and irrigated lands. However, north of Wood River in western Hall County water levels continued to decline to the extent that in at least 3 observation wells water levels in December 1946 were more than 5 feet lower than in December 1930.

Water levels were measured monthly in 1946 and bimonthly in 1947 in observation wells located throughout the area covered by this report. During this period water levels fluctuated through a range of about 3 feet, the lowest levels being reached in September 1946 and the highest levels being reached in July 1947. Average fluctuations between successive measurements were a little less than 0.4 foot. The amount of ground-water discharge in the summer months of 1947 was approximately double that of the previous summer. However, replenishment to ground-water storage during the fall of 1946 and the spring of 1947 was sufficiently great that the amount of water in storage in the valley as a whole at the end of the 2-year period was essentially equal to the amount in storage at the beginning of the period. At the end of 1947 the Dawson and Buffalo County areas showed gains to storage whereas the remainder of the valley suffered very slight losses during the same 2 years.

The quantity of ground water that a water-bearing material will yield is dependent upon the hydrologic properties of the material. Two hydrologic properties of greatest importance are permeability and specific yield. During the course of the present investigation 5 pumping tests were conducted to determine the coefficients of permeability and storage of the Pleistocene deposits. The values of the former range from 955 to 4,925 and the latter from 0.007 to 0.236 after 24 hours of pumping.

The mineral character of the ground water has been determined from analyses of samples, of which 15 represented municipal supplies and 3 were irrigation waters. Ground waters analyzed for this report contained variable amounts of dissolved solids ranging from 240 to 1,060 parts per million, with hardness values above limits considered desirable for public supplies. The increased concentration of dissolved solids for ground waters in the western part of the valley as a result of return flow conditions, is noted. Ground waters in the valley are discussed as to suitability for municipal and irrigation uses, and analyses of samples do not reveal any serious condition that would adversely affect the use of these waters for the purposes intended. As irrigation increases, periodic chemical analyses of ground waters

in this area will be required to evaluate the effects of the re-use of drainage waters and to provide information for salinity control.

Ground-water supplies are drawn upon extensively for irrigation purposes, for municipal supplies, and for rural, domestic and stock supplies. Nearly 4,000 irrigation wells are known to exist in the area, the greatest concentrations of these being in Dawson, Buffalo, and Hall Counties.

INTRODUCTION

Location and Extent of the Area

The area considered in this report is the floor of the Platte River Valley in Nebraska from the range line 2 miles west of North Platte in Lincoln County, to the range line 1 mile east of Fremont in Dodge County. It includes also the lower part of the Loup River Valley up to the range line passing through the town of Monroe, Platte County. (See fig. 1.) The entire area aggregates approximately 2,500 square miles and comprises parts of the following 19 counties: Adams, Buffalo, Butler, Colfax, Custer, Dawson, Dodge, Gosper, Hall, Hamilton, Howard, Kearney, Lincoln, Merrick, Nance, Phelps, Platte, Polk, and Saunders.

Previous Investigations

Earlier reports that have been drawn upon to some extent in this report for discussion of the Platte River Valley area and its hydrologic features are listed below:

Condra, G. E., The conservation of Nebraska's water resources: Nebraska Univ., Conservation Dept. Bull. 3, 19 pp., 1930.

Condra, G. E., Schramm, E. F., and Lugn, A. L., Deep wells of Nebraska: Nebraska Geol. Survey, 2d ser., Bull. 4, 288 pp., 1931.

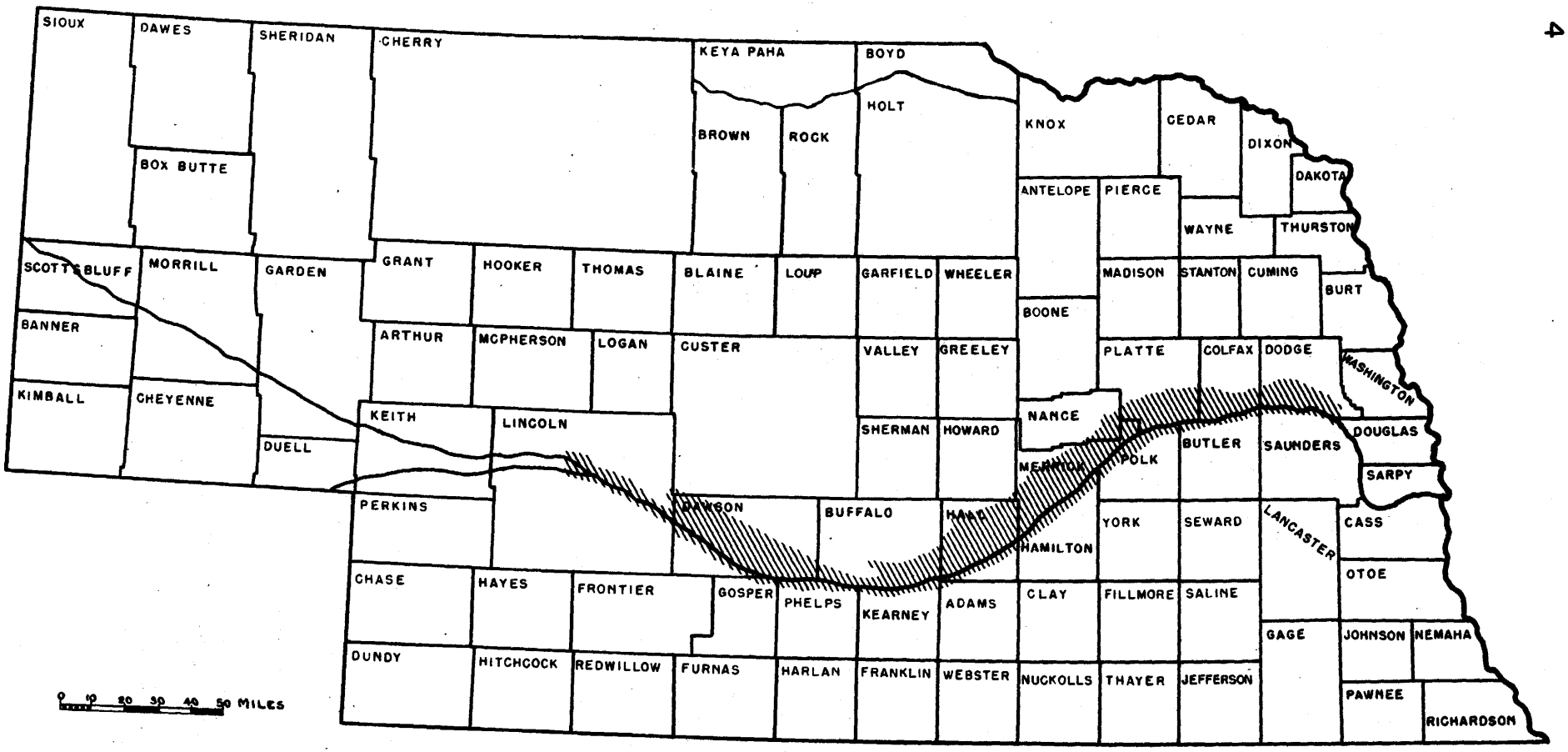

FIGURE 1.- MAP OF NEBRASKA SHOWING AREA COVERED BY THIS REPORT

Condra, G. E., The relation of drought to water use in Nebraska: Nebraska Univ., Conservation Dept. Bull. 6, 24 pp., 1934.

Condra, G. E., and Reed, E. C., Water-bearing formations of Nebraska: Nebraska Geol. Survey Paper 10, 24 pp., 3 pls., 1936.

Condra, G. E., and Reed, E. C., The geological section of Nebraska: Nebraska Geol. Survey Bull. 14, 82 pp., 1 pl., 1943.

Condra, G. E., Reed, E. C., and Gordon, E. D., Correlation of the Pleistocene deposits of Nebraska: Nebraska Geol. Survey Bull. 15, 73 pp., 15 pls., 1947.

Darton, N. H., Underground waters of a portion of southeastern Nebraska: U. S. Geol. Survey Water-Supply Paper 12, 56 pp., 1898.

Lugn, A. L., The Pleistocene geology of Nebraska: Nebraska Geol. Survey, 2d ser., Bull. 10, 223 pp., 4 pls., 1935.

Lugn, A. L., and Wenzel, L. K., Geology and ground-water resources of south-central Nebraska: U. S. Geol. Survey Water-Supply Paper 779, 242 pp., 16 pls., 1938.

Meinzer, O. E., The occurrence of ground water in the United States, with a discussion of principles: U. S. Geol. Survey Water-Supply Paper 489, 321 pp., 31 pls., 1923.

Meinzer, O. E., Outline of ground-water hydrology, with definitions: U. S. Geol. Survey Water-Supply Paper 494, 71 pp., 1923.

Meinzer, O. E., Outline of methods for estimating ground-water supplies: U. S. Geol. Survey Water-Supply Paper 638-C, pp. 99-144, 1932.

Wenzel, L. K., The Thiem method for determining permeability of water-bearing materials: U. S. Geol. Survey Water-Supply Paper 679-A, pp. 1-57, pls. 1-6, 1937.

Wenzel, L. K., Local overdevelopment of ground-water supplies, with special reference to conditions at Grand Island, Nebr.: U. S. Geol. Survey Water-Supply Paper 836-E, pp. 233-281, pls. 16-21, 1940.

Wenzel, L. K., Methods for determining permeability of water-bearing materials: U. S. Geol. Survey Water-Supply Paper 887, 192 pp., 6 pl., 1942.

Present Investigation

Although geologic and hydrologic studies in the Platte River Valley have been more or less continuously in progress for the past 17 years, the present studies represent a much-expanded program that was initiated in 1945 by the Ground Water Division, Geological Survey, in cooperation with the Bureau of Reclamation, both of the United States Department of the Interior, with the continued cooperation of the Conservation and Survey Division of the University of Nebraska. The expanded studies in Nebraska are part of an extensive program of ground-water investigations being carried out under the Missouri River Basin Development Program.

The principal objective of the studies upon which this report is based is the quantitative evaluation of ground-water recharge, discharge, and storage. It includes determinations of the depth to ground water below the land surface; determination of the character, thickness, and lateral extent of the water-bearing materials and evaluation of their water-yielding properties; determination of the direction and quantity of movement of the ground water; collection of records of fluctuation of water level in wells; and records of the quality of the water.

This report constitutes a compilation of the results of these current studies to date. Discussions of the geography, geology, and water resources of the Platte River Valley have appeared in an earlier report.[1]

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1 Lugn, A. L., and Wenzel, L. K., Geology and ground-water resources of south-central Nebraska; with special reference to the Platte River Valley between Chapman and Gothenburg: U. S. Geol. Survey Water-Supply Paper 779, 242 pp., 1938.

This report is based principally on field work that has been continuously in progress since October 1945. The ground-water studies have included the following:

(1) Periodic measurements of the depth to water in about 250 observation wells in the lower Platte River Valley. Of this total number, 54 are observation wells $1\frac{1}{4}$ inches in diameter; 2 are observation wells 8 inches in diameter and equipped with automatic water-stage recorders; a third is an abandoned irrigation well equipped with an automatic water-stage recorder. The $1\frac{1}{2}$-inch and 8-inch observation wells were installed by Geological Survey personnel.

(2) A field inventory of other existing wells (additional to the observation wells) selected as suitable control points necessary for the construction of maps showing the depth to water and the configuration of the water table. Approximately 250 wells in the area were included in this inventory, and in most of them the total depth and the depth to water level below land surface were measured with a steel tape. The records of the observation wells noted in (1) and of the wells that were visited in the process of this inventory are all included in the table of well records.

(3) An inventory of the public-supply wells of the principal towns in the valley between North Platte and Fremont. The records of these public-supply wells are given in the table of municipal wells.

(4) Hand-auger test holes bored on north-south profile sections across the valley, the spacing between profiles ranging from 10 to 16 miles. The purpose of the augering program was to obtain samples of

water-bearing materials in the zone of water-table fluctuation (arbitrarily considered to extend from a point 3 feet above the water table at the time the holes were bored to a point 3 feet below). Laboratory tests on the physical properties of the water-bearing materials are being conducted to determine the specific yield of the samples.

(5) Deep test holes drilled at strategic points in the Platte River Valley with a portable hydraulic rotary drilling rig owned by the Conservation and Survey Division of the University of Nebraska. The drilling equipment was made available for the Missouri River Basin studies in Nebraska by Dr. G. E. Condra and was operated by Ellis Gordon, geologist, and by Earl Duncan and James Nelson.

(6) Determination of altitude of measuring point at the site of all observation and inventory well test holes and of stream surface at strategic places by a level party using a Dumpy level. These altitudes served as control for the construction of the water-table contours in the valley.

(7) Determination of permeability and storage coefficients of water-bearing materials by means of Thiem pumping tests conducted on existing irrigation wells. In this connection, the small Failing Model 30 hydraulic rotary drilling rig, cooperatively owned by the Conservation and Survey Division of the University of Nebraska and the Federal Geological Survey and operated by a Federal drilling crew, was used to install temporary observation wells and to drill stratigraphic test holes at each of the pumping-test sites.

(8) Collection of ground-water samples from 18 representative wells. These samples were analyzed in the Lincoln laboratory of the Quality of Water Division of the Geological Survey.

(9) Computation of changes in ground-water storage in the lower Platte River Valley, based on water-table fluctuations.

(10) Preparation of hydrographs showing the changes in water level in 46 observation wells in the lower Platte River Valley during their respective periods of record.

(11) Construction of maps based on available water-level records to show changes in water level for periods of different length.

(12) Construction of a map of the lower Platte River Valley from data collected during the investigation showing contours on the water table.

(13) Construction of a map showing the depth to the water table below land surface, based on the measured depths to water in all the wells that were visited.

(14) Compilation of a base map of the lower Platte River Valley showing the locations of all existing irrigation wells. The well locations are based in part on data compiled prior to the present investigation and in part on field sheets of the Grand Island office of the Bureau of Reclamation.

Well-numbering System

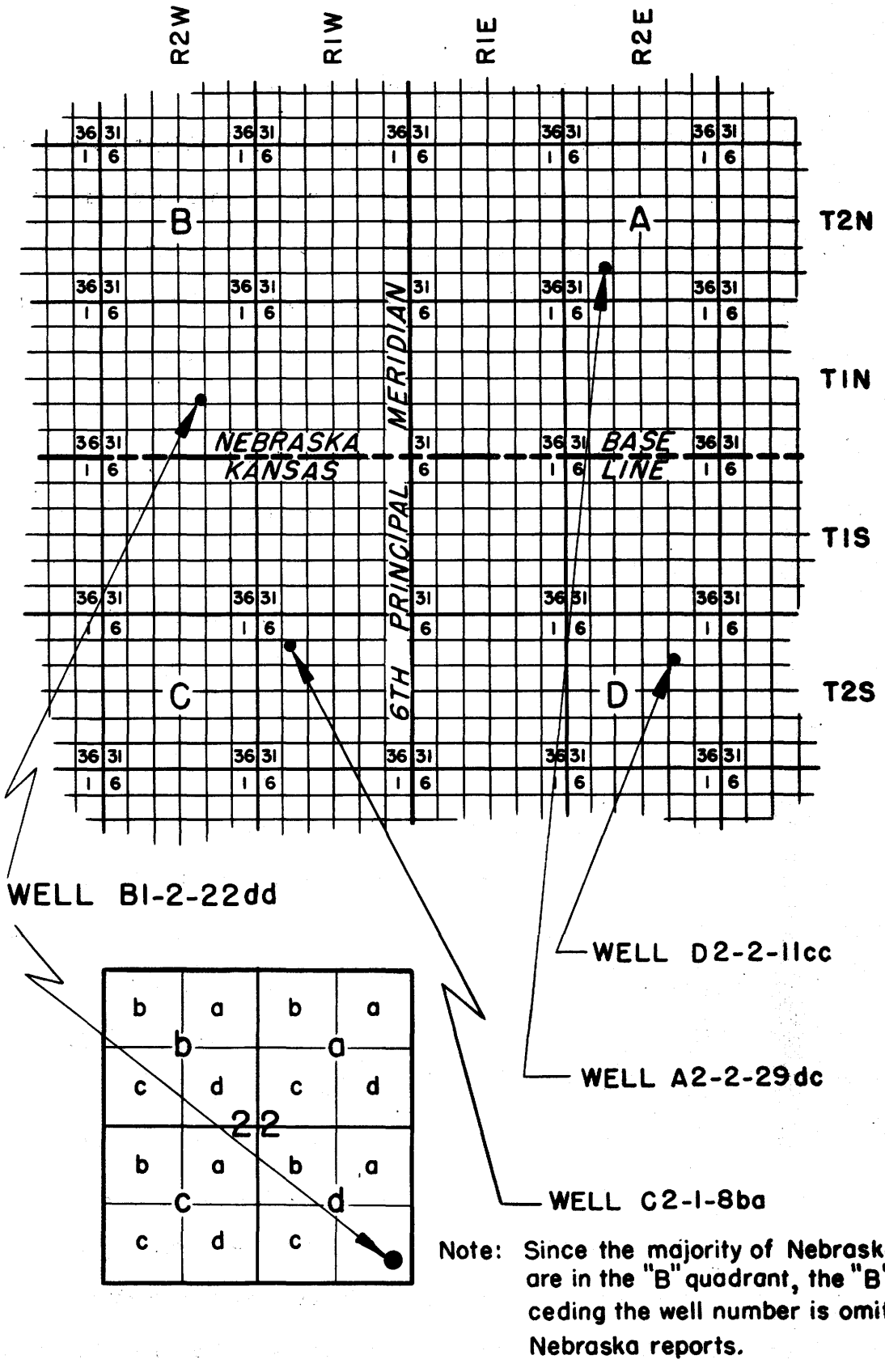
The following well-numbering system was adopted in Nebraska at the beginning of Missouri River Basin ground-water studies and is used throughout this report for all wells except municipal wells.

The first numeral in the well-location number indicates the township, the second the range, and the third the section. The lower-case letters that follow the section number indicate the position of the well within the section, the first letter indicating the quarter section and the second letter the quarter-quarter section. The letters a, b, c, and d are applied in counterclockwise direction, beginning with a in the northeast quadrant. The last numeral indicates the number of the well within the tract of land indicated by the last letter; but if only one well is inventoried within that tract, no number is shown.

Wells east of the 6th principal meridian, which passes through Columbus in Platte County, are differentiated by the capital letter A preceding the well number. These wells are in Butler, Colfax, Dodge, and Saunders Counties and in the eastern part of Platte County. (See fig. 2.)

Acknowledgments

The investigation in the lower Platte River Valley was carried on under the general supervision of the late O. E. Meinzer, former Chief of the Division of Ground Water of the Federal Geological Survey until his retirement on December 1, 1946. Since that date the work has been



Note: Since the majority of Nebraska wells are in the "B" quadrant, the "B" preceding the well number is omitted in Nebraska reports.

Figure 2.– Sketch showing application of General Land Office system of land subdivision to well-numbering system

under the general supervision of A. N. Sayre. The investigation was under the direct supervision of George H. Taylor, Regional Engineer, Ground Water, in charge of ground-water investigations in the Missouri River Basin.

Dr. G. E. Condra, State Geologist and director of the Conservation and Survey Division of the University of Nebraska, and E. C. Reed, Assistant State Geologist, reviewed the manuscript and gave many helpful suggestions, especially relating to the geology of the area, and made available many unpublished data and geologic sections that have been included in the present report. Ellis Gordon, geologist of the Conservation and Survey Division, was in charge of the drilling of test holes at several locations to ascertain the thickness of the water-bearing deposits.

Special acknowledgment is due the following personnel of the Lincoln office of the Division of Ground Water for their active participation in the field work and later in the preparation of the report: Ray Bentall, W. Kenneth Bach, Charles F. Keech, Howard F. Haworth, Graham D. Jones, Raymond L. Schreurs, Ferd G. Schnittker, James W. Nelson, Earl A. Duncan, Mervin F. Sunyoke, Raymond L. Stribic, Fred E. Busch, Otto E. Toppenberg, and W. M. Bollenbach, Jr. The maps showing changes in storage, together with the accompanying computations and discussion, as well as many other parts of the present report, were prepared by Mr. Bentall. Mr. Bach prepared the discussion of permeability of the water-bearing formations, based on pumping-test data obtained in the field, and the section on municipal supplies. The water-table contour map and the depth-to-water map were prepared by Mr. Keech, who, with the assistance of Mr. Bach,

also prepared the geologic sections. All the remaining illustrations were prepared by Mr. Stribic and Mr. Jones.

Mr. Schnittker made practically all the measurements of water levels in observation wells in the Platte Valley, collected water samples for chemical analysis, and participated actively in all phases of the field work. Messrs. Haworth and Sunyoke were in charge of the cooperatively owned Failing Model 30 drilling rig, which was used to put down a stratigraphic test hole and temporary observation wells at each pumping-test site. The same drilling equipment was used to install two observation wells that were later equipped with automatic water-stage recorders. Messrs. Bentall, Sunyoke, Jones, Schnittker, Schreurs, and Bollenbach carried on the field work of boring shallow hand-auger test holes on lines across the valley. A total of 63 observation wells, $1\frac{1}{4}$ inches in diameter, were installed by them. Messrs. Busch, Toppenberg, Keech, and Jones were responsible for all levels run in the valley, with the exception of those in Hall County, which were run by Messrs. Bach and Duncan.

Studies of the chemical quality of ground waters in the lower Platte River Valley were under the general direction of S. K. Love, Chief, Division of Quality of Water, and under the immediate supervision of Paul C. Benedict, District Engineer in charge of Missouri River Basin water quality investigations. The chemical analyses of ground waters collected in the valley were made by J. G. Connor, W. M. Barr, J. F. Bonebright, L. L. Thatcher, and R. P. Orth.

Acknowledgment is also due the many residents of the area who readily gave permission for measurement of their wells and who supplied helpful information regarding them. Special acknowledgment is due all well drillers in the area for their fine cooperation in making available well logs and other useful information.

GEOLOGIC FORMATIONS AND THEIR WATER-BEARING PROPERTIES

The geologic formations exposed at the surface in the lower Platte River Valley and its adjacent uplands are, almost exclusively, unconsolidated sediments of Recent or Pleistocene age. These unconsolidated sediments, collectively referred to as mantle rock, comprise windblown loess and dune sand, underlain by water-laid sand, gravel, and clay deposits. The mantle rock rests on sediments of Tertiary or Cretaceous age, consisting of alternating layers of shale, mudstone, sandstone, and limestone, which are essentially flat-lying or gently warped.

The named geologic formations that constitute the mantle rock and the underlying bedrock in this area are listed in proper sequence in table 1, which gives their range in thickness, lithologic character, and importance as sources of water supply. Further details are given below. The terminology used is that of the Nebraska Geological Survey.

Bedrock Formations

The bedrock formations in contact with the basal unconsolidated Pleistocene sediments that mantle the area under consideration are

progressively younger from east to west. These bedrock formations are of Cretaceous and Tertiary age. In the extreme eastern part of the area, from Fremont to the vicinity of Schuyler, the upper part of the Dakota group (the name is used here in the inclusive sense as defined by the Nebraska Geological Survey[2]), of Cretaceous age, underlies the Pleistocene sediments. Westward from the vicinity of Schuyler to the vicinity of Central City the Graneros shale, Greenhorn limestone, Carlile shale, and Niobrara formation, all of Cretaceous age, are progressively in contact with basal Pleistocene sediments. A younger formation of Cretaceous age, the Pierre shale, underlies much of the valley west of Grand Island but it is overlain by Tertiary formations which in turn are mantled by the Pleistocene deposits. The Ogallala formation, of Pliocene age, immediately underlies the Pleistocene sediments from the vicinity of Central City westward beyond North Platte. It rests on the Niobrara formation from its easternmost limit in the valley to central Hall County, on the Pierre shale as far west as central Dawson County and on the Brule clay of Oligocene age from central Dawson County westward. The Chadron formation, also of Oligocene age, underlies the Brule clay in central and western Lincoln County.

The upper part of the Dakota group, the Omadi sandstone, consists of fine- to medium-grained sandstone with interbedded clay shale and sandy shale. The sandstones are generally massive and cross-bedded, and ironstone zones are common. The Dakota group is 350-420 feet thick in

2 Condra, G. E., and Reed, E. C., The geological section of Nebraska: Nebraska Geol. Survey Bull. 14, 1943.

Table 1.—Generalized section of the geologic formations in the lower Platte River Valley, Nebraska

System	Series	Subdivision (Nebraska Geological Survey)	Thickness (feet)	Character and distribution	Water supply
Quaternary	Recent	Superficial alluvium, loess, dune sand, topsoil	Variable	Reworked sand and gravel in the river channel and its floodplain; isolated wind deposits of clay, silt, and sand; widespread soils.	Significant only as transmitting agent in recharge to ground water.
	Pleistocene	Bignell loess	Variable	Wind deposits of locally derived grayish silt on terraces and upland border of valley.	Significant only as transmitting agent in recharge to ground water.
		Unconformity			
		Peorian loess	30-100	Wind deposits of silty clay (loess), massive, yellow to buff; widespread on upland surfaces and on terraces in the valley; some dune sand.	In upland areas significant only as transmitting agent in recharge to ground water; occurs below water table in parts of valley but does not yield water readily.
		Todd Valley formation	0-35	Fine gray sand and gravel deposited essentially as valley fill; present at places in Platte Valley.	May yield water to wells where present below water table.
		Unconformity			
		Loveland formation	3-50	Stratified silt and clay with laminae of fine sand in valley phase of deposition; massive reddish-brown silt and clay (loess) in upland phase; capped by persistent "old soil."	In upland areas significant only as transmitting agent in recharge to ground water; occurs below water table in parts of valley but does not yield water readily.
		Crete formation	Variable	Channel-fill deposit of sand and gravel modified by locally derived materials; present in places under bottom lands of tributary valleys and in remnants of channel fill along Platte Valley side slopes.	May yield water to wells where present below water table.
		Unconformity			
		Upland formation	0-40 (average 6)	Greenish silty clay of aqueous-eolian deposition, capped by old soil; generally present at high levels in the Platte Valley side slopes.	Not a source of water supply.
		Grand Island formation	0-150 (average 75)	Stream-deposited sand and gravel; upper part underlies lower Platte Valley side slopes, lower part is below Platte Valley floor in most of the area.	Yields abundant supplies of water where present below water table.
		Unconformity			
		Fullerton formation	0-65 (average 25)	Silt and calcareous clay grading locally into fine sand; of fluvial-eolian origin; capped with peat in some places.	Not a source of water supply.
		Holdrege formation	0-150 (average 70)	Stream-deposited sand and gravel; underlies much of Platte Valley.	Yields abundant supplies of water throughout area.
		Unconformity			

Tertiary	Pliocene	Ogallala formation	0-400	Stream-deposited interlaminated gravel, sand, silt, and clay; some beds lime-cemented; underlies Platte Valley floor westward from vicinity of Central City	Yields abundant supplies in Dawson and Lincoln Counties.
		Unconformity			
	Oligocene	Brule clay	0-600	Pinkish massive silty and sandy clays with some channel sandstone; underlies Platte Valley floor westward from central Dawson County.	Generally yields water only where fractured or jointed; not a source of water supply in the Platte Valley.
		Chadron formation	0-100	Greenish to buff silt and clay with some channel sandstone at base; underlies Platte Valley floor westward from vicinity of Brady in Lincoln County.	Generally yields water only where fractured or jointed; not a source of water supply in the Platte Valley.
		Unconformity			
Cretaceous		Pierre shale	0-500	Dark clay shale with some shaly chalk and limestone and thin sandstone; underlies Platte Valley floor west of Grand Island where not removed by post-Cretaceous erosion.	Not a source of water supply.
		Niobrara formation	0-500	Lead-gray and yellow shaly chalk in upper part (Smoky Hill chalk member); massive gray to yellowish-gray limestone in lower part (Fort Hays limestone member); underlies Platte Valley westward from vicinity of Silver Creek.	Not a source of water supply.
		Carlile shale	0-400	Grayish and bluish-gray shale with thin limy layers; underlies Platte Valley floor westward from vicinity of Columbus.	Not a source of water supply.
		Greenhorn limestone	0-30	Interbedded gray limestone and gray shale; underlies Platte Valley floor westward from vicinity of Columbus.	Not a source of water supply.
		Graneros shale	0-500	Dark-gray shale with thin calcareous layers and some sand and sandy shale; underlies Platte Valley floor westward from vicinity of Schuyler.	Not a source of water supply.
		Dakota group (Omadi sandstone)		Massive sandstone with interbedded shale and sandy shale and zones of ironstone; underlies entire area.	A widespread source of water supply but not known to yield water to any wells in Platte Valley; water of variable quality.

eastern and central Nebraska and increases to between 600 and 700 feet in the west-central part of the State.

The Graneros shale consists of dark-gray plastic shale with thin calcareous layers and some sand and sandy shale; it contains carbonaceous material in the basal part. It averages about 65 feet in thickness in eastern Nebraska but thickens westward to more than 500 feet in Dawes County.

The Carlile shale consists mostly of bluish-gray shale with thin chalky layers in the lower part and sandy zones in the upper part. In some places in Nebraska a thin sandstone occurs near the top of the formation, but it is not known to occur within the area under consideration. The Carlile shale is about 150 feet thick in the eastern part of this area, but in the northwestern part of the State it thickens to more than 400 feet.

The Niobrara formation is subdivided into two members. The Fort Hays, or lower member, consists of gray to yellowish-gray massive limestone, and is 20 to 40 feet thick. The overlying Smoky Hill member consists of lead-gray and yellow shaly chalk and is 160 to 460 feet thick.

The Pierre shale consists of black, gray, and brownish clay shale, thin layers of bentonite, indurated shaly chalk, well-defined concretionary zones, and thin sandstones in the upper part. In parts of Dawson and Lincoln Counties it was removed by erosion prior to the deposition of the Tertiary sediments, but where present in the area covered by this report its thickness ranges up to approximately 500 feet.

The Chadron formation is composed of greenish to buff clay and silt. Locally, a channel sandstone is present at its base. The Chadron is 50 to 100 feet thick.

The Brule clay is subdivided into two members. The lower member consists of pink sandy clays and channel sandstone and is about 125 feet thick. The upper member is composed of pinkish, massive silty clays with thin layers of volcanic ash and sand. It ranges in thickness from 250 to 500 feet.

The Ogallala formation, of Pliocene age, is of continental origin, having been laid down by streams, and consists of interbedded hard and soft layers of sandy gravel, sand, silt, and clay. Some layers are cemented by lime, but others are relatively unconsolidated. The Ogallala is progressively finer-textured in an eastward direction. These finer-grained deposits, consisting principally of silt and silty sandstone, have been described as the Seward facies[3] of the Ogallala formation and underlie the Pleistocene deposits from the eastern limit of this facies near Central City as near west as central Buffalo County. The maximum thickness of the Ogallala formation is about 400 feet in the vicinity of North Platte and probably represents the approximate maximum thickness for the area under consideration.

Mantle-rock Formations

Holdrege formation.--The oldest Pleistocene deposits in the area consist of sand and gravel laid down principally in the valleys developed

3 Condra, G. E., Reed, E. C., and Gordon, E. D., op. cit., p. 15.

on the pre-Pleistocene surface. The deposits are of wide-spread occurrence in south-central Nebraska, originally forming a constructional plain interrupted only by the high divides of the ancestral drainage basins. These fluviatile sediments coalesced eastward, where they graded progressively into outwash deposits and till deposited during the Nebraskan stage of glaciation. The fluviatile material consists mostly of erosional products carried in by streams from the higher plains and mountains to the west. These basal Pleistocene deposits, referred to as the Holdrege formation, average 70 feet in thickness but locally have a maximum thickness of as much as 150 feet. The lower part of the Holdrege is continuous with the pre-Nebraskan sand and gravel in the area to the east, and the upper part is correlative with the Nebraskan till, which extends a short distance into the easternmost part of the area under consideration.

Fullerton formation.--Following the retreat of the Nebraskan glacier, the surface of the sand and gravel of the Holdrege formation and of the Nebraskan till were exposed to weathering and erosion with the concurrent development of soil and the local deposition of fine to coarse sediments in eroded areas. These deposits have been named the Fullerton formation. They range in thickness from less than a foot up to 65 feet, but average about 25 feet. The Fullerton formation is coextensive with the underlying Holdrege formation and is likewise discontinuous, owing to erosion both prior to and since the deposition of the formations that overlie it. The Fullerton formation is equivalent in age to silts of the Aftonian stage of eastern Nebraska.

Grand Island formation.--The Grand Island formation, like the Holdrege formation, is composed mainly of alluvial sand and gravel and some glacial outwash, but its upper part is composed principally of fine sand. Deposited during the advance and subsequent retreat of the Kansan glacier, this formation has a maximum thickness of about 150 feet and averages about 75 feet. The Grand Island formation is coextensive with the underlying Pleistocene deposits, but it is more continuous. It is exposed in the bluffs and gullies on the south side of the Platte River Valley from Columbus to Grand Island and from Elm Creek to Shelton. In the latter area it has been the source of sand which has been reworked by the wind into dunes on the south side of the valley. The lower part of the Grand Island formation and the Holdrege and Fullerton formations lie below the floor of the Platte River Valley at Grand Island and westward for a considerable distance.

Upland formation.--During the quiescent stage that followed the Kansan glaciation, clay and fine sand were deposited on the surface of the Grand Island formation. These deposits, named the Upland formation, range in thickness from a few feet to 40 feet or more. Although probably continuous at the time of deposition, this formation was subsequently subjected to weathering and eroded to the extent that it was reduced to more or less patchy occurrences before the deposition of the overlying formations.

Crete formation.--Post-Kansan erosion reduced the Grand Island-Upland constructional plain to a deeply and maturely dissected surface.

The Crete formation[4], consisting mostly of sand and gravel modified by materials derived locally from the valley slopes, was then deposited in the channels.

Loveland formation.--The early phase of deposition represented by the Crete formation gave way to widespread deposition of the Loveland formation, which consists of stratified silt and clay with some laminae of very fine sand within the valleys and massive reddish-brown loess mantling the upland surfaces. The deposition of sand and gravel of the Crete formation and of loess and silt of the Loveland formation with subsequent soil formation took place during the period of the advance and retreat of the Illinoian glacier.

Todd Valley formation and Peorian loess.--The Loveland constructional plain was subjected to mature dissection, and deposition was again resumed, with aggradation of valleys by the fine gray sand and gravel of the Todd Valley formation. This phase of sedimentation gave way to widespread deposition of the buff to yellowish Peorian loess, which, in some upland areas, ranges in thickness from 30 to 100 feet or more. One fairly thick soil has been recognized on top of the Peorian loess, and other traces of old soils have been recognized in some places. The Todd Valley formation is of Iowan age and the Peorian loess is of Iowan to Mankato age. It was during Peorian time that the Platte River was diverted from its former course through the Todd Valley to its present course; hence, the Platte Valley from a point north of Cedar Bluffs eastward past Fremont is much younger than at most other places.

4 Condra, G. E., Reed, E. C., and Gordon, E. D., Correlation of the Pleistocene deposits in Nebraska: Nebraska Geol. Survey Bull. 15, p. 24, 1947.

Bignell loess.--Soil formation on the surface of the Peorian loess was followed by deposition of the Bignell loess[5] which consists of grayish silt, on terraces and uplands bordering the Platte and other valleys. The thickness of this loess is variable and its age is probably Mankato to Recent.

Recent deposits.--No sharp line divides Recent deposits from those of Pleistocene age. Recent alluvium of the Platte River is restricted to the bottom lands and is limited to a few feet of reworked surface materials. In addition to alluvial deposits, Recent deposits consist of wind-blown loess and of topsoil developed on the valley terraces and upland surfaces.

Water-bearing Properties

Of the formations noted above, only the saturated part of the lower Pleistocene sand and gravel formations, the Ogallala formation of Tertiary age, and the Dakota group of Cretaceous age are sufficiently permeable to yield water freely to wells. In general, the Holdrege formation and the lower part of the Grand Island formation, both of Pleistocene age, are the more important water-bearing formations throughout the valley area. However, in parts of the valley in Dawson and Lincoln Counties the Pleistocene formations are thinner than elsewhere and some wells used for irrigation, public supply, and industrial purposes extend into lower water-bearing formations.

5 Schultz, B., and Stout, T. M., Pleistocene loess deposits of Nebraska: Jour. Sci., May 1945.

The water in the Pleistocene sand and gravel is under water-table conditions except where locally confined by lenses of clay or silty clay. Sustained yields ranging from less than 800 to more than 1,500 gallons a minute are common for properly constructed wells. In much of the area the water table is within 10 to 15 feet of the surface. Seepage from the Platte River and its tributaries, recharge from percolation losses beneath irrigated areas and from canals, and underflow from outside the area account for some of the recharge, but a large part of the recharge is from precipitation within the area. In areas of shallow water table, water levels respond within a relatively short time to prolonged rainfall.

The Ogallala formation is an important source of water in central and western Dawson County and in Lincoln County. Some irrigation, industrial, and municipal wells tap water both in the Pleistocene gravels and in the underlying Ogallala formation, but none are known definitely to obtain water exclusively from the Ogallala formation. The water in the Ogallala formation is probably under slight artesian head, but the differential between the piezometric surface of the confined water and the water table of the alluvium is probably very slight. No instances of artesian flow at the surface are known in the valley. Water derived from the Ogallala in the western part of the area is generally considered to be of slightly better quality than the water in the Pleistocene gravel.

No wells in the valley are known to extend into formations of the Dakota group. In the eastern part of the State, the chemical

character of the water in formations of the Dakota group is extremely variable, ranging from water of good quality to highly mineralized water not suited for use without treatment. It is not known whether there is mixing of water from the upper formations of the Dakota group and water from the overlying Pleistocene gravels in places where the two in direct contact.

FLUCTUATIONS OF THE WATER TABLE

General Considerations

The water table in the lower Platte River Valley is not a stationary surface, but a surface that fluctuates up and down much like the water level in a lake or reservoir. A condition of approximate equilibrium exists between the amount of water that is added annually to ground-water storage and the amount that is discharged annually by both artificial and natural means. In general, the water table rises when the amount of recharge exceeds the amount of discharge and declines when the discharge is greater than the recharge. Thus, changes in the water levels in wells indicate to what extent the ground-water reservoir is being depleted or replenished.

The principal factors controlling the rise of the water table in the valley are the amount of rainfall that penetrates into the ground; the amount of water added to the underground reservoir by recharge from the Platte River during periods of increased stream flow; the amount of water that is added to the zone of saturation by downward percolation

of water beneath valley lands irrigated with well water or with water diverted from the Platte River, and by seepage from canals, laterals, field ditches, and reservoirs; and the amount of water entering the valley as underflow from the west and perhaps from the northwest.

The principal factors controlling the decline of the water table are the amount of water lost by underflow to the Platte River and to several smaller tributary streams; the amount of water pumped from wells (some of which is returned by seepage); the amount of water lost through evaporation and transpiration in areas of shallow water table; and the amount of water leaving the valley as underflow at the eastern end of the area near Fremont and possibly from other parts of the valley. For a detailed discussion of the factors controlling fluctuations of the water table in the Platte Valley, the reader is referred to the report by Lugn and Wenzel[6].

Water-level Measurements

As part of the cooperative study of ground-water resources of south-central Nebraska by the Federal Geological Survey and the Conservation and Survey Division of the University of Nebraska, a water-level observation program was begun in the fall of 1930 in the part of the Platte River Valley between Grand Island and Gothenburg. Water-level measurements were continued at regular intervals on approximately 60

6 Lugn, A. L., and Wenzel, L. K., Geology and ground-water resources of south-central Nebraska: U. S. Geol. Survey Water-Supply Paper 779, pp. 105-123, 1938.

observation wells in that part of the valley during the period from 1930 through the summer of 1936, but from that time until the beginning of the present observation program, late in 1945, measurements were made only at infrequent intervals. A state-wide program of water-level measurements in wells was begun in 1934[7], and since that date the observation program has been extended to cover all the area included in the present report. These wells are referred to in table 2 as State-wide observation wells. In addition to the State-wide observation wells in the Platte River Valley, the Central Nebraska Public Power and Irrigation District, the Platte Valley Public Power and Irrigation District, and the Loup River Public Power District have installed observation wells in the vicinity of their respective projects. Many of the wells are situated in the valley, and 38 of them have been incorporated into the present water-level observation program. In order to achieve more nearly uniform coverage in the valley, 74 privately owned wells were added to the observation-well program, and 63 small-diameter wells, equipped with screened drive points, were installed by the Geological Survey in selected localities. The number of wells of each type in each county is shown in table 2.

All observation wells are listed in the table of well records (table 13), where they can be identified by the symbol "O" (Observation) in the column headed "Use of water." The locations of all but nine of the wells currently being measured are shown on plate 1; those

7 Meinzer, O. E., and Wenzel, L. K., Water levels and artesian pressure in observation wells in the United States in 1935: U. S. Geol. Survey Water-Supply Paper 777, pp. 86-88.

Table 2.--Observation wells in the lower Platte River Valley

County	State-wide observation wells incorporated into Platte Valley water-level observation program	Observation wells owned by other agencies	Privately owned wells added to water-level observation program since Oct. 1945	Observation wells installed by U. S. Geological Survey since Dec. 1945	Total number of wells in each county
Adams	--	--	1	--	1
Buffalo	13	--	5	6	24
Butler	--	--	5	2	7
Colfax	--	--	5	4	9
Dawson	35	a 6	21	7	69
Dodge	11	--	4	2	17
Gosper	--	--	1	--	1
Hall	10	--	8	6	24
Hamilton	1	--	2	--	3
Howard	--	--	--	1	1
Kearney	1	--	4	3	8
Lincoln	3	a 18	3	10	34
Merrick	2	--	2	17	21
Phelps	3	a 1	5	--	9
Platte	2	b 13	2	--	17
Polk	--	--	6	4	10
Saunders	--	--	--	1	1
Total for area	81	38	74	63	256

a Central Nebraska Public Power and Irrigation District.
b Loup River Public Power District.

omitted are wells in which water levels were not measured in both March and May 1947, only the locations of wells measured in those months being shown on the map.

Water level measurements made in the years 1931 to 1944 in all observation wells in the Platte River Valley have been published in annual reports of the Geological Survey[8]. Measurements since January 1, 1945 are given in table 11 in which the wells are arranged in numerical order within counties. All measurements given were made by Geological Survey observers unless otherwise stated.

Changes in Water Level since 1930

Hydrographs showing the changes in water levels in 44 selected observation wells in the lower Platte River Valley, Nebraska, which have a long period of record are given in figures 3 and 4. The hydrographs are grouped by counties and numerically within each county. Most of these hydrographs show no significant net changes of water level in the 17-year period from 1930 to 1947, if allowances are made for seasonal fluctuations. The hydrographs for wells 10-11-30bc, 10-12-20dd, 11-11-32cb, and 11-11-36cb in Hall County and well 10-13-24bc in Buffalo County, however, show a persistent decline of the water table during the time when water levels in other parts of the valley were recovering from the low levels reached during the drought period of the 1930's. Two hydrographs, well 9-22-17dd in Dawson County and well 13-30-21bb in Lincoln County, show a significant net rise believed to

8 See U. S. Geol. Survey Water Supply Papers 777 (1935); 817 (1936); 840 (1937); 845 (1938); 886 (1939); 908 (1940); 938 (1941); 946 (1942); 988 (1943); and 1018 (1944).

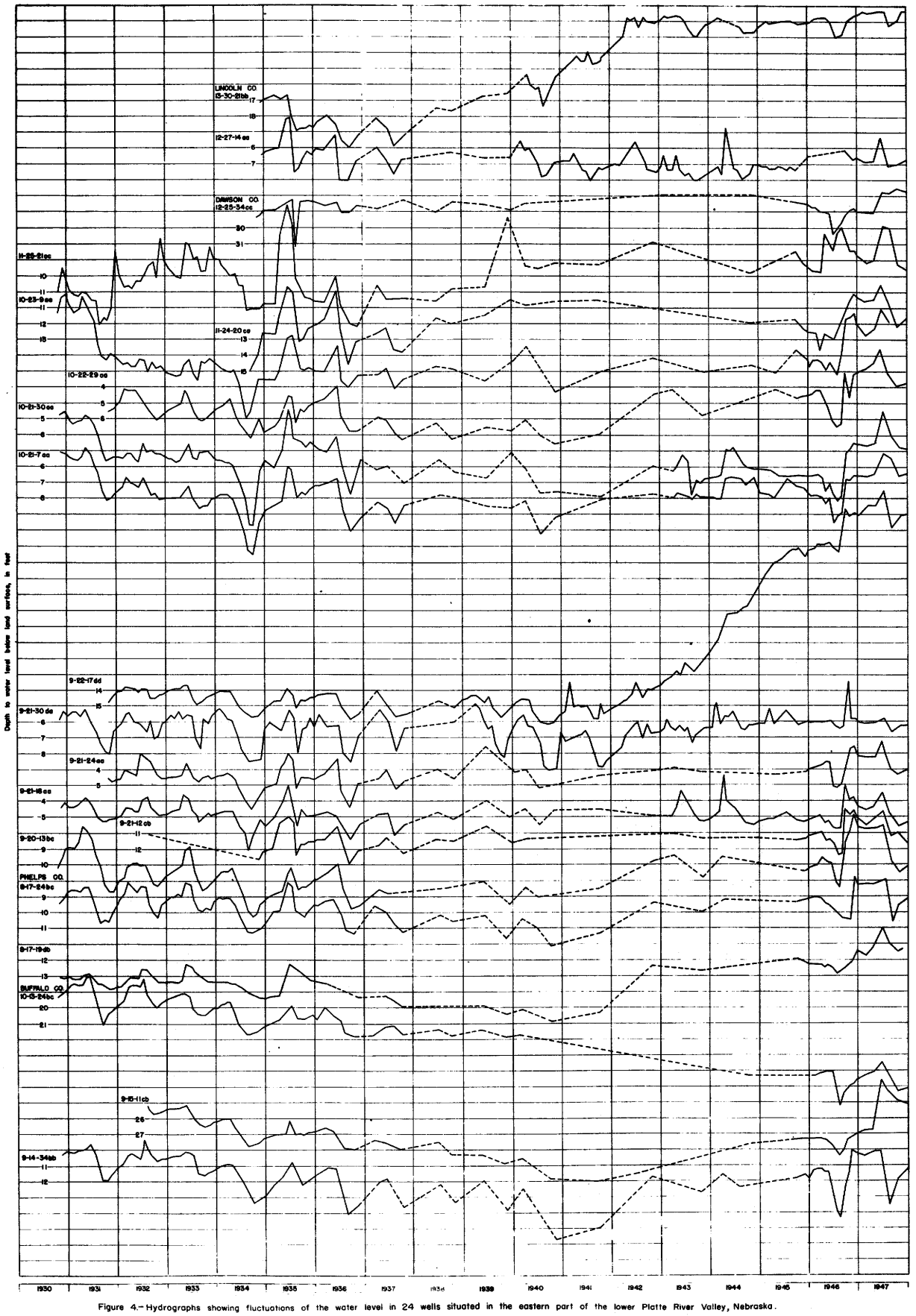


Figure 4.– Hydrographs showing fluctuations of the water level in 24 wells situated in the eastern part of the lower Platte River Valley, Nebraska. The locations of the observation wells for which hydrographs have been plotted are shown on plate 8

NOTE: Figure number and title on this page should be interchanged with those on opposite page.

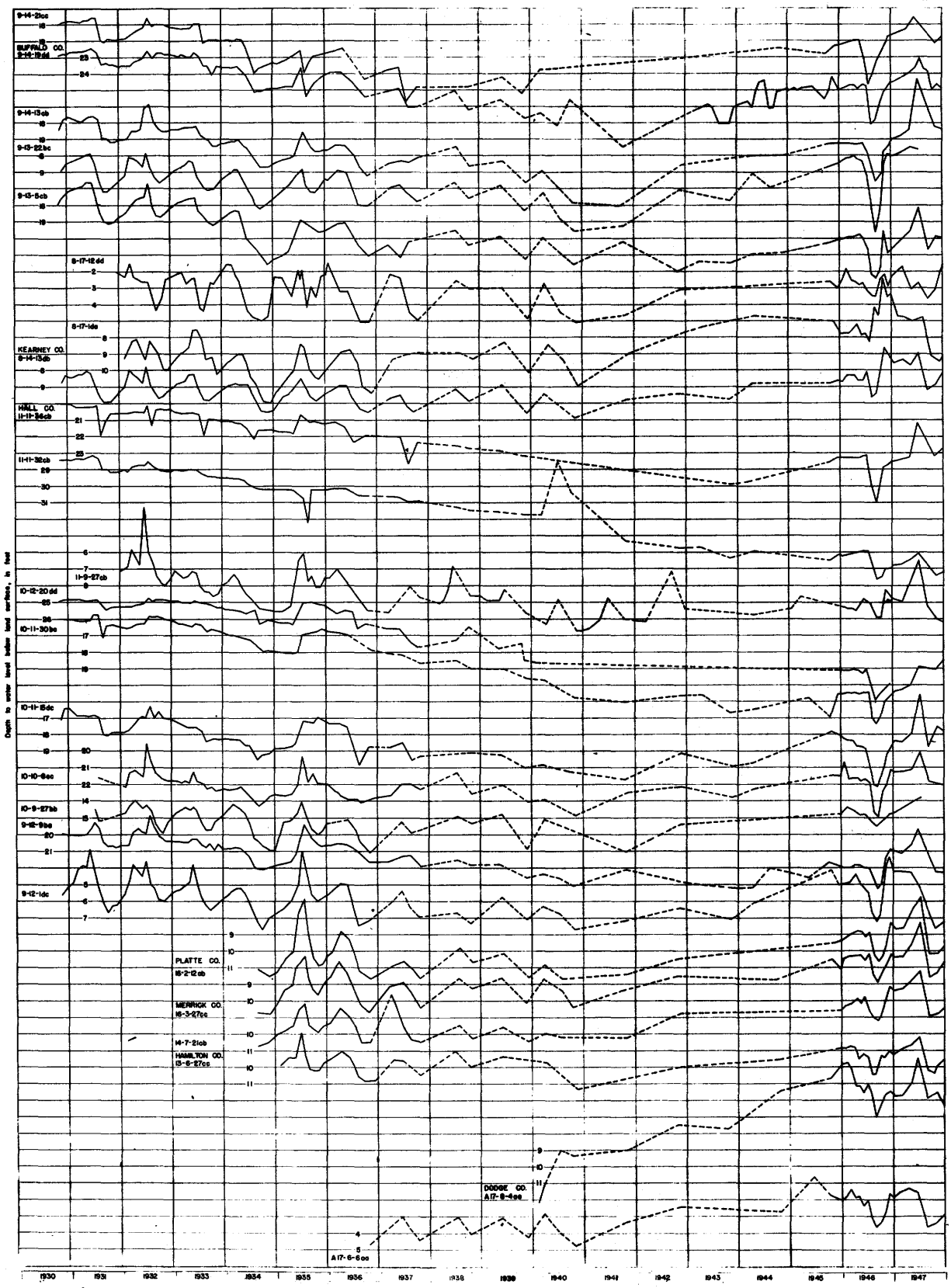
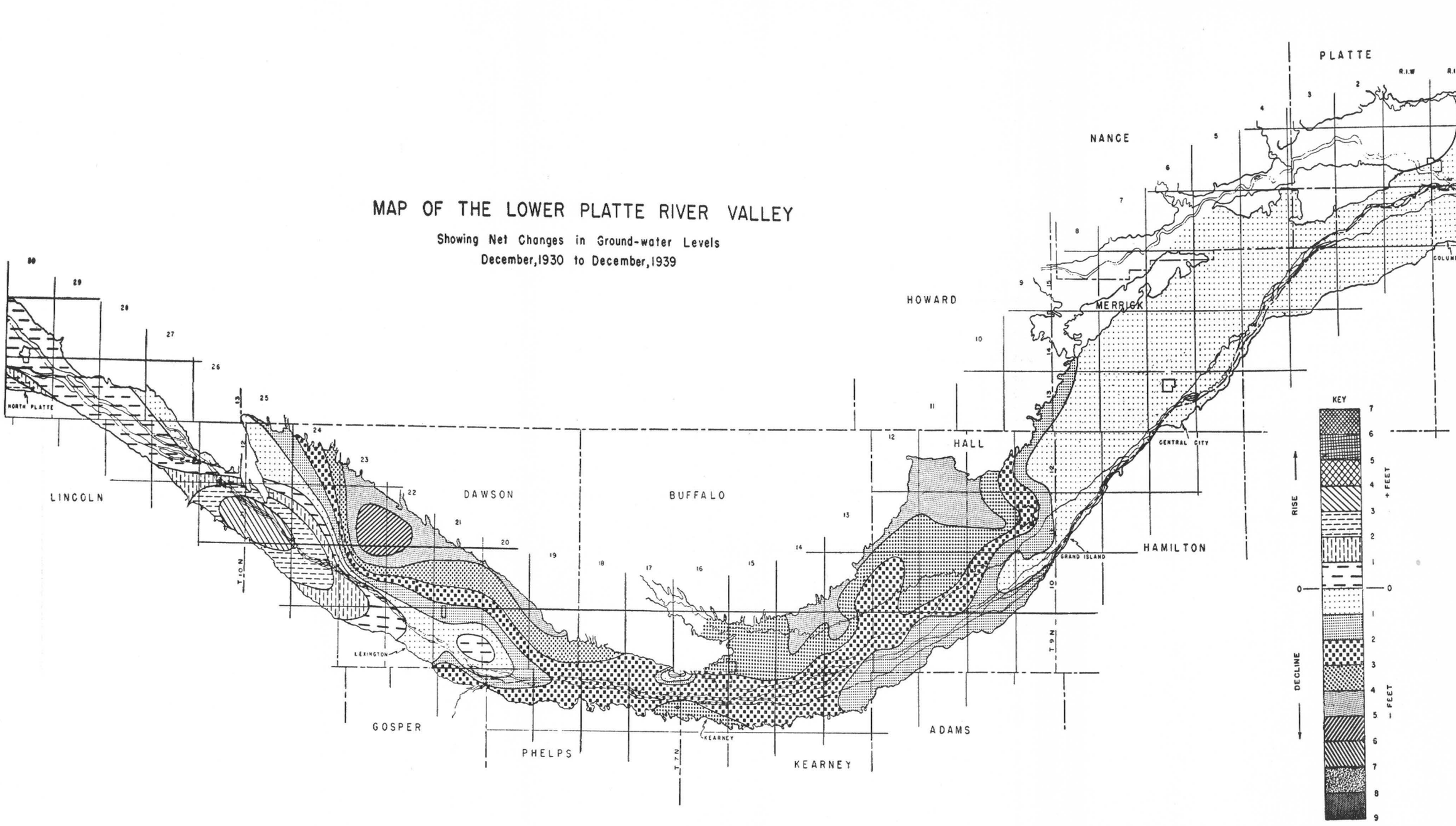


Figure 3.– Hydrographs showing fluctuations of the water level in 20 wells situated in the western part of the lower Platte River Valley, Nebraska.
The locations of the observation wells for which hydrographs have been plotted are shown on plate 8

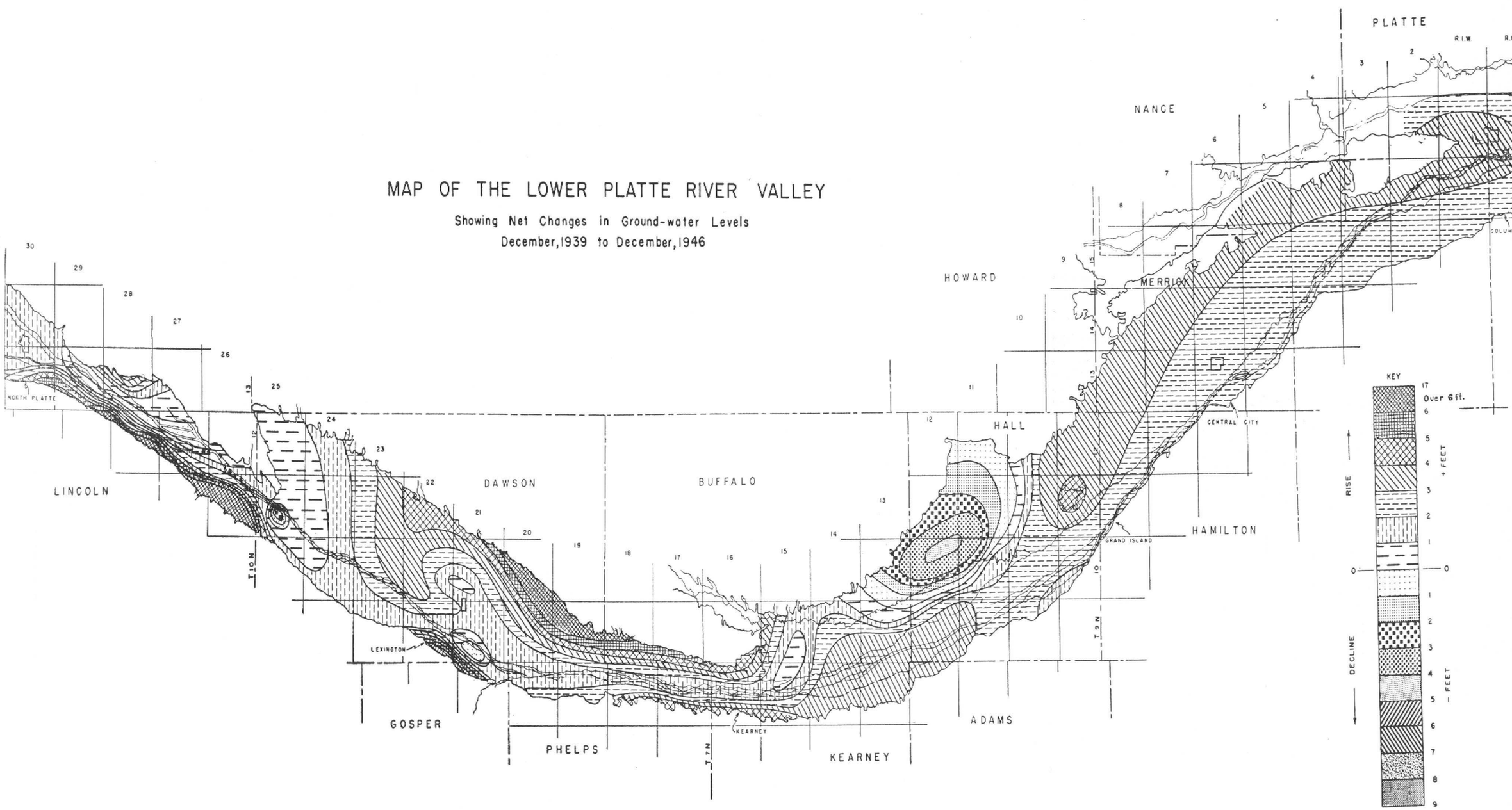
MAP OF THE LOWER PLATTE RIVER VALLEY

Showing Net Changes in Ground-water Levels
December, 1930 to December, 1939



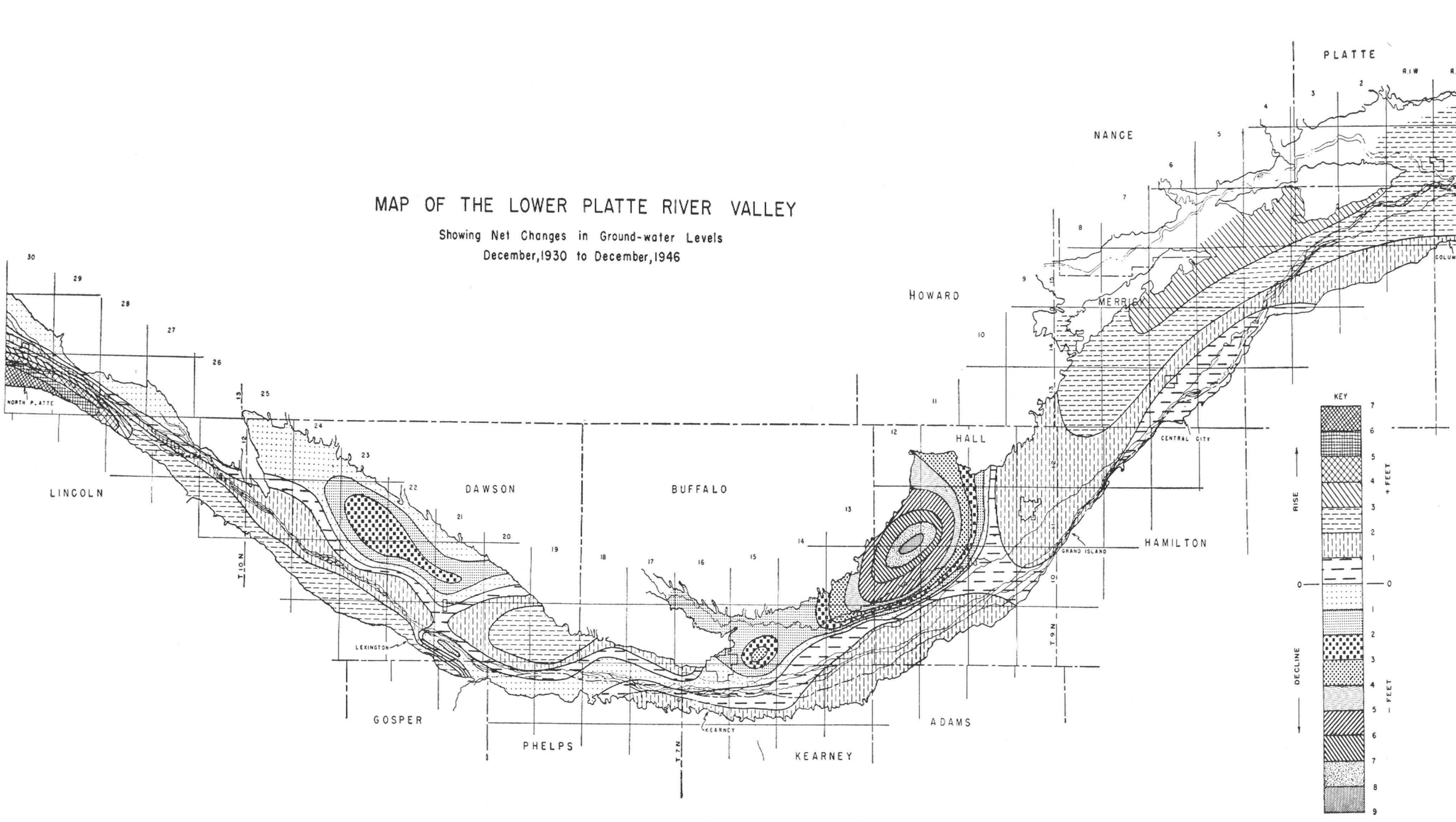
MAP OF THE LOWER PLATTE RIVER VALLEY

Showing Net Changes in Ground-water Levels
December, 1939 to December, 1946



MAP OF THE LOWER PLATTE RIVER VALLEY

Showing Net Changes in Ground-water Levels
December, 1930 to December, 1946



be due to seepage from canals and reservoirs in the general vicinity of the wells.

Three maps (pls. 2, 3 and 4) have been prepared to show the net changes in water level for the periods December 1930 to December 1939, December 1939 to December 1946 and for the entire period December 1930 to December 1946.

Plate 2, which shows net changes in water level December 1930 to December 1939, indicates a general lowering of the water table during that period throughout almost the entire valley area between the east county line of Hall County and the west county line of Dawson County. An average lowering of the water table amounting to 2.2 feet for this area is indicated. Sufficient control is not available to determine the average changes in water level in the parts of the valley lying east of Hall County and west of Dawson County.

Plate 3, showing net changes December 1939 to December 1946, indicates a general rise of water levels over the entire valley, except for an area on the north side of Wood River in western Hall County and extreme eastern Buffalo County. If closer control were available for this part of the valley, the rise in water level would probably appear to be more general instead of restricted to local areas, as shown on the map.

Plate 4 shows the net changes in water level for the combined periods shown on plates 2 and 3. A net rise of the water table in the valley east of Hall County is indicated, but the control in this part of the valley is very limited. In the western part of the area, south

of the Platte River between North Platte and Lexington the water table has been raised as a result of artificial recharge from canals and reservoirs in that vicinity, but the lines showing changes in the ground-water level during the period from December 1930 to December 1946, are based on a limited number of widely scattered water-level control points, and the areal extent of the part of the valley in which this rise occurred would probably have been much larger if water-level measurements for a greater number of strategically located observation wells had been available for this period.

Water levels have declined somewhat in an area north and northwest of Lexington, but the decline there is not as great as the decline in the area north of the river in western Hall and eastern Buffalo Counties. Water-level measurements in observation wells in the latter area indicate a lowering from 1930 to 1946 ranging from 0.89 foot to 7.67 feet. Between December 1946 and May 1947, however, the maximum net decline had been reduced by 0.56 foot. The lowering of the water table in this area has reduced the gradient of the water table toward the Platte River to the extent that the two are now essentially in equilibrium and the direction of ground-water flow is parallel to the surface flow. Further decline of the water table in this area would eventually result in a reversal of the water-table gradient to the extent that ground-water movement would be away from the river rather than toward it.

Changes in Ground-water Storage since January 1946

Changes in ground-water storage, based on fluctuations of water levels in observation wells, have been determined for monthly periods in 1946 and for bimonthly periods in 1947. The procedure described below was followed in making the computations.

All measurements of the depth to water in all observation wells in a given month were compared with the corresponding previous measurements, the differences being expressed as positive values if the water table had risen or as negative values if the water table had declined. The locations of these wells, with the corresponding water-level differences, were then plotted on a map having a scale of 4 miles to the inch. Perpendicular bisectors were erected on the lines connecting each well location with its surrounding neighbors, thus enclosing each well location in a polygon. As every point within a polygon thus constructed is nearer to the enclosed well location than to any other well location in the area under consideration, the water-level difference of the enclosed well was considered, for the purposes of storage computation, to apply to the entire area within the polygon. Hence the sum of the products obtained by multiplying (1) the individual water-level differences by (2) the corresponding polygonal areas by (3) the specific yield of the sediments in which the fluctuation has taken place is a means of approximating the total loss or gain of water to storage. As specific-yield determinations of the materials within the zone of water-table fluctuation have not yet been determined, an arbitrary figure of 20 percent, was chosen for the specific yield.

The areas of the polygons were also used in the determination of the weighted average rise and decline of the water table. These were derived by dividing (1) the sum of the products of the changes in water level multiplied by the corresponding polygonal areas by (2) the sum of the polygonal areas.

Plate 1 shows the locations of all wells in which the depth to water was measured in both April and May 1947. The numerals indicate the rise (+) or decline (-) or water level between the two readings. A total of 240 control points are shown on this map. This is an increase of 142 over the first map constructed (for the period January to February 1946), or an increase of approximately 145 percent. The average polygon area, excluding the closely spaced profile wells from consideration, has correspondingly decreased from 40 square miles to 12 square miles.

As water levels do not rise or fall uniformly throughout the length of the area under consideration, the area has been arbitrarily subdivided into six smaller areas numbered in order going downstream. These are shown by the small index map on Plate 1.

Lincoln County area. -- The first or westernmost area extends from Range 30 West to Range 26 West and lies entirely in Lincoln County. The city of North Platte is situated at the west end of the area. The area comprises 178.6 square miles.

Dawson County area. -- The second area extends from Range 19 West to Range 25 West and lies almost wholly in Dawson County, although small portions of Phelps, Gosper, and Custer counties are also included. The area comprises 533.6 square miles.

Table 3.--Weighted average water-table fluctuations, by periods, and cumulative weighted average water-table fluctuations since January 1, 1946.

(A, weighted average rise (+) or decline (-) of the water table, in feet; and B, cumulative weighted average rise (+) or decline (-) of the water table, in feet).

Period		Lincoln County	Dawson County	Buffalo County	Hall County	Merrick County	East of Merrick Co.	Entire area
January 1946	A	---	-0.078	+0.028	-0.103	+0.029	+0.099	a +0.001
	B	---	- .078	+ .028	- .103	+ .029	+ .099	a + .001
February 1946	A	---	+ .571	+ .080	+ .038	+ .219	+ .271	a + .265
	B	---	+ .493	+ .108	+ .065	+ .248	+ .370	a + .266
March 1946	A	---	- .051	+ .073	- .008	+ .020	- .229	a - .060
	B	---	+ .442	+ .181	- .073	+ .268	+ .141	a + .206
April 1946	A	---	- .009	- .196	- .114	- .145	+ .015	a - .073
	B	---	+ .433	- .015	- .187	+ .123	+ .156	a + .133
May 1946	A	---	+ .013	+ .015	+ .160	+ .347	- .391	a .000
	B	---	+ .446	.000	- .027	+ .470	- .235	a + .133
June 1946	A	---	- .604	- .322	- .099	- .340	+ .347	a - .175
	B	---	- .158	- .322	- .126	+ .130	+ .112	a - .042
July 1946	A	---	- .043	- .731	- .953	- .731	- .934	a - .664
	B	---	- .201	-1.053	-1.079	- .601	- .822	a - .706
August 1946	A	---	+ .278	- .253	- .472	- .256	- .153	a - .142
	B	---	+ .077	-1.306	-1.551	- .857	- .975	a - .850
September 1946	A	---	+2.286	+1.614	+ .303	+ .656	+ .299	a +1.000
	B	---	+2.363	+ .308	-1.248	- .201	- .676	a + .150

October 1946	A	——	-0.057	+0.676	+0.688	+0.446	+0.171	a +0.329
	B	b +0.151	+2.306	+ .984	- .560	+ .245	- .505	+ .456
November 1946	A	+ .085	+ .216	+ .234	+ .353	+ .631	+ .652	+ .418
	B	+ .236	+2.522	+1.218	- .207	+ .876	+ .147	+ .874
December 1946	A	- .233	- .325	- .422	+ .009	- .245	- .283	- .253
	B	+ .003	+2.197	+ .796	- .198	+ .631	- .136	+ .621
Jan.-Feb. 1947	A	- .041	- .083	+ .238	+ .033	+ .022	+ .169	+ .060
	B	- .038	+2.114	+1.034	- .165	+ .653	+ .033	+ .681
Mar.-Apr. 1947	A	- .080	+ .108	+ .028	+ .216	+ .307	+ .434	+ .221
	B	- .118	+2.222	+1.062	+ .051	+ .960	+ .467	+ .901
May-June 1947	A	+ .514	+ .957	+ .807	+1.152	+ .688	+1.168	+ .937
	B	+ .396	+3.179	+1.869	+1.203	+1.648	+1.635	+1.839
July-Aug. 1947	A	-1.058	-1.708	-2.038	-1.527	-1.969	-2.101	-1.822
	B	- .662	+1.471	- .171	- .324	- .321	- .466	+ .016
Sept.-Oct. 1947	A	+ .186	- 1.58	+ .338	- .094	- .109	- .179	- .059
	B	- .476	+1.313	+ .169	- .418	- .430	- .645	- .042
Nov.-Dec. 1947	A	+ .274	+ .226	+ .319	+ .068	+ .227	+ .123	+ .191
	B	- .202	+1.539	+ .488	- .350	- .203	- .522	+ .149

a Exclusive of Lincoln County.

b Based on comparison of measurements made in early January 1946 with measurements made in early November 1946.

Table 4.—Changes in ground-water storage based on weighted average water-table fluctuations, by periods, and cumulative changes in ground-water storage since January 1, 1946.

(A, gain (+) or loss (-) in ground-water storage, in acre-feet; and B, cumulative gain (+) or loss (-) in ground-water storage, in acre-feet).

Period		Lincoln County	Dawson County	Buffalo County	Hall County	Merrick County	East of Merrick Co.	Entire area
January 1946	A	—	- 5,341	+ 1,104	- 5,115	+ 1,825	+ 7,927	a + 400
	B	—	- 5,341	+ 1,104	- 5,115	+ 1,825	+ 7,927	a + 400
February 1946	A	—	+ 39,000	+ 3,154	+ 1,897	+ 13,733	+ 21,612	a + 79,396
	B	—	+ 33,659	+ 4,258	- 3,218	+ 15,558	+ 29,539	a + 79,796
March 1946	A	—	- 3,463	+ 2,872	- 372	+ 1,254	- 18,262	a - 17,971
	B	—	+ 30,196	+ 7,130	- 3,590	+ 16,812	+ 11,277	a + 61,825
April 1946	A	—	- 625	- 7,731	- 5,662	- 9,093	+ 1,204	a - 21,907
	B	—	+ 29,571	- 601	- 9,252	+ 7,719	+ 12,481	a + 39,918
May 1946	A	—	+ 880	+ 604	+ 7,971	+ 21,785	+ 31,221	a + 19
	B	—	+ 30,451	+ 3	- 1,281	+ 29,504	- 18,740	a + 39,937
June 1946	A	—	- 41,240	-12,693	- 4,895	- 21,340	+ 27,654	a - 52,514
	B	—	- 10,789	-12,690	- 6,176	+ 8,164	+ 8,914	a - 12,577
July 1946	A	—	- 2,951	-28,848	-47,350	- 45,841	- 74,486	a -199,476
	B	—	- 13,740	-41,538	-53,526	- 37,677	- 65,572	a -212,053
August 1946	A	—	+ 19,003	- 9,996	-23,423	- 16,061	- 12,239	a - 42,716
	B	—	+ 5,263	-51,534	-76,949	- 53,738	- 77,811	a -254,769
September 1946	A	—	+156,134	+63,644	+15,053	+ 41,154	+ 23,818	a +299,803
	B	—	+161,397	+12,110	-61,896	- 12,584	- 53,993	a + 45,034

October 1946	A	——	- 3,873	+26,657	+34,182	+ 27,997	+ 13,637	a + 98,600
	B	b + 3,440	+157,524	+38,767	-27,714	+ 15,413	- 40,356	+147,074
November 1946	A	+ 1,948	+ 14,780	+ 9,238	+17,531	+ 39,557	+ 51,965	+135,019
	B	+ 5,388	+172,304	+48,005	-10,183	+ 54,970	+ 11,609	+282,093
December 1946	A	- 5,321	- 22,232	-16,638	+ 448	- 15,333	- 22,561	- 81,645
	B	+ 67	+150,072	+31,367	- 9,743	+ 39,637	- 10,952	+200,448
Jan.-Feb. 1947	A	- 935	- 5,638	+ 9,368	+ 1,660	+ 1,402	+ 13,494	+ 19,351
	B	- 868	+144,434	+40,735	- 8,083	+ 41,039	+ 2,542	+219,799
Mar.-Apr. 1947	A	- 1,836	+ 7,356	+ 1,094	+10,708	+ 19,220	+ 34,577	+ 71,119
	B	- 2,704	+151,790	+41,829	+ 2,625	+ 60,259	+ 37,119	+290,918
May-June 1947	A	+11,752	+ 65,395	+31,836	+57,213	+ 43,119	+ 93,139	+302,454
	B	+ 9,048	+217,185	+73,665	+59,838	+103,378	+130,258	+593,372
July-Aug. 1947	A	-24,172	-116,651	-80,376	-75,847	-123,463	-167,553	-588,062
	B	-15,124	+100,534	- 6,711	-16,009	- 20,085	- 37,291	+ 5,310
Sept.-Oct. 1947	A	+ 4,248	- 10,809	+13,334	- 4,662	- 6,832	- 14,275	- 18,996
	B	-10,876	- 89,725	+ 6,623	-20,671	- 26,917	- 51,570	- 13,686
Nov.-Dec. 1947	A	+ 6,264	+ 15,442	+12,567	+ 3,395	+ 14,234	+ 9,776	+ 61,678
	B	- 4,612	+105,167	+19,190	-17,276	- 12,683	- 41,794	+ 47,992

a Exclusive of Lincoln County.

b Based on comparison of measurements made in early January 1946 with measurements made in early November 1946.

Buffalo County area. -- The third area extends from Range 18 West to Range 13 West and includes parts of Buffalo, Kearney, and Phelps Counties. The city of Kearney is almost centrally located in this area, which comprises 308.2 square miles.

Hall County area. -- The fourth area extends from Range 12 West to Range 9 West. The area lies almost wholly in Hall County, but very small parts of Nance and Adams Counties are included. Grand Island, the largest city in the Lower Platte Valley, is situated in this area. The area comprises 388.0 square miles.

Merrick County area. -- The fifth area extends from Range 8 West to Range 2 West. Most of the area lies in Merrick County, but small parts of Nance, Polk, and Hamilton Counties are also included. The area comprises 489.9 square miles.

Area east of Merrick County. -- The sixth or easternmost area extends from Range 2 West to Range 8 East and includes parts of Platte, Colfax, Dodge, Polk, Butler, and Saunders Counties. The principal cities are Columbus, Schuyler, and Fremont. The area comprises 623 square miles.

The weighted average water-table fluctuations, by periods, and the cumulative weighted average water-table fluctuations since January 1, 1946, for the six areas described above appear in table 3. The corresponding changes in ground-water storage, based on the weighted average water-table fluctuations, and the cumulative changes in ground-water storage are given in table 4.

CONFIGURATION OF THE WATER TABLE

Water levels were measured in a total of 260 wells in addition to the observations wells in order to afford sufficient control for the construction of a water-table contour map. Pertinent information regarding all wells that were measured is included in the table of well records (table 13). These data should be useful to future investigators in making measurements of water level in these same wells for the purpose of comparison with data presented in this report. Water levels in both the inventory wells and the observation wells were measured in March 1947, and these measurements were used in determining the altitude of the water table as given on the water-table contour map (pl. 5). Measuring-point altitudes have been determined by instrumental leveling from bench marks previously established by the Geological Survey, the Coast and Geodetic Survey, the Bureau of Reclamation and the Union Pacific Railroad.

The water-table contour map shows that between Grand Island and Kearney the ground-water contour lines extend across the valley almost at right angles to the flow of the Platte River. Hence, the direction of ground-water movement is essentially parallel to that of the surface flow in the river, and the gradient is essentially the same as the gradient of the River, or about 7 feet to the mile. In this part of the valley, therefore, there is no evidence of pronounced discharge of ground water to the surface flow, nor is there loss of surface flow to ground-water storage. There is very little evidence indicating any substantial ground-water underflow to the valley alluvium from the uplands north or south of the valley. Recharge to ground-water storage

is therefore derived from precipitation within the area and from underflow from the west in the valley alluvium.

From Kearney west to North Platte the ground-water contour lines tend to be V-shaped upstream, thus indicating ground-water movement toward the river. Underflow toward the river is most pronounced on the south side of the river between Lexington and Maxwell. The gradient in this area probably has been steepened somewhat in recent years, owing to mounding of the water table as result of seepage from canals and reservoirs in that vicinity. The maximum water-table gradient toward the river is about 30 feet to the mile on the south side of the River between Cozad and Gothenburg. Elsewhere on the south side of the river the gradient toward the river ranges upward from 7 feet to the mile. On the north side of the river between Lexington and Maxwell the ground-water movement is quite uniformly in a southeast direction, the contour lines intersecting the direction of river flow at angles of as much as approximately 50°. In this part of the valley the gradient averages 13 or 14 feet to the mile. Between Overton and Lexington there is indication of only slight movement of water out of the Platte River channel to recharge the ground-water reservoir directly to the north of the River. Between Maxwell and North Platte the ground-water movement ranges from parallel to the river to riverward at a slight angle.

DEPTH TO THE WATER TABLE

Approximately 500 control points were used in construction of

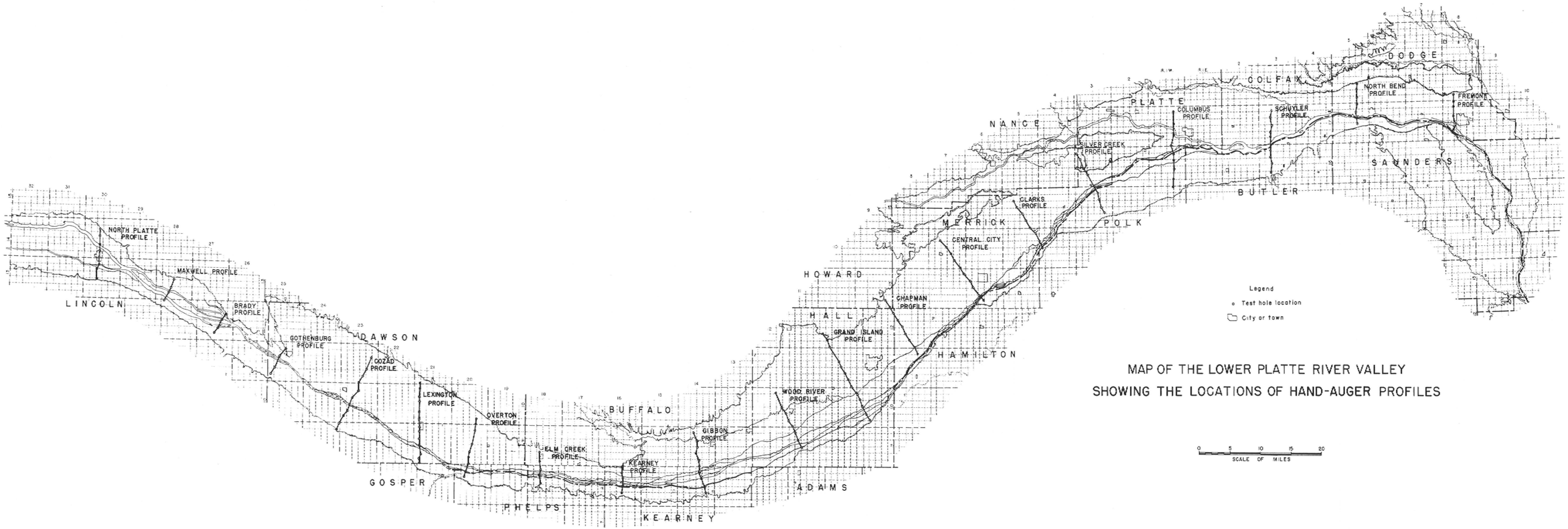
the depth-to-water map (pl. 6). All depths to water shown on the map are based on measurements made in March 1947. As detailed topographic surveys made by modern methods are not available for the Platte River Valley, the construction of the depth-to-water map involved a certain amount of interpretation. Existing Geological Survey 30-minute quadrangle maps made by reconnaissance methods were used to some extent as an aid to interpretation but could not be relied upon for close control.

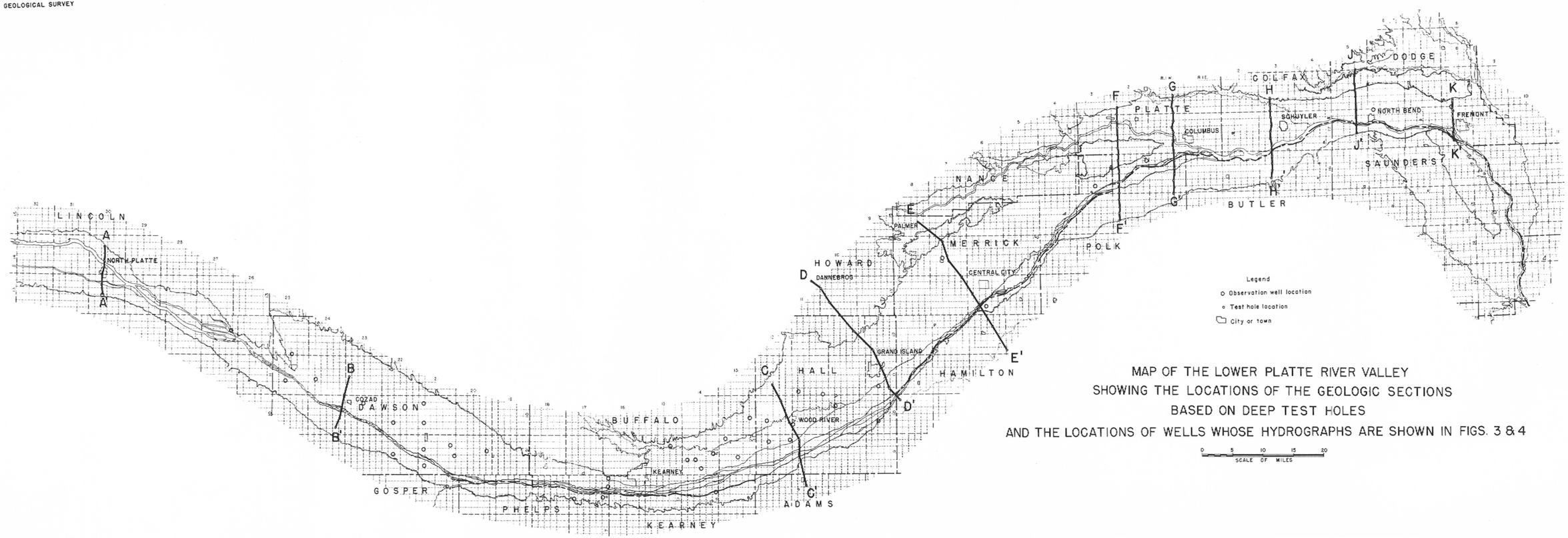
Examination of plate 6 shows an irregular distribution of the areas of various depth to water. Inasmuch as the water-table contour map indicates that the water table presents a fairly regular, nearly plane surface, the variations in depth can be accounted for by the irregularities of the topographic surface. In general, it is obvious that where the land surface is relatively low the depth to water is less than in adjacent areas where the land surface is at higher altitudes. Exceptions to this are not uncommon, however, owing to local mounding of the water table from recharge by surface water and to local decline of the water table resulting from natural discharge or pumping.

RESULTS OF TEST DRILLING

Shallow Test-hole Profiles

Recharge to ground-water storage in the Platte River Valley is largely from local precipitation; minor sources of recharge are


NORTH PLATTE PROFILE
MAXWELL PROFILE
BRADY PROFILE
GOTHENBURG PROFILE
COZAD PROFILE
LEXINGTON PROFILE
OVERTON PROFILE
ELM CREEK PROFILE
KEARNEY PROFILE
GIBBON PROFILE
WOOD RIVER PROFILE
GRAND ISLAND PROFILE
CHAPMAN PROFILE
CENTRAL CITY PROFILE
CLARKS PROFILE
SILVER CREEK PROFILE
COLUMBUS PROFILE
SCHUYLER PROFILE
NORTH BEND PROFILE
FREMONT PROFILE
LINCOLN
DAWSON
BUFFALO
GOSPER
PHELPS
KEARNEY
ADAMS
HALL
HOWARD
MERRICK
NANCE
POLK
PLATTE
COLFAX
DODGE
SAUNDERS
BUTLER
Legend
Test hole location
City or town
MAP OF THE LOWER PLATTE RIVER VALLEY
SHOWING THE LOCATIONS OF HAND-AUGER PROFILES
0 5 10 15 20
SCALE OF MILES



MAP OF THE LOWER PLATTE RIVER VALLEY
SHOWING THE LOCATIONS OF THE GEOLOGIC SECTIONS
BASED ON DEEP TEST HOLES
AND THE LOCATIONS OF WELLS WHOSE HYDROGRAPHS ARE SHOWN IN FIGS. 3 & 4

0 5 10 15 20
SCALE OF MILES

seepage from the river, streams, and river diversions, from spreading of irrigation waters, and underflow from outside the limits of the valley. The ability of the alluvial deposits above the water table to transmit water downward is an important factor in the replenishment of losses to ground-water storage.

The character of the materials above the water table was determined by augering test holes on 20 profiles across the valley, generally at right angles to the river. Where feasible, holes were augered at each intersection of a profile line with a section line; hence, the holes on a given profile are approximately a mile apart. Profiles were spaced at average intervals of 13 miles, and each profile is identified by the name of the nearest town or city. Wherever possible, samples were obtained from the surface down to a point 3 feet below the water table. The sediments below the water table in most cases were obtained by means of a solid-tube drive-sample barrel, $1\frac{1}{4}$ inches in diameter and with a beveled cutting edge and interior flange at the bottom to prevent loss of the sample when lifted. The samples were examined and described in the field.

The locations of these augered test holes are shown on plate 7 and the logs are given in table 12. Each auger hole was given a number, following the same numbering system used for the wells. For convenience of comparison, the logs are arranged according to their position on the profile, in a north-south order, rather than by order in the coordinate system of numbering.

Deep Test-hole Profiles

The drilling of deep test holes by means of a portable hydraulic rotary drilling rig has been and is an integral part of the State-Federal cooperative study of the ground-water resources of Nebraska. Profiles based on such holes drilled across the valley at North Platte, Cozad, Wood River, Grand Island, Central City, 4 miles east of Silver Creek, Columbus, Schuyler, North Bend, and Fremont (see pl. 8) are presented in diagrammatic fashion in figures 5, 6, 7 and 8. The same horizontal and the same vertical scales were used in constructing all these profile sections in order that the relative thickness of water-productive materials may readily be compared.

Examination of the profiles reveals that the limits of the alluvial deposits that underlie the Platte Valley floor are in no way coextensive with the topographic limits of the present Platte Valley. As pointed out by Condra, Reed, and Gordon[9], test drilling has revealed that the present topographic valley of the Platte River, at least in the greater part of the area under consideration in this report, has been cut into the extensive fluviatile deposits of buried preexisting valleys, which, in general, trend in a west-east direction. Hence, the greater thicknesses of water-productive mantle rock are not confined to the limits of the present Platte Valley. In some parts they may follow the same course as the present valley, but in other parts they may intersect the valley at some angle.

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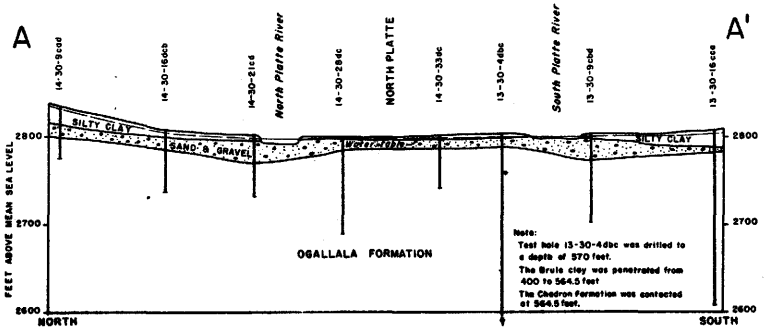
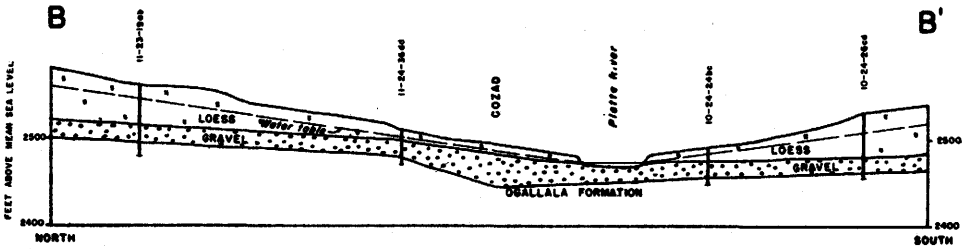
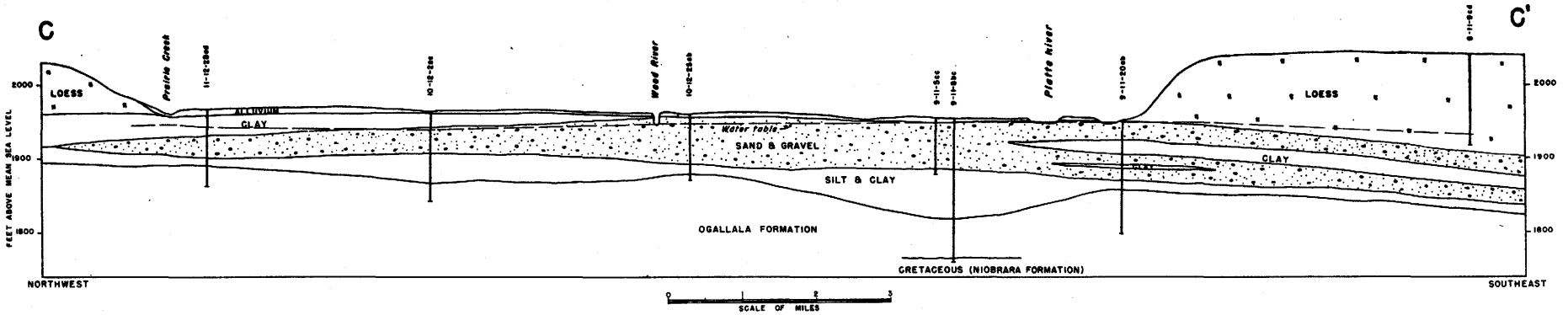
9 Condra, G. E., Reed, E. C., and Gordon, E. D., Correlation of the Pleistocene deposits of Nebraska: Nebraska Geol. Survey Bull. 15, 73 pp., 1947.



GEOLOGIC SECTION AT NORTH PLATTE, NEBRASKA



GEOLOGIC SECTION NEAR COZAD, NEBRASKA



GEOLOGIC SECTION NEAR WOOD RIVER, NEBRASKA

BASED ON DATA OBTAINED IN COOPERATION WITH THE CONSERVATION AND SURVEY DIVISION OF THE UNIVERSITY OF NEBRASKA

Figure 5. Geologic sections at North Platte, near Cozad, and near Wood River.

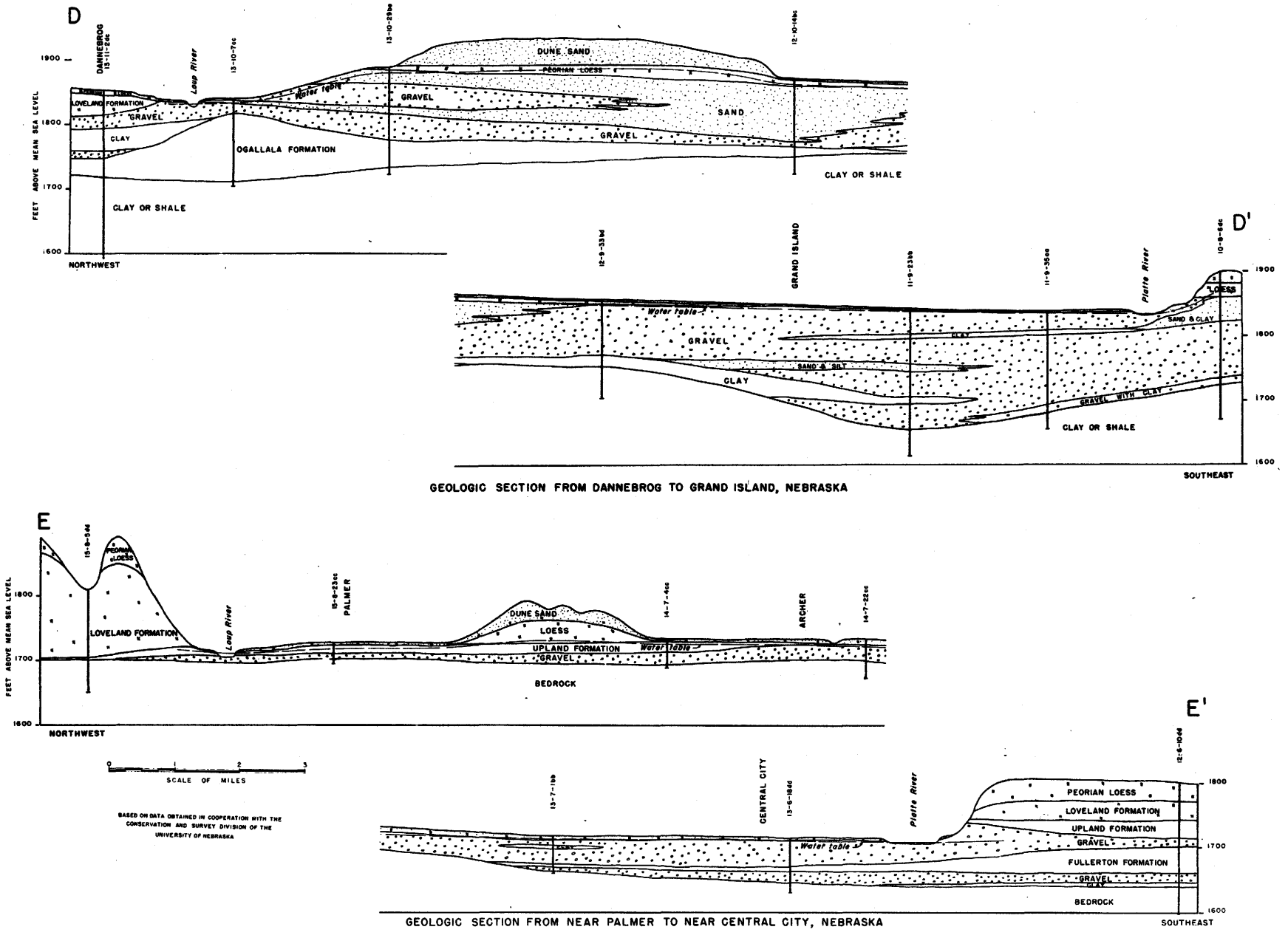


Figure 6. Geologic sections from Dannebrog to Grand Island, and from near Palmer to near Central City.

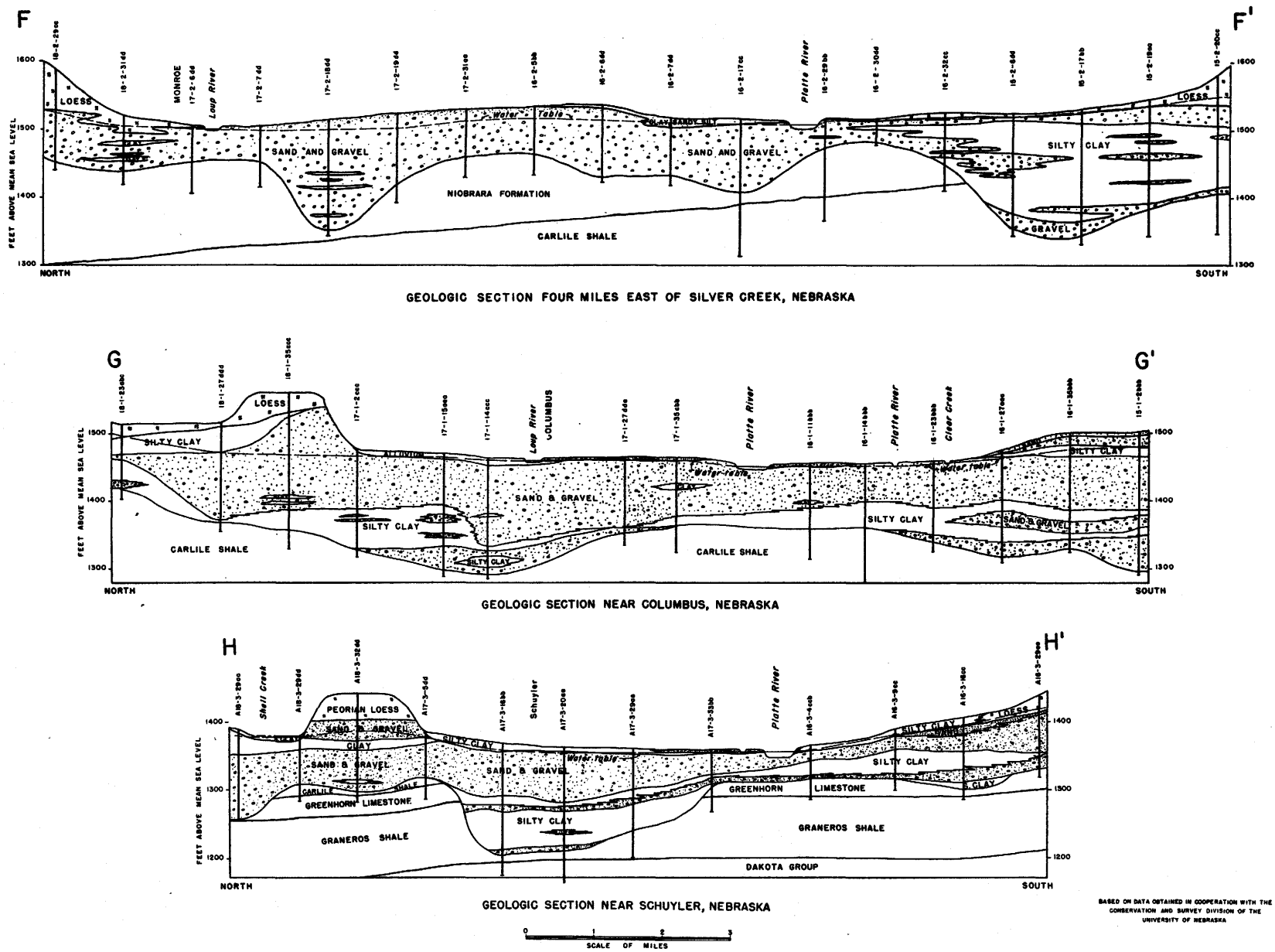
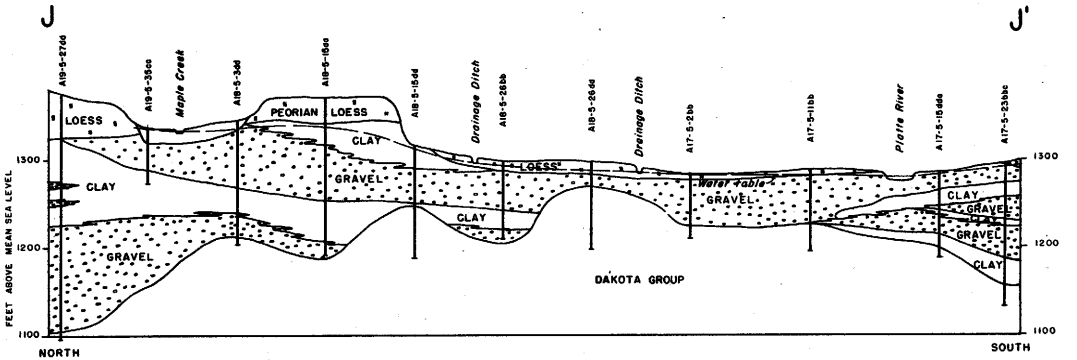
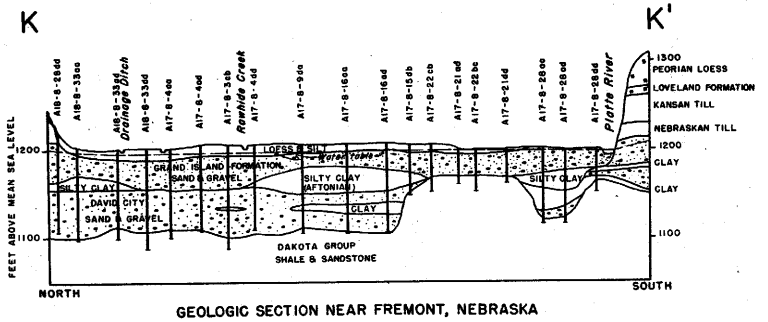


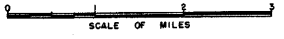
Figure 7. Geologic sections 4 miles east of Silver Creek, near Columbus, and near Schuyler.



GEOLOGIC SECTION NEAR NORTH BEND, NEBRASKA



GEOLOGIC SECTION NEAR FREMONT, NEBRASKA



BASED ON DATA OBTAINED IN COOPERATION WITH THE CONSERVATION AND SURVEY DIVISION OF THE UNIVERSITY OF NEBRASKA

Figure 8. Geologic sections near North Bend, and near Fremont.

HYDROLOGIC PROPERTIES OF THE WATER-BEARING MATERIALS

The quantity of ground water that a water-bearing material will yield to wells or other recovery devices depends in part upon the hydrologic properties of the material. These properties vary greatly with changes in size, shape, number, and degree of interconnection of the interstices. Because water-bearing formations are usually not homogeneous, a wide range of values is expected in the hydrologic properties; hence, quantitative determinations are desirable.

The two hydrologic properties of greatest importance are permeability and specific yield. Permeability is a measure of the ability of the material to transmit water; specific yield is a measure of the quantity of water a material will yield when drained.

The field coefficient of permeability used in this report is defined as the number of gallons that will flow under prevailing conditions through each mile of water-bearing bed (measured at right angles to the direction of flow) in one day, for each foot of thickness of the bed and for each foot per mile of hydraulic gradient. The coefficient of transmissibility is a similar measure and is defined as the product of the field coefficient of permeability and the thickness of the saturated portion of the water-bearing bed[10].

The specific yield of a water-bearing material is defined as the ratio of (1) the volume of water that, after being saturated, it will

10 Theis, C. V., The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: Am. Geophys. Union Trans., 1935, p. 520.

yield by gravity to (2) its own volume[11]. The coefficient of storage is a similar term and is essentially equal to the specific yield for water-table conditions. For artesian conditions the coefficient of storage is an expression of the quantity of water yielded from storage by the compression of a column of the water-bearing material and its associated fine-grained beds, and by expansion of the contained water when the head declines[12]. Ordinarily it is defined as the cubic feet of water yielded from a vertical column of the aquifer with a basal area of 1 square foot when the head declines 1 foot.

The permeability of water-bearing materials may be determined by laboratory tests of samples of the materials, by field determinations of ground-water velocity, and by pumping tests made on wells that withdraw water from the materials. All these methods have been employed previously in the lower Platte River Valley. The procedure and results of these tests have been published in detail[13].

During the course of the present investigation, five pumping tests were conducted to determine the permeability and specific yield of the water-bearing materials in the Platte Valley. The results of these tests, and of three tests previously conducted, are given in tables 5 and 6.

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11 Meinzer, O. E., Outline of ground-water hydrology, with definitions: U. S. Geol. Survey Water-Supply Paper 494, p. 28, 1923.

12 Kazmann, R. G., Some field applications of water transmissibility and storage coefficients: Agr. Eng. vol. 25, no. 8, pp. 299, 300, 304, Aug. 1944.

13 Lugn, A. L., and Wenzel, L. K., Geology and ground-water resources of south-central Nebraska: U. S. Geol. Survey Water-Supply Paper 779, 242 pp., 1938. Wenzel, L. K., Methods of determining permeability of water-bearing materials: U. S. Geol. Survey Water-Supply Paper 887, 192 pp., 1942.

Table 5.—Pumping test determinations of coefficients of permeability and transmissibility in the lower Platte River Valley, Nebraska

Location	Date of test	Discharge (gallons a minute)	Maximum measured drawdown (feet)	Duration of pumping (hours)	Specific capacity[1]	Coefficient of transmissibility (T)	Thickness of water-bearing material (feet)	Field coefficient of permeability (Pf)
Dawson County								
11-24-19bc	1933	532	10.3	24	52	64,260	17	2/ 3780
Phelps County								
8-18-16cc	1946	805	15.5	50	52	167,450	34	4925
Buffalo County								
9-14-27b	1933	1100	11.00	24	100	193,300	48	2/ 4027
Hall County								
9-11-8bc	1945	1100	9.74	24	113	236,930	67.5	3510
12-9-10db	1946	690	15.82	26	44	139,200	60	2320
12-9-25cd	1946	1431	43.19	27	33	58,500	45	1300
Merrick County								
11-8-17b	1931	540	20	48	27	95,500	100	2/ 955
Platte County								
17-1-34dc	1945	740	7.74	24	96	248,850	70	3555

1/ Yield in gallons a minute per foot of drawdown.

2/ Wenzel, L. K. Methods for determining permeability of water-bearing materials, with special reference to discharging well methods. U. S. Geol. Survey Water-Supply Paper 887, p. 147.

Table 6.—Pumping-test determinations of coefficients of storage in the lower Platte River Valley, Nebraska

Location	Date of test	Coefficient of storage										
		Pumping time, in hours						Recovery time, in hours				
		1	3	6	12	24	48	1	3	6	12	24
Dawson County												
11-24-19bc	1933	-	-	-	-	a0.032	-	-	-	-	-	-
Phelps County												
8-18-16cc	1946	0.056	0.083	0.096	0.114	0.163	0.262	0.066	0.088	0.110	0.140	0.199
Buffalo County												
9-14-27b	1933	-	-	-	-	b0.07	-	-	-	-	-	-
Hall County												
9-11-8bc	1945	0.047	0.068	0.086	0.116	0.181	-	-	-	-	-	-
12-9-10db	1946	0.003	0.006	0.011	0.020	0.031	-	-	-	-	-	-
12-9-25cd	1946	0.0030	0.0035	0.0043	0.0053	0.0073	-	-	-	-	-	-
Merrick County												
11-8-17b	1931	-	-	-	-	-	c0.217	-	-	-	-	-
Platte County												
17-1-34dc	1945	0.101	0.164	0.193	0.208	0.236	-	-	-	-	-	-

a Wenzel, L. K., Methods for determining permeability of water-bearing materials, with special reference to discharging well methods. U. S. Geol. Survey Water-Supply Paper 887, p. 134.
b Idem, p. 131.
c Idem, p. 125.

The procedure followed in these tests was similar to the procedure developed in the test near Grand Island[14], though considerably simplified. The most significant change was in the position and number of observation wells with respect to the pumped well. In each of the tests conducted, three pairs of observation wells were installed at distances of 100, 200, and 300 feet, respectively, on a line extending outward from the pumped well. One well of each pair was shallow and penetrated the aquifer only deep enough to extend below the sediments dewatered during the pumping test. The second well of each pair was deep and extended to the bottom of the aquifer. Measurements of water level in the observation wells and in the pumped well were made periodically with a steel tape or with an electrical device during both the period of pumping and the period of recovery. In connection with the tests south of Elm Creek in Phelps County (8-18-16cc) and near Wood River, in Hall County, (9-11-8bc) an additional observation well equipped with an automatic water-stage recorder was used. In the Wood River test, the yield of the pumped well was measured over a rectangular weir, but in all the other tests the yield of the pumped well was measured with a Collins flow gage.

The coefficient of transmissibility was computed from the data collected in each test by the procedure outlined by Jacob[15]. In this method the adjusted drawdowns of the observation wells are plotted

14 Wenzel, L. K., The Thiem method for determining permeability of water-bearing materials and its application to the determination of specific yield: U. S. Geol. Survey Water-Supply Paper 679-A, 57 pp., 1936; Methods for determining permeability of water-bearing materials: U. S. Geol. Survey Water-Supply Paper 887, 192 pp., 1942.

15 Jacob, C. E., Notes on determining permeability by pumping tests under water-table conditions, 25 pp., 5 figs. 1944. (Processed.)

against the logarithm of their respective horizontal distances from the pumped well. A straight line is fitted through these points, and the coefficient of transmissibility is determined from the equation $T=\frac{527.8}{\Delta s'}Q$, in which

T is the coefficient of transmissibility, in gallons a day per foot.

Q is the rate of pumping in gallons a minute

s is the measured drawdown in feet

s' is the adjusted drawdown and is equal to $s - \frac{s^2}{2M}$

M is the thickness of the saturated portion of the aquifer before pumping began, in feet

$\Delta s'$ is the difference in the drawdown of the straight line, over one log cycle, in feet

The field coefficient of permeability then is determined by the expression

$$P_f = \frac{T}{M}$$

The field coefficients of permeability, the coefficients of transmissibility, and other pertinent data are shown in table 5.

The coefficient of storage or specific yield is determined from the expression $S = \frac{4Tt}{r^2} W^{-1} \left(\frac{4\pi Ts}{Q}\right)$ in which, with consistent units,

S is the apparent coefficient of storage

T is the coefficient of transmissibility

t is the time since pumping began

r is the horizontal distance between the observation well and pumped well

s is the adjusted drawdown

Q is the rate of pumping

Values for $W^{-1}\left(\frac{4\pi Ts}{Q}\right)$ are found in a table prepared by Kazmann[16]. The computed value for $\frac{4\pi Ts}{Q}$ is found in the body of the table and the corresponding value for W^{-1} ( ) is determined by substituting the number appearing on the same line in the column headed N, at the extreme left of the table, for N in the expression at the top of the column in which the value $\frac{4\pi Ts}{Q}$ was found.

The apparent coefficient of storage was computed for different pumping periods and for different recovery periods. These are shown, together with the specific yields determined in the earlier pumping tests made in the Platte Valley, in table 6.

DISTRIBUTION OF IRRIGATION WELLS

The locations of 3,797 irrigation wells are shown on plate 9 which gives also the sources from which the information was obtained. The total number of existing irrigation wells undoubtedly is considerably greater, but a complete field survey would be required to determine the exact number and location. Of the wells shown, 3,735 are within the area covered by this report, as listed below by counties.

Adams	7	Howard	2
Buffalo	864	Kearney	100
Butler	31	Lincoln	96
Colfax	60	Merrick	371
Dawson	875	Nance	11
Dodge	86	Phelps	78
Gosper	27	Platte	103
Hall	980	Polk	41
Hamilton	3	Saunders	0

16 Wenzel, L. K., Methods for determining permeability of water-bearing materials, U. S. Geol. Survey Water-Supply Paper 887, p. 89, 1942.

MUNICIPAL WATER SUPPLIES

All the towns in the lower Platte River Valley between North Platte and Fremont obtain their water supplies from wells. North Platte, Gothenburg, Cozad, Lexington, Overton, Elm Creek, Kearney, Gibbon, Shelton, Wood River, Grand Island, Central City, Silver Creek, Columbus, Schuyler, North Bend and Fremont have public-supply systems. In Maxwell, Brady, Willow Island, Darr, Odessa, Alda, Chapman, Clarks, Havens, Richland, Rogers, and Ames water is obtained from individual domestic wells. None of the public-supply systems have facilities for softening treatment, and only one (North Bend) has facilities for the removal of iron and manganese. The chemical quality of the public supplies in the valley is discussed on pages 64 to 86. Records of municipal wells are given in tables 7 and 8.

Table 7.--Municipal well supplies in the lower Platte River Valley, Nebraska

(Based principally on field data collected in 1947 by Ferd G. Schnittker and in part on the section on Municipal Water Supplies in Water-Supply Paper 779, pp. 146-149.)

City or town and Well No.	Date Completed	Type of well[1]	Depth of well (feet)	Diameter of well (inches)	Method of lift[2]	Capacity of well (gpm)	Power[3]	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
North Platte								
14-30-32aa	1947	Dr	253	18	-	4/1,600	-	New well, pump to be installed. Well is south of Lincoln Highway, south of Cody Cabin Camp.
32dd1	1942	Dr	96	26	T	800	E	Grant well at Grant and 1st Streets. Reserve pump; used occasionally.
32dd2	--	Dr	92	26	T	1,900	E	Southwest well (Canfield) 1900 West A Street. Used only as needed; drawdown 13 feet when pumping 1,000 gallons a minute.
33ac	--	--	90, 100	6 42 36	-	--	-	Main pumping station on East 7th Street. Multiple of 41 wells interconnected to two centrifugal pumps by a vacuum system.
Gothenburg								
11-25-10bd	1943	Dr	72	18	T	200	E	North well 20th and E Streets. Well pumping fine sand; to be abandoned. Drawdown, 20 feet.
10ca	1930	Dr	33	24	T	400	E	Park well, 16th and F Street; interconnected to syphon well situated 50 feet west. Chemical analysis made.
15bb	1926	Dr	58	18	C	150	E	West well on 8th Street near tailrace from power plant; used only as an emergency supply.

Note: See end of table for footnotes.

Table 7.--Municipal well supplies in the lower Platte River Valley, Nebraska--Continued.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cozad								
10-23-6cc1	--	Dr	33	30 24	T	600	E	West group on 9th Street; 3 wells interconnected to one pump. Chemical analysis made.
6cc2	--	Dr	33	30 24	T	650	E	East group on 9th Street; 3 wells interconnected to one pump.
7ba1	--	Dr	25	24	C	650	E	Power plant wells; 2 wells interconnected to one pump. Also serves as a reserve supply for emergency use.
7ba2	--	Dr	25	18	T	250	E	Power plant well; used exclusively for cooling and condensing supply for Diesel engines.
Lexington								
9-21-5cb	1889-1905	Dr	44	6	P	350	E	5th and Madison Streets. 5 sand points interconnected to one pump; used in emergency only.
8bb	--	Dr	60	18	T	450	E	Harrison and High Streets. Chemical analysis made.
10-21-32ca	--	Dr	60	18	T	500	E	17th and Washington Streets. Drawdown, 9 feet.
32cc1	1940	Dr	60	26	T	650	E	13th and Taylor Streets. Drawdown, 8 feet.
32cc2	--	Dr	60	26	T	500	E	14th and Taylor Streets. Drawdown, 8 feet.
Overton								
9-19-19bb	1916	Dr	43	14	C	250	E, G	
Elm Creek								
9-18-28ad1	--	Dr	33	12 16	C	250	E	4 wells interconnected to one pump at pumphouse beside elevated tank.
28ad2	--	Dr	36	18	C	250	E	3 wells interconnected to one pump; north of elevated tank. Chemical analysis made.

Note: See end of table for footnotes.

Table 7.--Municipal well supplies in the lower Platte River Valley, Nebraska--Continued.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Kearney								
8-16-1cb	1946	Dr	--	--	--	--	--	Central Avenue between 16th and 17th Streets. New well; not completed.
1cc	1936	Dr	39.2	24	T	900	E	12th Street and Avenue A. Drawdown, 11 feet.
2ab	1940	Dr	56	24	T	950	E	Pioneer Park, 21st Street and 8th Avenue. Drawdown, 10-13 feet.
2ac	1946	Dr	46	24	--	--	--	8th Avenue near 18th Street. New well; no pump installed yet.
2ad	1924	Dr	41	26	T	512	E	5th Avenue and 19th Street.
2da1	1924	Dr	43	26	T	500	E	6th Avenue near 17th Street. Test May 1941 showed 728 gallons a minute with drawdown of 9.25 feet.
2da2	1924	Dr	42	26	T	670	E	6th Avenue near 16th Street. Chemical analysis made.
2dd	1941	Dr	47	18	T	750	E	13th Street and 5th Avenue. Drawdown, 8 feet; temperature, 54°.
Gibbon								
9-14-13ca	1922	Dr	55	24	T	550	E	Labarre Street.
Shelton								
9-13-1ca1	1922	Dr	57	36	C	350	E	North side of fire station; two wells interconnected to one pump.
1ca2	1939	Dr	42	18	T	700	E	One block north of fire station. Chemical analysis made.
Wood River								
10-11-19cb	1916	Dr	58	24	C	300	E	
Grand Island								
11-9-8da	1926	Dr	101	25	T	1,000	E	Broadwell well, 17th Street and Broadwell Avenue.

Note: See end of table for footnotes.

Table 7.--Municipal well supplies in the lower Platte River Valley, Nebraska--Continued.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Grand Island--Continued								
11-9-9aa	--	--	104	25	-	--	-	Blaine well, Illinois Avenue and Ohio Avenue.
16aa	--	--	--	--	-	--	-	Ice Plant, North Front and Pine Streets.
16ac1	1919	Dr	76	25	T	1,200	E	Cedar well, 4th and Cedar Streets.
16ac2	1927	Dr	88	25	T	1,200	E	Cleburn well, North Front and Cleburn Streets.
16ca	1926	Dr	88	25	T	1,300	E	Lincoln well, North Front and Lincoln Streets.
16db	1917	Dr	70	25	T	1,000	E	Clark well, South Front and Clark Streets.
17cd	--	--	82	25	-	--	-	Hart well, North Front Street and Hart Avenue.
21bd	1931	Dr	92	25	T	1,200	E	Jackson well, Jackson and Anna Streets.
21cc	1941	Dr	82	25	T	820	E	South Harrison Street well. Chemical analysis made.
27bb	1937	Dr	113	25	T	1,300	E	South Locust Street well. Chemical analysis made.
29aa	--	Dr	79	25	-	1,000	-	Parkview well.
Central City								
13-6-9ca1	--	Dr	40	25	T	400	E	Inside pumping plant, G Street and G Avenue. Chemical analysis made.
9ca2	--	Dr	39	24	C	250	E, G	West side of pumping plant.
9cd	--	Dr	41	24	T	425	E	22d Avenue and 25th Street.
Silver Creek								
16-3-33db1	1910	Dr	32	18	C	150	E	East side of pumping plant. Chemical analysis made.
33db2	1921	Dr	36	18	C	350	E	West side of pumping plant; emergency use only.

Note: See end of table for footnotes.

Table 7.--Municipal well supplies in the lower Platte River Valley, Nebraska--Continued.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Columbus								
A17-1-19cc1	--	Dr	--	--	-	--	-	11th Street well.
19cc2	--	Dr	--	--	-	--	-	10th Street well.
20bc	1941	Dr	84	24	T	600	E	16th Street and 16th Avenue. Chemical analysis made.
24ad	--	Dr	--	--	-	--	-	Northwest well.
29bb	1936	Dr	88	18	T	1,000	E	Buffalo Park well.
Schuyler								
A17-3-15aa1	--	Dr	69	26	C	700	-	75 feet north of pumping station No. 1.
15aa2	--	Dr	69	26	T	600	E	Boiler and condenser supply at generator station.
15ad1	--	Dr	34	36	T	400	E	Inside pumping station No. 2.
15ad2	--	Dr	69	26	T	750	E	Inside pumping station No. 4. Chemical analysis made.
15dd	--	Dr	--	--	-	--	-	New well in South Park.
North Bend								
A17-6-7bb1	1940	Dr	54	24	T	200	E	Northwest part of town. Chemical analysis made.
7bb2	1917	Dr	54	12	T	200	E	Northwest part of town. Chemical analysis made.
Fremont								
A17-8-14bc	--	Dr	--	--	T	--	-	Northwest well, 19th and I Streets.
14cd	1947	Dr	108	24	T	4,000	E	Power-plant well, 9th and C Streets; boiler and condenser supply only.
14db	--	Dr	--	--	T	--	-	Northeast well, 14th and Irving Avenue.
23ad	1941	Dr	103	24	T	1,350	E	Southeast well, 3d and Bell Streets; chemical analysis made. Principal public-supply well.
23bb	--	Dr	--	--	T	--	-	Power-plant well, 8th and Park Avenue; boiler and condenser supply only.

1 Dr, Drilled.
2 T, Turbine pump; C, centrifugal pump; P, plunger-type (Reciprocating).
3 E, Electric motor; G, natural gas.
4 Test pumped only; drawdown, 13 feet after 8 hours pumping 1,600 gallons a minute.

Table 8.--Summary of municipal water supplies in the lower Platte River Valley, Nebraska

City or Town	No. of wells	Storage capacity (gallons)	Daily consumption (thousands of gal.)	
			Maximum	Average
North Platte	a 44	None	4,048	2,330
Gothenburg	3	65,000	b 400	b 200
Cozad	8	50,000	1,000	300
Lexington	c 9	93,000	3,000	1,000
Overton	1	50,000	b 285	b 120
Elm Creek	7	40,000	b 60	b 40
Kearney	d 7	1,000,000	5,000	1,500
Gibbon	1	65,000	b 396	b 200
Shelton	2	65,000	600	200
Wood River	1	50,000	b 295	b 70
Grand Island	12	1,000,000	---	8,380
Central City	2	93,000	180	100
Silver Creek	2	e	48	20
Columbus	5	---	---	713.3
Schuyler	5	84,600	265	200
North Bend	2	f 28,000	160	120
Fremont	g 5	---	4,327	2,085.7

a Of this total, 38 are sand-point wells, 6 inches in diameter, interconnected in a vacuum system to two centrifugal pumps. In addition, a new well, 18 inches in diameter and 178 feet deep, was completed in April 1947.

b Data collected in 1932.

c Of this total, five are sand-point wells 6 inches in diameter, interconnected to a triplex pump.

d In addition to these, two new wells have been completed and will be equipped with pumps.

e Water is pumped into a steel pressure tank.

f Water system includes an iron-removal plant of the aeration type consisting of a steel tower that has a capacity of 50,000 gallons a day.

g Two of these wells are used for condenser supply only; the other three pump directly into the mains.

CHEMICAL QUALITY OF THE GROUND WATER

By Herbert A. Swenson

INTRODUCTION

The purpose of this section is to define the present quality of ground waters in the lower Platte River Valley and to discuss the mineral content of these waters insofar as it has practical significance on domestic and agricultural utilization.

In the determination of mineral character of ground waters in the valley, chemical analyses were made of waters from wells along the lower Platte River between North Platte and Fremont, Nebraska. Water samples were obtained from 18 wells, 15 of which are used as minicipal supplies, and three for irrigation purposes. The municipal well sampled at North Platte and the Vic Halligan irrigation well (13-20-15cc) near North Platte obtain water from the Ogallala formation, and the municipal well sampled at Lexington may derive its water supply from a combination of the Pleistocene deposits and the underlying Ogallala formation. The remaining wells which were sampled obtain their water exclusively from the Pleistocene sands and gravels.

The chemical analyses of ground waters from municipally-owned wells not only provide information on the quality of public supplies in the valley but also show the probable mineral character of adjacent ground waters from wells pumped for irrigation of crop lands.

PHYSICAL PROPERTIES AND CHEMICAL CONSTITUENTS

In the following paragraphs are discussions of physical measurements of water as well as those mineral constituents in solution present in sufficient quantities to have practical significance.

Temperature.--Information on water temperature is necessary for certain industrial processes and is used in the determination of the yield of a well. The temperature of water in the ground at any place is in general about the same as the mean annual air temperature[17]. Near the surface the temperature of the water follows the changes in air temperature; at greater depths the water has a higher temperature corresponding to the increase of the earth temperature with increasing depth.

For practical purposes it may be stated that a ground-water supply obtained at any depth from 20 to 200 feet will have a uniform temperature ranging from about 3° to 6° F above the mean annual air temperatures. If the supply comes from a depth more than 300 feet the difference in temperature due to increased depth must be taken into account. Temperatures measured for ground waters in the lower Platte River Valley ranged from 51° to 57° F, with a mean of 55°. None of the wells discussed in this section exceed 300 feet in depth.

pH.--The degree of acidity or alkalinity of water, as indicated by the hydrogen-ion concentration, or pH, is related to the corrosive properties of water. The value, pH, which represents the negative

17 Collins, W. D., Temperature of water available for industrial use in the United States; U. S. Geol. Survey Water Supply Paper 520-F, pp. 97-98, 1925.

logarithm of the number of moles of ionized hydrogen per liter of water, should also be known so that proper treatment for coagulation may be made at water-treatment plants. A pH value of 7.0 indicates that the water is neither acid nor alkaline. For practical purposes, the pH scale may be used with reference to acidity and alkalinity, as a temperature scale is used with reference to heat conditions. The pH of most natural waters varies between 6.0 and 8.0. Some alkaline waters have pH values greater than 8.0 and waters containing free mineral acid have values less than 4.5. The pH of water indicates its acidity toward metal surfaces, and as the pH increases, the corrosive activities of the water decrease. The pH values of the waters sampled in the lower Platte River Valley range from 7.3 to 8.5.

Specific conductance.--The specific conductance of a water is a measure of its ability to conduct a current of electricity. It varies with the temperature and with the concentration and degree of ionization of the different minerals in solution; results are expressed in reciprocal ohms (mhos x 10^5) at 25° C. When considered in conjunction with determinations for other constituents, specific conductance is a useful determination. For ground waters of fairly uniform composition, the specific conductance bears a fairly definite relation to the total concentration of dissolved minerals. Values reported range from 34.9 to 147 reciprocal ohms.

Silica.--Silica is dissolved from practically all rocks. A few natural waters contain less than 3 parts per million of silica and some contain more than 50 parts, but most of them contain from 10 to 30 parts

per million. Silica affects the usefulness of a water because it contributes to the formation of boiler scale. The analyses show a maximum silica content of 53 parts per million, although silica was not determined in all samples.

Iron.--Iron is dissolved from many rocks and soils and frequently from the iron pipes through which the water flows. Iron in water in the home is objectionable because it makes stains on porcelain or enameled fixtures and on clothing and other fabrics. Water furnished to domestic consumers preferably should not contain more than 0.3 parts per million of iron. On exposure to air, water that contains more than one part per million of iron soon becomes turbid with the insoluble compound produced by oxidation; surface waters therefore rarely contain as much as one part per million of dissolved iron. Ground waters and certain spring waters, however, frequently contain several parts per million of dissolved iron until they are brought in contact with air. Ground waters sampled in the lower Platte River Valley contained from .00 to .10 parts per million iron.

Calcium.--Calcium is dissolved from practically all rocks but particularly from limestone, dolomite, gypsum and gypsiferous shales. Calcium and magnesium make water hard and are the active agents in forming boiler scale. Most waters associated with granite or siliceous sands contain less than 10 parts per million of calcium; many waters from limestone contain from 30 to 100 parts; and waters that leach deposits of gypsum may contain several hundred parts. For the analyses given in this report, maximum and minimum values for ground waters are

190 and 38 parts per million of calcium respectively.

Magnesium.--Magnesium is dissolved from many rocks, particularly from dolomitic types. Its effects are similar to those of calcium. The magnesium in soft waters may amount to only 1 or 2 parts per million, but water may contain from 20 to 100 or more parts per million of magnesium in areas that contain large quantities of dolomite or other magnesium-bearing rocks. The analyses of ground-water samples collected in the Platte River Valley indicate magnesium values ranging from 6.0 to 42 parts per million.

Sodium and potassium.--Sodium and potassium are dissolved from practically all rocks. For most surface waters in humid regions, sodium and potassium make up only a small part of the dissolved mineral matter. In many semi-arid sections of western United States, however, sodium is often the predominant basic radicle in the more highly mineralized waters. Waters that carry more than 50 or 100 parts per million of sodium and potassium may require careful operation of steam boilers to prevent foaming. Where sodium salts make up most of the mineral content, the water may not be satisfactory for irrigation, and a few waters contain so much sodium that they are unfit for nearly all uses. A more detailed discussion of the effect of sodium in irrigation waters is given under the heading Percent Sodium. In the analyses given for ground waters the maximum value is 160 parts per million.

Carbonate and bicarbonate.--Carbonate and bicarbonate occur in waters largely through the action of carbon dioxide, which enables the water to dissolve carbonates of calcium and magnesium. Carbonate is

not present in appreciable quantities in many natural waters. The bicarbonate in waters that come from relatively insoluble rocks may amount to less than 10 parts per million; many waters from limestone contain from 200 to 400 parts per million. Results in parts per million for bicarbonate in waters sampled range from 132 to 394, with an average of 318.

Chloride.--Chloride is dissolved in small quantities from rock materials in most parts of the country. The chloride has little effect unless it is present in excessive quantities, as in brines. Surface waters in humid regions are usually low in chloride, while streams in arid or semi-arid regions may have several hundred parts per million of sodium chloride that has been leached from the soil and rocks, especially where such streams receive return drainage from irrigated lands. Drinking waters containing much more than 500 parts per million chloride may have a noticeable salty taste. The chloride concentration of ground waters sampled was low, ranging from 5 to 71 parts per million.

Fluoride.--Fluoride may be present in some rocks to about the same extent as chloride. However, the quantity present in natural waters is usually much less than that of chloride. Fluoride in water is known to be associated with the dental effect known as mottled enamel, if the water is used for drinking by young children during calcification or formation of the teeth. This condition becomes more noticeable as the quantity of fluoride in water increases above 1 part per million. It is reported that the incidence of dental caries (decay

of teeth) is decreased or prevented by quantities of fluoride that are not sufficient to cause permanent disfigurement from mottled enamel. The fluoride content of ground waters analyzed does not exceed 1 part per million.

Nitrate.--Nitrate in water may indicate previous contamination by sewage or other organic matter as it represents the final stage of oxidation in the nitrogen cycle. The quantities of nitrate usually present have no effect on the value of water for ordinary uses. Nitrate results for ground waters in the lower Platte River Valley range from 0.3 to 29 parts per million.

Boron.--The boron content of an irrigation water is of significance in the growth of many crops. Some crops,[18] as beans, are very sensitive to an excess of boron, and others, as sugar beets will tolerate large quantities. A water containing more than 2.0 parts per million of boron usually will cause trouble in time with many of the crops grown. The boron concentration of ground waters reported does not exceed 0.32 parts per million.

Dissolved solids.--The quantity reported as dissolved solids - the residue on evaporation - consists mainly of the dissolved mineral constituents in the water. It may also contain some organic matter and water of crystallization. Waters with less than 500 parts per million of dissolved solids are usually satisfactory for domestic and some industrial uses. Waters with more than 1,000 parts per million of dissolved solids are likely to be unsuitable for most domestic and industrial uses. Waters containing several thousand parts per million

18 Magistad, O. C., and Christiansen, J. E., Saline Soils, Their nature and management: U. S. Dept. Agr. Circ. 707, p. 9, Sept. 1944.

of solids in solution are sometimes successfully used for irrigation when irrigation practices permit removal of soluble salts through the application of large volumes of water on well-drained lands. For a class 1 irrigation water[19] otherwise suitable for most plants under most conditions the dissolved solids should preferably not exceed 700 parts per million. For ground waters reported in this section the dissolved solids range from 240 to 1,060 parts per million.

Hardness.--Hardness is the characteristic of water that receives most attention with reference to industrial and domestic use. It is recognized by the quantity of soap required to produce a lather and by the formation of insoluble curd which is objectionable in all washing processes. Hardness is caused almost entirely by calcium and magnesium and is reported as calcium carbonate ($CaCO_3$) equivalent to the calcium and magnesium. The hardness caused by calcium and magnesium equivalent to the bicarbonate or carbonate in a water is called carbonate hardness; the hardness caused by other compounds of calcium and magnesium is called noncarbonate hardness.

Water that has less than 60 parts per million of hardness is usually considered soft and suitable for most purposes without further softening. Hardness between 60 and 120 parts per million does not seriously interfere with the use of water for most purposes except for use in high-pressure steam boilers and in some industrial processes. Waters with hardness ranging from 121 to 200 are considered hard, and in the upper ranges laundries and industries may profitably soften the supply. Water with

19 Magistad, O. C., and Christiansen, J. E., op. cit., p. 9.

hardness beyond 200 parts per million usually requires some treatment for removal of hardness before being used for most purposes. Hardness values for ground waters sampled in the lower Platte River Valley range from 119 to 581 parts per million.

Percent sodium.--The proportion of sodium to other basic constituents in a water has a bearing on the suitability of the water for irrigation. Percent sodium is defined as the result obtained by dividing the equivalents per million of sodium by the equivalents per million of the cations (usually calcium, magnesium, sodium and potassium) and multiplying by 100. Waters in which the percent sodium is more than 60 may be injurious when applied to certain types of soils, particularly when adequate drainage is not provided.

The relative quantities of calcium and sodium absorbed on a soil greatly modify its phsical properties and its permeability to water. High concentrations of sodium in solution tend to replace calcium and magnesium from the mineral and organic complexes of the soil with the result that the soil becomes gelatinous and relatively impermeable to the movement of water. It has been reported[20] that even on sandy soils with good drainage, waters of 85 percent sodium or higher will give rise to impermeable soils after prolonged use. The percent sodium values in ground waters analyzed for this study are all below 60, ranging from 3 to 43.

20 Magistad, O. C., and Christianson, J. E., op. cit., p. 8.

QUALITY OF GROUND WATERS

General

For convenience in the discussion of quality of ground waters, the lower Platte River Valley has arbitrarily been divided into western and eastern parts as shown in figure 9. The western part of the lower valley extends from the city of North Platte downstream to the vicinity of Shelton, Nebraska, and the eastern part extends from Shelton to Fremont.

Practically all major diversions of Platte River water for irrigation of crop lands are found in the western part of the valley. Higher values for dissolved solids, hardness, and percent sodium were generally found for ground waters above Shelton. This relationship is shown graphically in figure 10, where these values are plotted against distance downstream from North Platte.

Extensive use and re-use of return flows are made in the western part of the valley. This is reflected in the analyses of ground waters, particularly in the ratios of sulfate to carbonate (calculated from bicarbonate) and also to a certain extent from specific conductance values. While bicarbonate values do not show appreciable fluctuation west to east, sulfates are found generally in greater concentrations in the western part. Figure 11 gives sulfate-carbonate ratios plotted downstream from North Platte. Specific conductance determinations, indicative of total salinity, further point out the general increased mineralization of ground waters in the western part, and these results are plotted in figure 12.

Ground waters furnishing public supplies to cities and villages in the valley are all hard, the minimum value reported as calcium

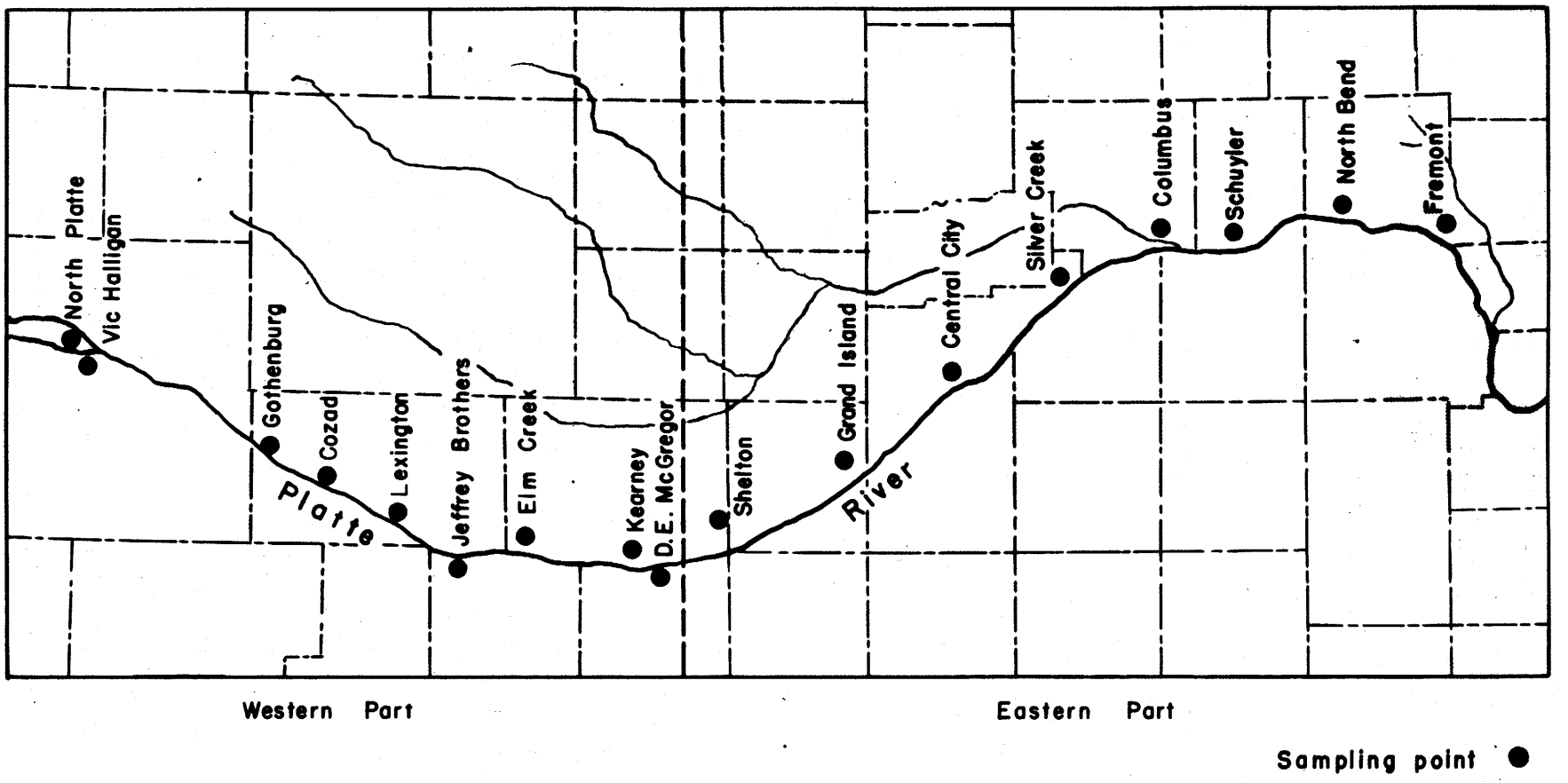

Figure 9 - Map of lower Platte River Valley, Nebraska showing divisions of study and sampling points.

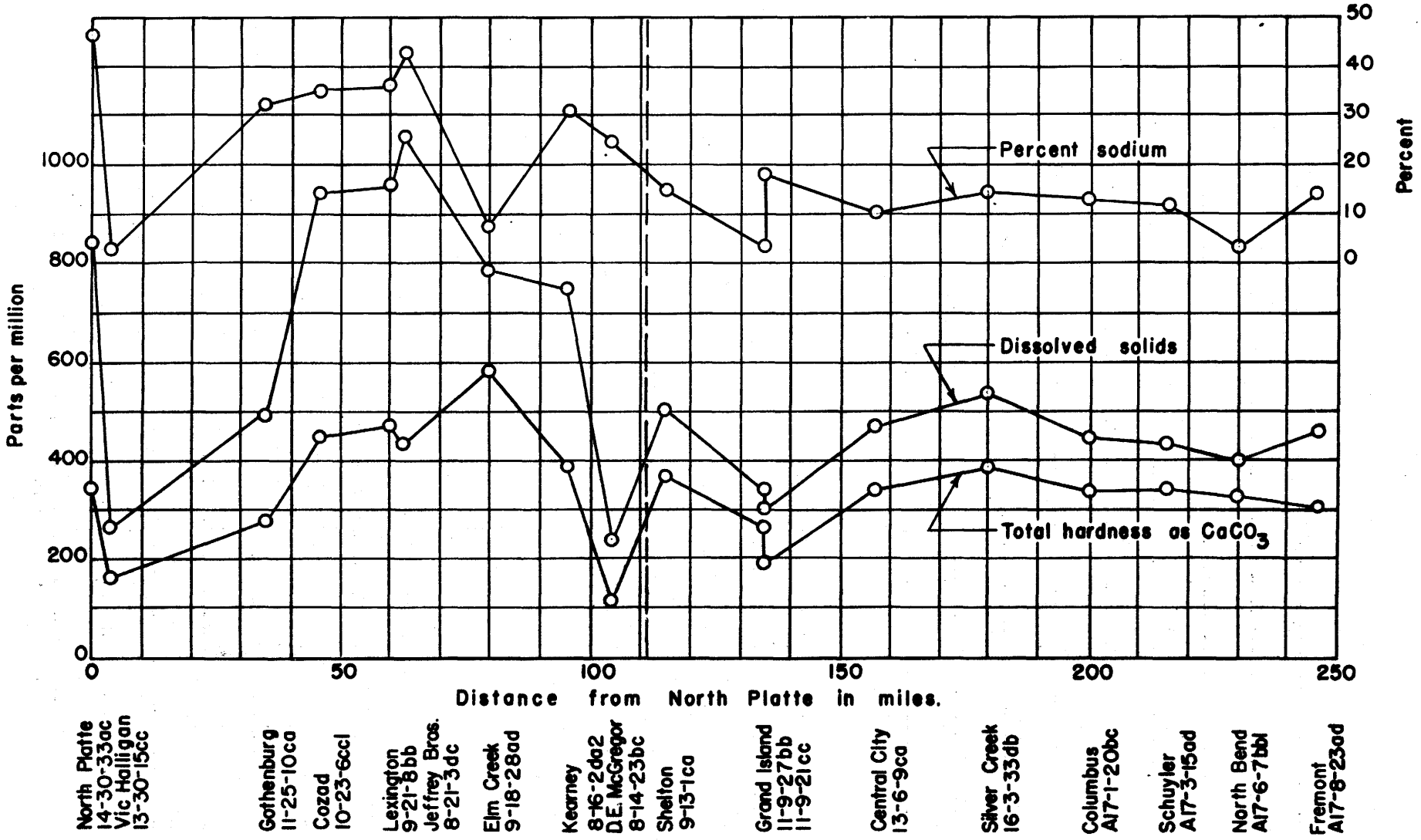

Figure 10.-Study of mineral concentration in ground waters from west to east, lower Platte River Valley, Nebraska.

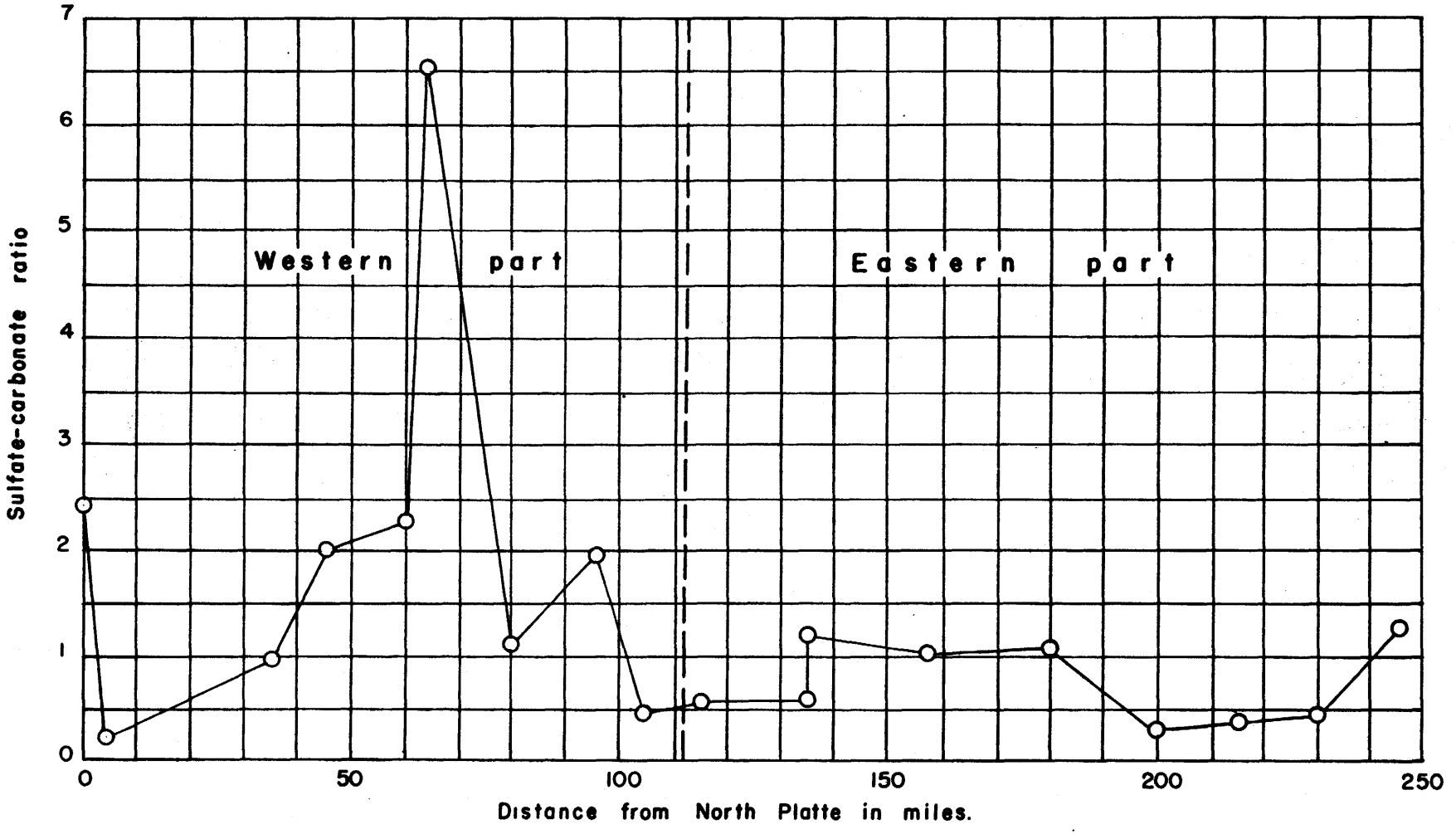

Figure 11.- Relation of sulfate-carbonate ratio in ground waters of the lower Platte River Valley, to the distance in miles from North Platte, Nebraska.

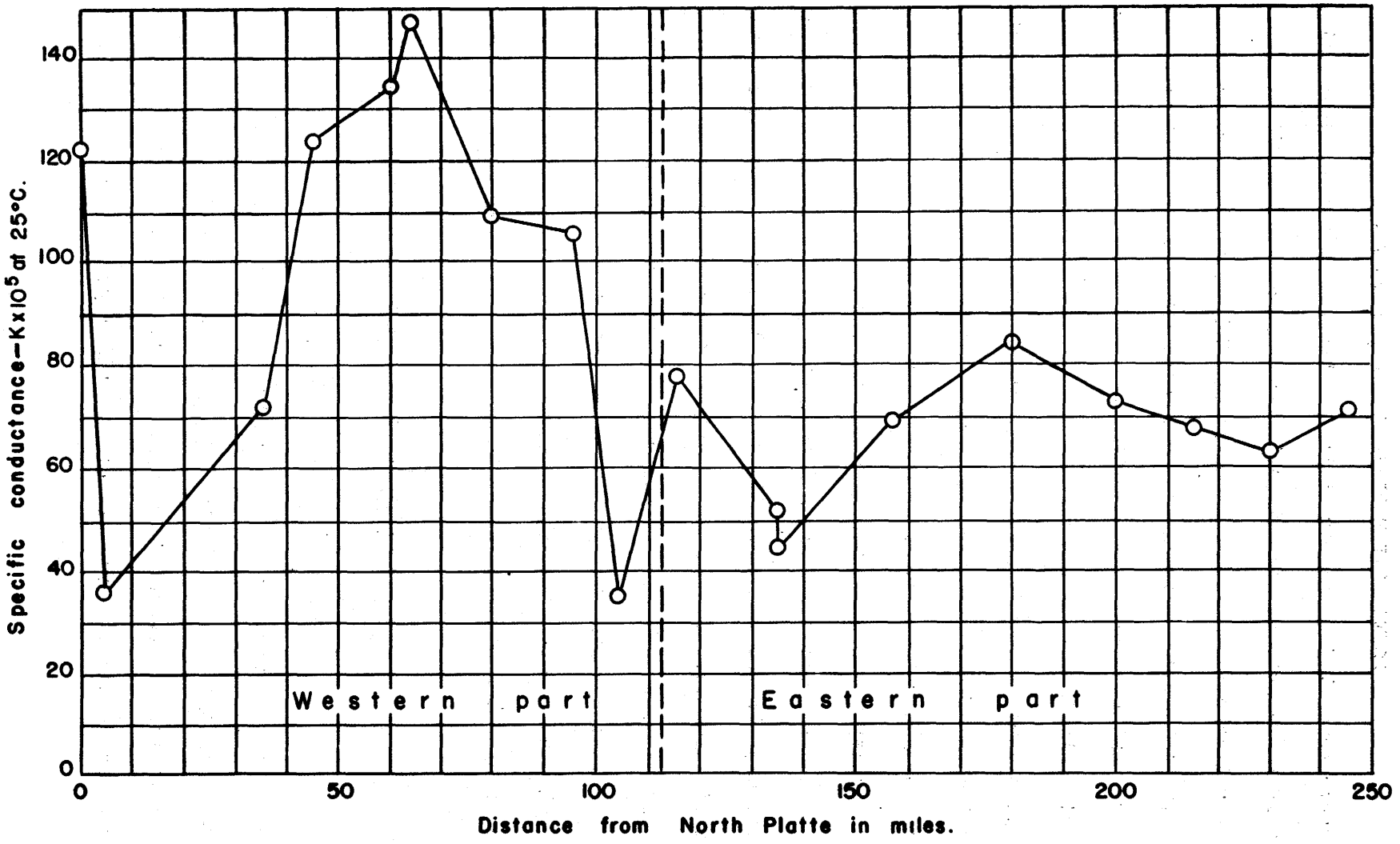

Figure 12 - Relation of specific conductance of ground waters of the lower Platte River Valley, to the distance in miles from North Platte, Nebraska.

carbonate being 197 parts per million. Concentrations of dissolved minerals range from 305 to 957 parts, and as previously indicated, the higher values being found above Shelton. Chloride concentrations range from 5.6 to 76 parts per million, while results for fluoride do not exceed one part per million. Nitrates range from 0.3 to 25, and average approximately 10 parts per million.

Considered as irrigation waters, all ground waters analyzed met class 1 standards with respect to boron content and percent sodium. The higher mineral content for several ground waters in the western part of the valley would group these waters in class 2. All ground waters in the eastern part, downstream from Shelton, met class 1 requirements. In general, all ground waters discussed in this section are suitable for irrigation use; even along reaches of the river, where return flow conditions exist, salinity concentrations have not been found critical.

Complete chemical analyses in parts per million with related physical measurements for all ground waters sampled in this study are given in tables 9 and 10.

Western Part of the Valley

As previously noted and by reference to table 9, shallow ground waters in the western part of the valley generally are found to contain somewhat greater amounts of dissolved mineral solids than are found downstream from Shelton. This may be due to the many diversions of the river water in the western part of the valley creating a condition in

which the water is used over and over for downstream agricultural development. The concentration of salts in drainage water from irrigated lands is greater than that found in waters applied to the land. This drainage water upon mixing with the ground water will in general increase the salinity of the latter.

Of the municipalities in the western part of the valley whose water supplies were analyzed for this report, Lexington, with 957 parts per million and Gothenburg with 497 parts, represented extremes in concentration of dissolved solids. Gothenburg and Elm Creek had public supplies meeting the requirements for chemical characteristics recommended by the United States Public Health Service[21]. Supplies furnishing water to North Platte, Cozad, Lexington and Kearney all contain sulfate in amounts exceeding 250 parts per million, the recommended maximum of the Public Health Service.

The three samples of irrigation waters from wells 13-30-15cc (Vic Halligan), 8-21-3dc (Jeffrey Brothers), and 8-14-23bc (D. E. McGregor) met standards for class 1 irrigation waters with respect to percent sodium and boron, and with the exception of the water from well 8-21-3dc, for mineral content and specific conductance. The dissolved solids concentration of 1,060 parts per million and the specific conductance value of 147 would place the latter water as a class 2 irrigation water.

All ground waters analyzed in the western part of the valley, considered as irrigation waters, would be class 1 or 2, depending upon

21 U. S. Pub. Health Serv., Drinking water standards: Pub. Health Repts., vol. 61, no. 11, pp. 371-384, 1946.

Table 9.—Mineral constituents, in parts per million, and related physical measurements of ground waters, lower Platte River Valley, Nebraska (western part)

Owner and well number	Date of collection	Depth (feet)		Diameter (inches)	Discharge (gallons a minute)	Temperature (°F)	pH	Specific conductance K x 10^5 at 25°C	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$		Percent Sodium
		Well	To water surface																			Total	Noncarbonate	
City of North Platte 14-30-33ac	4-24-47	90	10	18	1500	53	8.5	122	36	0.10	105	20	143		256	311	76	1.0	15	0.32	841	344	134	47
Vic Halligan 13-30-15cc	7-15-47	246	16.2	24	1700	56	8.0	36.4	53	.00	54	10	2.9		183	17	5.0	.4	8.0	.09	264	176	26	3
City of Gothenburg 11-25-10ca	4-22-47	33	-	24	-	-	7.5	72.0	-	.05	89	13	63		270	129	36	.4	2.5	.05	497	276	55	33
City of Cozad 10-23-6ccl	4-22-47	33	-	30	-	51	8.5	123	-	.00	139	25	116		364	357	18	.4	4.0	.05	939	450	152	36
City of Lexington 9-21-3bb	4-22-47	60	10	18	-	53	7.7	134	46	.05	141	30	126		346	387	35	.5	15	.11	957	475	191	37
Jeffrey Bros. 8-21-3dc	7-15-47	60	15	24	1000	55	8.1	147	45	.10	105	42	160	16	158	513	71	.6	29	.17	1060	435	306	43
Village of Elm Creek 9-18-28ad	4-21-47	29.4	9.8	8-24	250	55	7.4	109	-	.05	190	26	22		394	214	48	.1	20	.07	793	581	258	8
City of Kearney 8-16-2da2	4-21-47	43	-	26	670	54	7.3	106	-	.05	122	23	81		292	277	30	.4	5.0	.03	746	399	160	31
D.E. McGregor 8-14-23bc	8-22-47	56	9	36-18	1200	54	8.4	34.9	40	.02	38	6.0	21	2.0	132	31	10	.2	17	.16	240	119	11	25

Table 10.—Mineral constituents, in parts per million, and related physical measurements of ground waters, lower Platte River Valley, Nebraska (eastern part)

Owner and well number	Date of collection	Depth (feet)		Diameter (inches)	Discharge (gallons a minute)	Temperature (°F)	pH	Specific conductance K×10⁵ at 25°C	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$		Percent Sodium
		Well	To water surface																			Total	Noncarbonate	
Village of Shelton 9-13-1ca	4-21-47	42	18	24	700	55	7.8	77.9	-	0.05	119	19	31		344	91	38	0.2	15	0.07	503	375	93	15
City of Grand Island 11-9-27bb	4-4-47	113.1	9.0	25	1300	54	8.0	52.1	-	.00	71	22	3.9		239	65	6.0	.3	4.0	-	339	268	72	3
City of Grand Island 11-9-21cc	4-4-47	82.8	11.4	25	820	54	7.6	44.7	-	.00	61	11	20		155	95	5.6	.2	8.0	-	305	197	70	18
City of Central City 13-6-9ca	4-14-47	52	4.5	25	400	56	7.6	69.6	-	.05	105	19	20		256	127	17	.4	20	.14	471	340	130	11
Village of Silver Creek 16-3-33db	4-14-47	32	5.5	72	150	56	7.9	83.9	-	.05	123	20	31		306	161	24	.5	4.0	.09	541	389	138	15
City of Columbus A17-1-20bc	4-14-47	100	16	24	600	54	7.7	73.0	-	.10	106	18	23		382	56	11	.2	0.3	.08	449	338	25	13
City of Schuyler A17-3-15ad	4-16-47	68	12	26	750	56	7.9	68.5	-	.10	103	21	22		356	64	8.0	.2	25	.11	439	343	51	12
Village of North Bend A17-6-7bb1	4-15-47	54	3.5	24	200	57	8.0	63.4	-	.10	109	14	7.0		307	66	16	.3	0.3	.07	402	330	78	4
City of Fremont A17-8-23ad	4-16-47	105	17	24	1350	55	7.9	71.5	-	.10	96	17	25		209	132	27	.4	20	.14	469	309	138	15

their dissolved solids content. Calcium and magnesium combined as equivalents composed more than one-half of the bases for all samples analyzed. The results of chemical analyses, expressed as equivalents per million, are shown graphically in figure 13, where the heights of the diagrams are proportional to the concentrations of constituents as equivalents.

Eastern Part of the Valley

Ground waters analyzed in that part of the lower Platte River Valley below Shelton are fairly uniform in mineral concentration. Results of chemical analyses for samples in the eastern part of the valley are given in table 10. Well waters for which analyses are reported range from 305 to 541 parts per million dissolved solids and average 392. Minimum hardness for waters in the eastern part of the valley is 197 parts per million. All the ground waters sampled below Shelton are calcium bicarbonate waters. They were appreciably less mineralized and in general contained smaller amounts of sulfate than waters in the western part.

All waters sampled in the eastern part of the valley are used as municipal supplies and meet all standards for chemical characteristics recommended by the Public Health Service. These waters are suitable for all domestic purposes except that many are very hard.

Considered as irrigation waters, all ground waters sampled in the eastern part of the valley satisfy class 1 standards. Percent sodium rangesfrom 3 to 18, while concentrations of boron and dissolved solids do not exceed 0.14 and 541 parts per million respectively.

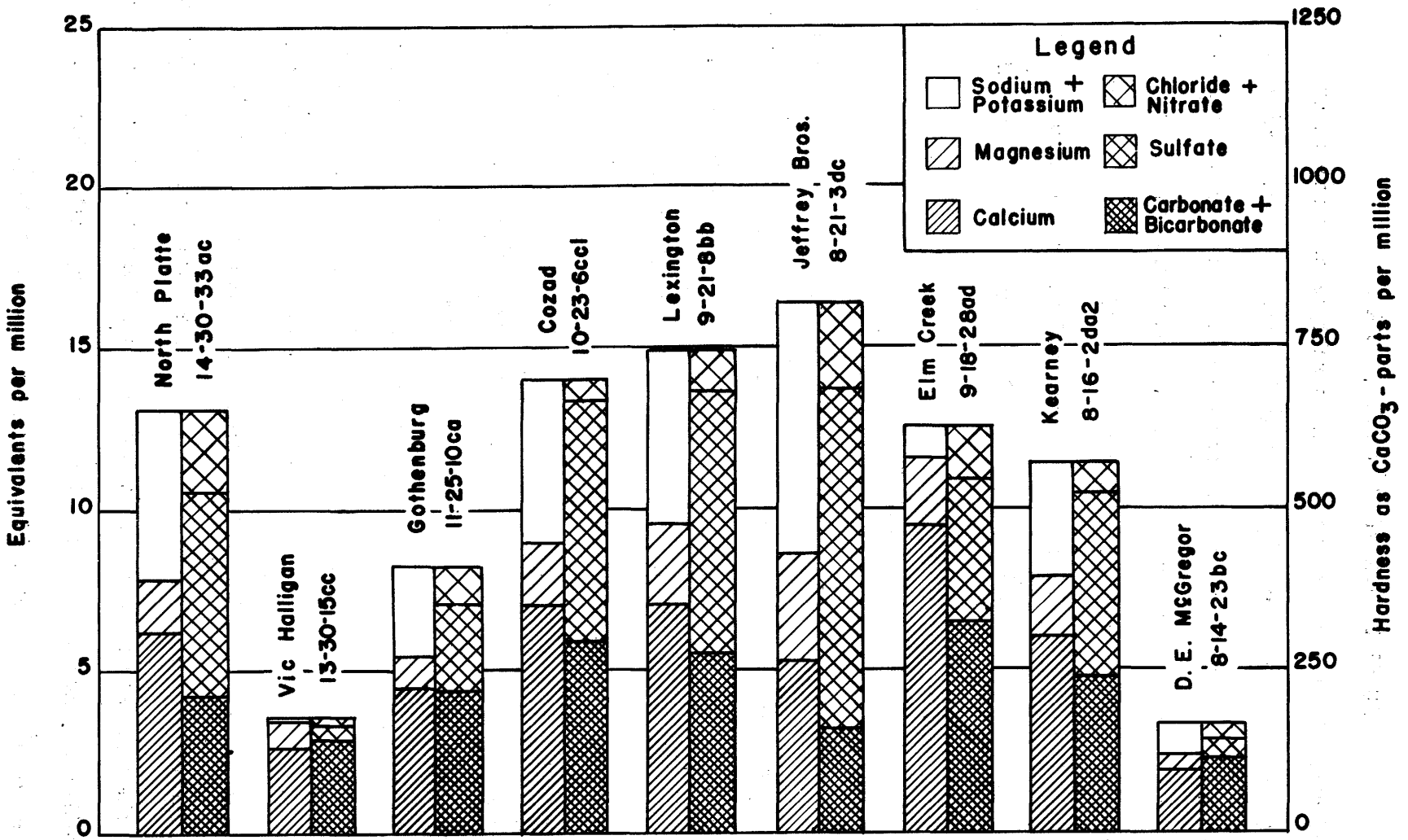

Figure 13 - Principal mineral constituents present in ground waters of the lower Platte River Valley, Nebraska. (western part).

Lower salinity values and reduction in sulfate concentrations observed in the eastern part of the valley as contrasted with results found above Shelton probably can be attributed to the absence of major diversions from the Platte River with consequent mixing of drainage water with the ground water. This lower degree of mineralization for waters in the eastern part of the valley is evident from figure 14, in which analytical results have been reported in equivalents per million.

SUMMARY

All ground waters sampled in the lower Platte River Valley contained less than 1,000 parts per million total solids with the single exception of water from well 8-21-3dc. Hardness values are above limits considered desirable for public water supplies. The analyses of ground waters in the valley do not reveal any serious condition that would adversely affect the use of these waters for municipal or irrigation purposes. Other shallow ground waters in the valley are probably similar in mineral character to those waters analyzed for this report.

The analyses show relatively higher dissolved solids content with appreciably more sulfate in shallow ground waters in the western part of the valley. This condition may be attributed to the fact that the ground water is recharged in part by drainage waters which have been used and reused on irrigation tracts along the Platte River above Shelton. However, the analyses indicate that the ground waters in the western part of the valley are largely class 1 irrigation waters, with a few waters containing higher dissolved solids being grouped in class 2.

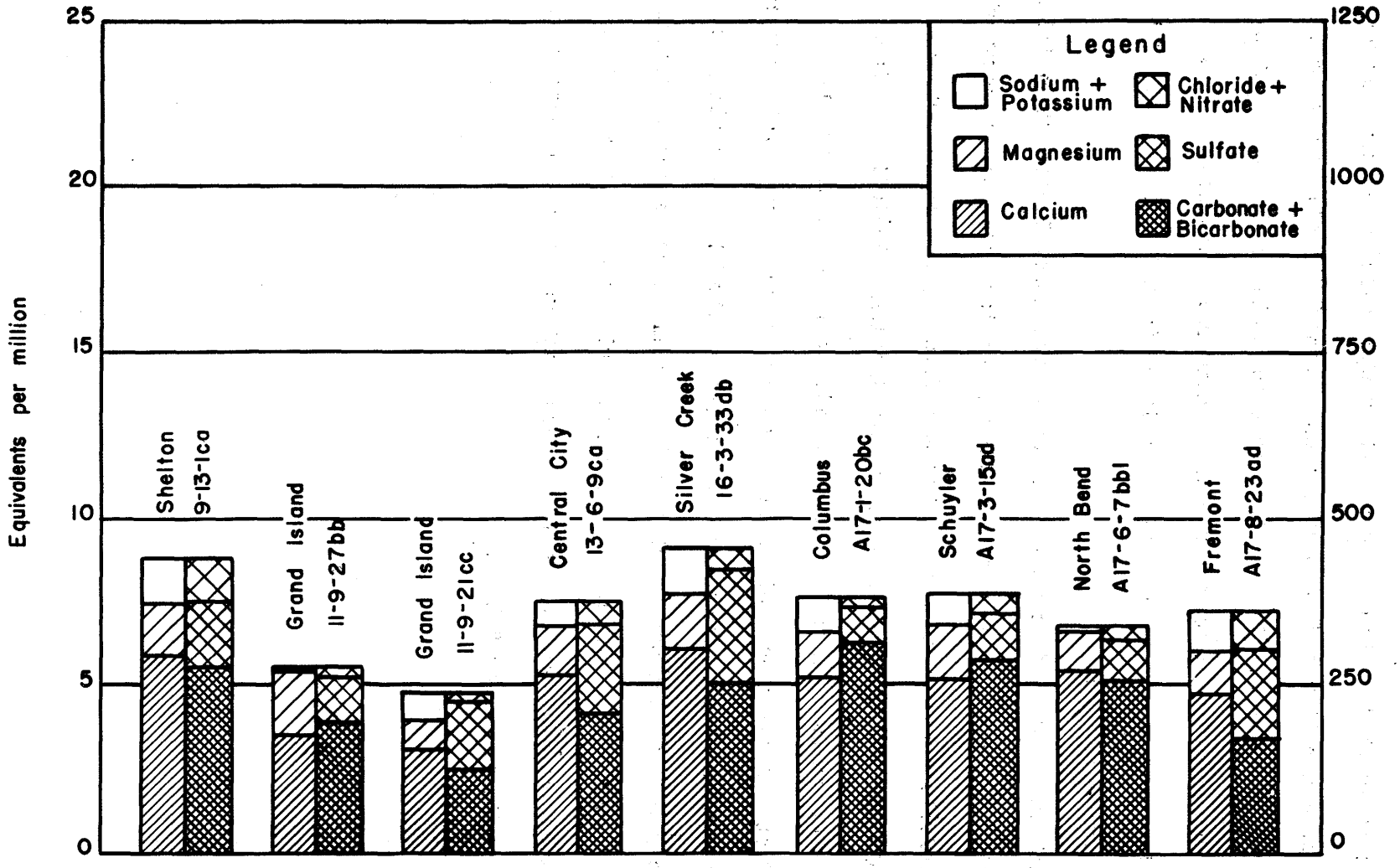

Figure 14.- Principal mineral constituents present in ground waters of the lower Platte River Valley, Nebraska. (eastern part).

Waters sampled in the eastern part of the valley were more uniform in both concentration and composition and essentially all were of calcium bicarbonate type. These waters were suitable as public supplies though somewhat harder than generally considered satisfactory. As irrigation waters, the ground waters analyzed in the eastern part of the valley would all be class 1.

With increase in irrigation throughout the lower Platte River Valley there will be maximum use of return flows, particularly during years of low rainfall. This maximum use of return flow may result in a considerable increase in ground water mineralization. Periodic chemical analyses of ground waters in this area will be required to evaluate the effects of the re-use of drainage waters and to provide information for salinity control. Furthermore, studies of the mineral quality of surface waters at selected gaging stations will be necessary to define present natural conditions. Such studies would be of major importance because of the inter-relationship between surface and ground waters in the lower Platte River Valley.

Table 11.--Water-level measurements in wells, in feet below land-surface datum

Adams County

8-12-8ab

Date	Water level	Date	Water level	Date	Water level
Feb. 15, 1946	9.30	Sept. 7, 1946	9.72	Mar. 19, 1947	8.33
Mar. 13	9.29	Oct. 4	9.20	May 14	8.05
Apr. 11	9.30	Nov. 15	8.11	July 16	7.68
May 10	9.35	Dec. 6	7.98	Sept. 11	8.70
June 5	9.37	Jan. 10, 1947	8.23	Nov. 7	8.85
July 12	9.31				

Buffalo County

8-16-3cb

Jan. 16, 1946	12.11	July 10, 1946	12.78	Jan. 7, 1947	10.74
Feb. 13	12.05	Aug. 7	13.22	Mar. 12	10.97
Mar. 14	11.97	Sept. 5	12.22	May 12	10.95
Apr. 10	11.98	Oct. 7	11.55	July 11	11.15
May 8	11.64	Nov. 7	10.98	Sept. 8	10.22
June 7	12.30	Dec. 3	10.48	Nov. 4	12.12

8-16-10cc

Sept. 5, 1946	3.71	Jan. 7, 1947	3.09	July 11, 1947	2.04
Oct. 7	2.53	Mar. 12	1.80	Sept. 8	3.68
Nov. 7	1.76	May 12	2.83	Nov. 4	2.79
Dec. 3	2.34				

8-16-12cc

Oct. 18, 1945	5.74	June 5, 1946	4.99	Jan. 7, 1947	7.80
Dec. 12	5.21	July 10	5.20	Mar. 12	5.10
Jan. 17, 1946	4.70	Aug. 7	5.42	May 12	5.04
Feb. 13	5.25	Sept. 5	5.62	July 11	4.95
Mar. 13	4.96	Oct. 7	4.05	Sept.11	6.45
Apr. 10	5.00	Nov. 7	4.51	Nov. 4	6.22
May 8	5.28	Dec. 3	4.26		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Buffalo County--Continued

8-17-1da

Date	Water level	Date	Water level	Date	Water level
Oct. 18, 1945	6.92	June 6, 1946	7.62	Jan. 7, 1947	6.62
Dec. 13	7.69	July 10	8.27	Mar. 12	6.74
Jan. 17, 1946	7.64	Aug. 7	6.02	May 12	6.86
Feb. 13	7.67	Sept. 5	6.63	July 11	6.57
Mar. 14	7.37	Oct. 7	4.18	Sept. 8	9.00
Apr. 10	7.12	Nov. 7	5.53	Nov. 4	9.37
May 8	7.84	Dec. 3	5.11		

8-17-4bc

Feb. 13, 1946	7.57	Aug. 7, 1946	9.23	Jan. 7, 1947	6.08
Mar. 14	7.20	Sept. 5	10.05	Mar. 12	5.68
Apr. 10	6.88	Oct. 7	7.95	May 12	6.04
May 8	7.77	Nov. 7	7.49	July 11	6.54
June 6	7.69	Dec. 3	5.26	Nov. 4	9.80
July 10	8.42				

8-17-12dd

Oct. 18, 1945	2.45	June 6, 1946	2.53	Jan. 7, 1947	1.97
Dec. 13	2.88	July 10	3.06	Mar. 12	1.52
Jan. 17, 1946	2.32	Aug. 7	3.32	May 12	2.90
Feb. 13	1.67	Sept. 5	3.37	July 11	2.48
Mar. 14	2.38	Oct. 7	2.29	Sept. 8	3.47
Apr. 10	2.47	Nov. 7	2.01	Nov. 4	2.92
May 8	2.67	Dec. 3	2.76		

8-18-4cb

Sept. 5, 1946	9.62	Jan. 7, 1947	8.66	July 11, 1947	7.44
Oct. 7	7.30	Mar. 12	8.68	Sept. 8	9.67
Nov. 7	8.18	May 12	8.95	Nov. 4	9.65
Dec. 3	8.15				

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Buffalo County--Continued

9-13-5cb

Date	Water level	Date	Water level	Date	Water level
Oct. 18, 1945	20.34	June 7, 1946	19.99	Jan. 6, 1947	20.58
Dec. 12	20.16	July 10	20.62	Mar. 10	20.12
Jan. 17, 1946	20.10	Aug. 7	22.22	May 12	19.59
Feb. 13	20.02	Sept. 5	22.54	July 10	18.10
Mar. 13	19.95	Oct. 4	22.02	Sept. 5	20.75
Apr. 10	19.85	Nov. 7	19.42	Nov. 3	19.35
May 8	19.76	Dec. 2	20.90		

9-13-9cc

Oct. 19, 1945	14.57	May 8, 1946	13.60	Jan. 6, 1947	13.60
Dec. 12	14.00	June 7	13.60	Mar. 10	13.19
Jan. 17, 1946	13.93	July 10	13.91	May 12	12.80
Feb. 13	13.79	Oct. 4	17.09	July 10	13.00
Mar. 13	13.72	Nov. 7	14.66	Nov. 3	12.44
Apr. 10	13.60	Dec. 2	14.22		

9-13-22bc

Oct. 18, 1945	8.69	May 8, 1946	8.27	Nov. 7, 1946	8.49
Dec. 12	8.57	June 7	8.38	Dec. 2	7.87
Jan. 17, 1946	8.39	July 10	9.22	Jan. 6, 1947	8.05
Feb. 13	8.21	Aug. 7	10.97	Mar. 10	7.81
Mar. 13	8.17	Sept. 5	12.74	May 12	7.49
Apr. 10	8.03	Oct. 4	11.47	July 10	7.68

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Buffalo County--Continued

9-14-1dc.

Lowest daily water level, 1946-47

/Measurements made after Nov. 14 are taken from recorder charts/

Day	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	-	-	-	-	18.65	18.45	18.29	18.13	17.97	17.79	17.70	16.87	17.04	17.88	17.90	17.86	17.73
2	-	-	-	-	18.64	18.45	18.30	18.13	17.96	17.79	17.72	16.83	17.06	17.92	17.89	17.85	17.77
3	-	-	-	-	18.61	18.45	18.27	18.12	17.95	17.77	17.70	16.78	17.08	17.92	17.89	17.82	17.77
4	-	-	19.49	-	18.61	18.45	18.28	18.12	17.93	17.77	17.68	16.75	17.07	17.96	17.89	17.82	17.75
5	-	19.79	-	-	18.60	18.43	18.28	18.13	17.95	17.77	17.69	16.73	17.10	17.98	17.89	17.83	17.75
6	-	-	-	-	18.59	18.42	18.26	18.13	17.98	17.77	17.69	16.72	17.12	18.00	17.89	17.81	17.73
7	19.32	-	-	18.89	18.58	18.42	18.26	18.12	18.00	17.77	17.68	16.69	17.16	18.01	17.90	17.81	17.74
8	-	-	-	-	18.57	18.43	18.26	18.11	17.97	17.76	17.68	16.68	17.17	18.03	17.92	17.82	17.76
9	-	-	-	-	18.57	18.43	18.25	18.10	17.94	17.76	17.65	16.67	17.20	18.05	17.88	17.82	17.75
10	-	-	-	-	18.57	18.30	18.25	18.10	17.92	17.74	17.68	16.67	17.23	18.07	17.88	17.82	17.74
11	-	-	-	-	18.56	18.37	18.26	18.08	17.94	17.74	17.71	16.68	17.27	18.10	17.86	17.81	17.73
12	-	-	-	-	18.55	18.36	18.26	18.06	17.95	17.75	17.71	16.72	17.30	18.10	17.90	17.83	17.74
13	-	-	-	-	18.55	18.35	18.24	18.06	17.94	17.77	17.67	16.73	17.35	18.04	17.90	17.82	17.73
14	-	-	-	18.73	18.55	18.37	18.24	18.06	17.90	17.75	17.65	16.78	17.38	18.04	17.88	17.79	17.70
15	-	-	-	18.77	18.54	18.38	18.25	18.06	17.88	17.76	17.64	16.79	17.42	18.04	17.86	17.80	17.71
16	-	-	-	18.79	18.54	18.39	18.23	18.06	17.88	17.76	17.63	16.82	17.46	18.00	17.86	17.83	17.72
17	-	-	-	18.79	18.55	18.38	18.22	18.06	17.87	17.75	17.61	16.86	17.49	17.99	17.86	17.83	17.71
18	-	-	-	18.77	18.55	18.37	18.22	18.05	17.85	17.75	17.60	16.89	17.53	17.98	17.87	17.80	17.70
19	-	-	-	18.76	18.52	18.35	18.20	18.05	17.86	17.75	17.60	16.88	17.55	17.98	17.88	17.80	17.71
20	-	-	-	18.75	18.50	18.37	18.20	18.03	17.86	17.75	17.58	16.92	17.58	17.97	17.86	17.79	17.73
21	-	-	-	18.74	18.50	18.38	18.20	18.02	17.85	17.73	17.55	16.93	17.61	17.97	17.85	17.81	17.70
22	-	-	-	18.74	18.50	18.36	18.19	18.00	17.84	17.75	17.55	16.94	17.63	17.98	17.84	17.82	17.70
23	-	-	-	18.72	18.49	18.33	18.19	18.01	17.84	17.75	17.35	16.96	17.67	17.94	17.86	17.80	17.71
24	-	-	-	18.70	18.49	18.32	18.18	18.02	17.84	17.75	17.15	16.98	17.70	17.94	17.87	17.78	17.70
25	-	-	-	18.70	18.49	18.31	18.18	18.03	17.84	17.72	17.06	17.00	17.74	17.94	17.87	17.79	17.71
26	-	-	-	18.69	18.47	18.31	18.18	18.02	17.83	17.72	17.03	17.00	17.77	17.94	17.85	17.78	17.67
27	-	-	-	18.68	18.47	18.30	18.17	18.00	17.81	17.71	16.97	17.01	17.80	17.93	17.84	17.79	17.65
28	-	-	-	18.67	18.48	18.30	18.14	17.99	17.81	17.71	16.94	17.03	17.82	17.93	17.84	17.78	17.65
29	-	-	-	18.66	18.48	18.28	-	18.00	17.79	17.72	16.92	17.03	17.84	17.94	17.84	17.80	17.65
30	-	-	-	18.65	18.48	18.28	-	17.99	17.78	17.71	16.89	17.04	17.84	17.94	17.82	17.80	17.66
31	-	-	-	-	18.48	18.28	-	17.97	-	17.69	-	17.04	17.87	-	17.85	-	17.66

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Buffalo County--Continued

9-14-4cc

Date	Water level	Date	Water level	Date	Water level
June 7, 1946	20.06	Nov. 7, 1946	20.70	May 14, 1947	19.68
July 10	20.68	Dec. 3	20.25	July 11	17.68
Aug. 7	22.42	Jan. 6, 1947	19.91	Sept. 8	20.65
Sept. 5	23.11	Mar. 12	20.77	Nov. 4	19.65
Oct. 7	21.80				

9-14-13cb

May 15, 1945	19.66	May 8, 1946	19.20	Dec. 2, 1946	19.32
Oct. 18	19.33	June 7	19.15	Jan. 6, 1947	19.08
Dec. 12	19.30	July 10	19.75	Mar. 12	18.83
Jan. 17, 1946	19.32	Sept. 5	21.55	May 12	18.50
Feb. 13	19.27	Oct. 4	21.04	July 11	15.30
Mar. 13	19.22	Nov. 7	19.60	Nov. 3	18.25
Apr. 10	19.20				

9-14-19dd

Jan. 29, 1945	25.09	Jan. 29, 1946	25.00	Nov. 29, 1946	25.29
Feb. 28	24.92	Feb. 28	24.87	Dec. 29	24.67
Mar. 29	25.03	Mar. 29	24.71	Mar. 12, 1947	24.37
Apr. 30	24.85	Apr. 10	24.78	Apr. 29	24.19
May 29	24.79	29	24.71	May 29	23.99
June 29	24.79	May 29	24.92	June 27	23.69
Aug. 29	25.39	June 28	24.70	July 29	23.20
Sept.29	25.64	July 10	24.79	Aug. 29	24.79
Oct. 29	25.19	29	25.90	Oct. 29	24.83
Nov. 29	24.29	Aug. 29	27.26	Nov. 29	24.69
Dec. 29	24.92	Sept.29	26.86	Dec. 29	24.96
Jan. 17, 1946	25.04	Oct. 29	25.84		

9-14-21cc

Oct. 18, 1945	19.67	June 7, 1946	18.88	Jan. 6, 1947	18.72
Dec. 12	19.25	July 10	20.30	Mar. 12	18.45
Jan. 17, 1946	19.20	Aug. 7	21.58	Apr. 24	18.60
Feb. 13	19.12	Oct. 7	20.19	May 12	18.22
Mar. 13	19.04	Nov. 7	19.60	July 11	17.49
Apr. 10	18.97	Dec. 3	19.17	Nov. 3	19.08
May 8	18.90				

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Buffalo County--Continued

9-14-22bb

Date	Water level	Date	Water level	Date	Water level
July 10, 1946	17.27	Nov. 7, 1946	17.86	Mar. 12, 1947	16.64
Aug. 7	17.62	Dec. 3	17.48	May 12	16.28
Sept. 5	19.56	Jan. 6, 1947	17.05	July 11	15.00
Oct. 7	19.13				

9-14-34bb

Oct. 18, 1945	11.74	June 7, 1946	11.35	Jan. 6, 1947	10.15
Dec. 12	11.52	July 10	12.47	Mar. 10	10.33
Jan. 17, 1946	11.82	Aug. 7	13.75	May 12	10.07
Feb. 13	11.27	Sept. 5	14.37	July 11	10.05
Mar. 13	11.18	Oct. 7	12.40	Sept. 8	13.45
Apr. 10	11.15	Nov. 7	11.39	Nov. 3	11.83
May 8	11.36	Dec. 3	9.92		

9-15-11cb

Oct. 18, 1945	27.31	June 7, 1946	27.39	Jan. 6, 1947	27.05
Dec. 12	27.29	July 10	27.69	Mar. 12	26.78
Jan. 17, 1946	27.29	Aug. 7	28.07	May 12	26.75
Feb. 13	27.30	Sept. 5	28.39	July 11	23.67
Mar. 13	27.27	Oct. 7	28.08	Sept. 8	24.40
Apr. 10	27.27	Nov. 7	27.35	Nov. 4	24.87
May 8	27.32	Dec. 3	27.20		

9-15-16cc

Sept. 5, 1946	35.02	Dec. 3, 1946	33.45	May 12, 1947	32.62
Oct. 7	34.29	Jan. 6, 1947	33.19	July 11	32.24
Nov. 7	33.84	Mar. 12	32.81		

9-15-34bb

Oct. 8, 1945	20.58	Mar. 13, 1946	20.50	May 12, 1947	18.35
Dec. 12	20.33	Apr. 10	20.75	July 11	18.46
Jan. 17, 1946	20.33	Mar. 12, 1947	18.57	Nov. 4	21.03
Feb. 13	20.63				

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Buffalo County--Continued

9-17-31cd

Date	Water level	Date	Water level	Date	Water level
Feb. 13, 1946	11.12	Aug. 7, 1946	10.53	Mar. 12, 1947	10.09
Mar. 14	10.90	Sept. 5	10.42	May 12	9.30
Apr. 10	10.61	Oct. 7	8.02	July 11	8.30
May 8	10.79	Nov. 7	8.71	Sept. 8	9.47
June 6	10.49	Dec. 3	8.43	Nov. 4	11.58
July 10	10.74	Jan. 7, 1947	9.50		

9-18-27dd

Feb. 13, 1946	8.45	Aug. 7, 1946	8.77	Mar. 12, 1947	6.02
Mar. 14	8.57	Sept. 5	8.01	May 12	5.82
Apr. 10	8.49	Oct. 7	3.63	July 11	4.32
May 9	8.93	Nov. 7	4.96	Sept. 8	6.19
June 6	9.02	Dec. 3	4.33	Nov. 4	6.89
July 10	9.39	Jan. 7, 1947	5.47		

9-18-31cc

Feb. 14, 1946	11.42	Sept. 6, 1946	12.49	Mar. 12, 1947	10.39
Mar. 14	11.40	Oct. 8	7.38	May 12	10.45
Apr. 10	11.37	Nov. 7	10.22	July 11	8.84
May 9	11.17	Dec. 3	9.95	Sept. 8	11.49
June 6	11.33	Jan. 7, 1947	10.38	Nov. 4	11.65
July 10	11.70				

10-13-24bc

Mar. 13, 1946	24.25	Sept. 5, 1946	26.28	Mar. 10, 1947	24.34
Apr. 10	24.16	Oct. 4	25.42	May 12	24.17
May 8	24.14	Nov. 6	25.05	July 10	23.44
June 6	24.06	Dec. 2	24.88	Nov. 3	25.30
July 10	24.02	Jan. 6, 1947	24.65		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Butler County

A16-1-17bc

Date	Water level	Date	Water level	Date	Water level
Jan. 8, 1946	3.50	July 8, 1946	4.44	Jan. 2, 1947	4.37
Feb. 11	4.10	Aug. 5	5.40	Mar. 4	4.52
Mar. 11	3.42	Sept. 3	5.47	May 7	3.89
Apr. 8	3.98	Oct. 12	4.82	July 7	2.80
May 6	3.70	Nov. 4	4.82	Sept. 3	5.12
June 3	4.39	Dec. 9	3.85	Nov. 10	4.84

A16-2-14cc

Feb. 11, 1946	5.18	Aug. 5, 1946	5.68	Mar. 4, 1947	5.35
Mar. 11	4.97	Sept. 3	6.22	May 7	4.64
Apr. 8	5.09	Oct. 12	6.35	July 7	3.46
May 6	5.29	Nov. 4	6.24	Sept. 3	5.93
June 3	5.55	Dec. 9	5.20	Nov. 10	6.34
July 8	4.55	Jan. 2, 1947	5.51		

A16-2-30bc

Jan. 8, 1946	21.96	July 8, 1946	22.10	Jan. 2, 1947	22.56
Feb. 11	22.00	Aug. 5	22.68	Mar. 4	22.62
Mar. 11	21.97	Sept. 3	22.26	May 7	22.53
Apr. 8	22.09	Oct. 12	22.39	July 7	21.49
May 6	22.14	Nov. 4	22.50	Sept. 3	21.54
June 3	22.17	Dec. 9	22.44	Nov. 10	21.80

A16-3-1dc

Jan. 8, 1946	10.77	July 8, 1946	10.37	Jan. 2, 1947	11.65
Feb. 12	10.80	Aug. 5	11.53	Mar. 4	11.45
Mar. 11	10.72	Sept. 3	12.17	May 7	10.52
Apr. 8	10.92	Oct. 11	12.20	July 7	8.11
May 6	11.35	Nov. 5	12.25	Sept. 3	11.24
June 3	11.84	Dec. 9	11.31	Nov. 10	12.14

A-16-3-8dd

Oct. 12, 1946	4.43	Jan. 2, 1947	3.53	July 7, 1947	2.98
Nov. 4	4.30	Mar. 4	3.46	Sept. 3	4.86
Dec. 9	2.93	May 7	3.28	Nov. 10	4.53

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Butler County--Continued

A16-3-15cd

Date	Water level	Date	Water level	Date	Water level
Feb. 11, 1946	14.80	Aug. 5, 1946	17.28	Mar. 4, 1947	14.57
Mar. 11	14.77	Sept. 3	15.10	May 7	14.05
Apr. 8	14.84	Oct. 11	15.26	July 7	11.52
May 6	15.02	Nov. 4	15.19	Sept. 3	13.56
June 3	15.16	Dec. 9	14.64	Nov. 10	14.00
July 8	14.14	Jan. 2, 1947	14.74		

A17-4-28cd

Jan. 8, 1946	20.90	July 8, 1946	21.09	Jan. 2, 1947	21.42
Feb. 12	20.86	Aug. 5	21.64	Mar. 4	21.12
Mar. 11	20.57	Sept. 3	22.09	May 7	20.85
Apr. 8	20.78	Oct. 11	22.10	July 7	19.55
May 6	20.97	Nov. 5	21.81	Sept. 3	21.24
June 3	21.38	Dec. 9	21.27	Nov. 10	21.74

Colfax County

A17-2-16bc

Dec. 28, 1945	25.43	July 9, 1946	25.56	Jan. 2, 1947	25.90
Feb. 12, 1946	25.35	Aug. 6	26.02	Mar. 6	25.86
Mar. 11	25.11	Sept. 4	26.32	May 6	25.50
Apr. 9	25.44	Oct. 11	26.28	July 8	24.62
May 7	25.39	Nov. 5	26.10	Sept. 4	25.55
June 4	25.62	Dec. 9	25.71	Nov. 11	25.60

A17-2-22dd

Feb. 12, 1946	5.63	Aug. 6, 1946	5.70	Mar. 6, 1947	5.55
Mar. 11	5.18	Sept. 4	6.10	May 6	4.78
Apr. 9	5.22	Oct. 11	6.07	July 8	3.52
May 6	5.09	Nov. 5	6.04	Sept. 4	5.88
June 4	5.22	Dec. 9	5.27	Nov. 11	6.39
July 9	4.97	Jan. 2, 1947	5.22		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Colfax County--Continued

A17-3-4cc

June	Water level	June	Water level	June	Water level
Oct. 11, 1946	6.28	Jan. 2, 1947	5.76	July 8, 1947	5.34
Nov. 5	6.10	Mar. 6	5.72	Sept. 4	6.34
Dec. 9	5.45	May 6	5.54	Nov. 11	6.14

A17-3-11dd

Dec. 28, 1945	9.00	July 9, 1946	8.87	Jan. 3, 1947	10.50
Feb. 12, 1946	9.48	Aug. 6	9.35	Mar. 4	10.14
Mar. 12	9.60	Sept. 4	9.67	May 6	9.37
Apr. 9	9.51	Oct. 11	10.05	July 7	6.60
May 7	9.47	Nov. 5	10.18	Sept. 3	8.37
June 3	9.44	Dec. 10	9.92	Nov. 10	9.19

A17-3-18dc

Jan. 7, 1946	3.18	July 9, 1946	3.52	Jan. 2, 1947	3.09
Feb. 12	3.53	Aug. 6	4.68	Mar. 5	3.04
Mar. 11	2.65	Sept. 4	4.82	May 6	3.27
Apr. 9	3.54	Oct. 11	4.76	July 8	3.34
May 6	3.24	Nov. 5	3.43	Sept. 4	4.68
June 4	3.66	Dec. 9	2.83	Nov. 11	4.77

A17-3-23cc

Feb. 12, 1946	4.48	Aug. 5, 1946	5.02	Mar. 5, 1947	4.39
Mar. 11	4.02	Sept. 3	5.27	May 6	3.95
Apr. 9	4.38	Oct. 11	4.83	July 7	2.84
May 6	4.22	Nov. 5	4.45	Sept. 3	5.05
June 3	4.68	Dec. 9	4.00	Nov. 10	4.84
July 8	4.16	Jan. 2, 1947	4.35		

A17-3-29aa

Oct. 11, 1946	8.63	Jan. 2, 1947	8.36	July 8, 1947	6.97
Nov. 5	8.54	Mar. 5	8.39	Sept. 4	8.54
Dec. 9	8.15	May 6	8.07	Nov. 11	8.78

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Colfax County--Continued

A17-4-1cc

Date	Water level	Date	Water level	Date	Water level
Oct. 16, 1945	4.98	July 8, 1946	5.61	Jan. 3, 1947	5.12
Jan. 2, 1946	4.91	Aug. 6	5.98	Mar. 4	4.60
Mar. 12	4.49	Sept. 4	6.05	May 6	4.65
Apr. 9	4.80	Oct. 11	5.25	July 7	3.85
May 7	4.89	Nov. 5	5.26	Sept. 3	6.06
June 3	5.32	Dec. 10	4.92	Nov. 10	5.86

A17-4-4bb

Dec. 28, 1945	13.14	July 9, 1946	13.31	Jan. 3, 1947	15.33
Feb. 12, 1946	13.67	Aug. 6	17.11	Mar. 4	15.15
Mar. 12	13.64	Sept. 4	16.37	May 6	14.49
Apr. 9	13.82	Oct. 11	15.39	July 8	11.19
May 7	13.88	Nov. 5	15.48	Sept. 3	13.70
June 3	13.98	Dec. 9	15.20	Nov. 10	14.47

Dawson County

9-19-16ab

Feb. 14, 1946	9.40	Aug. 8, 1946	10.31	Mar. 12, 1947	7.12
Mar. 14	9.34	Sept. 6	10.68	May 13	6.98
Apr. 10	9.14	Oct. 8	10.09	July 11	6.99
May 9	9.49	Nov. 7	7.06	Sept. 8	9.02
June 6	9.69	Dec. 3	6.50	Nov. 4	8.75
July 11	9.89	Jan. 7, 1947	7.03		

9-19-25bb

Feb. 14, 1946	9.23	Aug. 7, 1946	8.32	Mar. 12, 1947	6.34
Mar. 14	9.17	Sept. 6	9.00	May 13	5.95
Apr. 10	8.90	Oct. 8	5.92	July 11	5.45
May 9	6.80	Nov. 7	7.08	Sept. 8	6.24
June 6	8.04	Dec. 3	6.38	Nov. 4	7.24
July 10	8.49	Jan. 7, 1947	6.63		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

9-19-33bb

Date	Water level	Date	Water level	Date	Water level
Feb. 14, 1946	7.66	Aug. 7, 1946	7.99	Mar. 12, 1947	5.94
Mar. 14	7.53	Sept. 6	9.04	May 12	5.94
Apr. 10	7.12	Oct. 8	5.03	July 11	5.35
May 9	7.19	Nov. 7	5.93	Sept. 8	8.52
June 6	7.07	Dec. 3	5.30	Nov. 4	7.59
July 10	7.56	Jan. 9, 1947	6.02		

9-20-3dd

Sept. 6, 1946	12.52	Jan. 7, 1947	9.22	July 12, 1947	8.79
Oct. 8	9.66	Mar. 13	9.34	Sept. 8	11.14
Nov. 7	9.26	May 13	9.38	Nov. 4	11.63
Dec. 3	8.72				

9-20-5bc

Feb. 14, 1946	21.61	Aug. 8, 1946	22.82	Mar. 13, 1947	19.62
Mar. 14	21.41	Sept. 6	22.60	May 13	19.61
Apr. 10	21.35	Oct. 8	20.81	July 1	18.45
May 9	21.89	Nov. 7	19.45	Sept. 8	21.15
June 6	21.81	Dec. 3	19.01	Nov. 4	21.35
July 11	22.50	Jan. 7, 1947	19.31		

9-20-13bc

Dec. 13, 1945	10.44	Aug. 8, 1946	10.97	Mar. 13, 1947	7.78
Jan. 17, 1946	10.25	Sept. 6	11.45	May 12	7.70
Mar. 14	10.00	Oct. 8	8.55	July 11	7.47
Apr. 10	9.51	Nov. 7	7.80	Sept. 8	9.80
May 9	9.80	Dec. 3	6.90	Nov. 4	10.49
June 6	8.88	Jan. 7, 1947	7.65		

9-20-22cc

Feb. 14, 1946	10.68	Sept. 6, 1946	12.33	Mar. 13, 1947	8.84
Mar. 14	10.50	Oct. 8	10.79	May 12	8.57
Apr. 10	10.30	Nov. 7	8.36	July 12	7.92
May 9	10.78	Dec. 3	7.44	Sept. 8	10.50
June 6	10.78	Jan. 7, 1947	8.44	Nov. 4	10.75
July 11	11.18				

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

9-20-33dd

Date	Water level	Date	Water level	Date	Water level
Sept. 6, 1946	4.59	Jan. 7, 1947	2.68	July 12, 1947	2.81
Oct. 8	3.07	Mar. 13	2.85	Sept. 8	4.54
Nov. 7	2.41	May 12	3.34	Nov. 4	3.72
Dec. 3	2.47				

9-21-6ad

Jan. 7, 1945	5.37	Apr. 11, 1946	5.64	Dec. 3, 1946	3.97
Mar. 25	5.30	May 9	6.42	Jan. 7, 1947	4.75
July 29	5.75	June 6	6.73	Mar. 13	4.88
Oct. 14	5.65	July 11	8.30	May 13	4.74
Dec. 13	5.73	Aug. 8	7.01	July 12	3.25
Jan. 17, 1946	6.03	Sept. 6	7.15	Sept. 8	5.53
Feb. 14	5.76	Oct. 8	1.39	Nov. 4	5.85
Mar. 14	5.47	Nov. 8	3.92		

9-21-6da

Jan. 7, 1945	4.18	Mar. 14, 1946	4.43	Dec. 3, 1946	3.02
Mar. 25	4.12	May 9	4.76	Jan. 7, 1947	3.70
Apr. 29	4.21	June 6	4.75	Mar. 13	3.75
July 29	4.21	July 11	5.49	May 13	3.79
Oct. 14	4.68	Aug. 8	5.03	July 12	2.29
Dec. 13	4.44	Sept. 6	5.61	Sept. 8	3.91
Jan. 17, 1946	4.45	Oct. 8	1.01	Nov. 4	4.78
Feb. 14	4.45	Nov. 8	3.06		

9-21-7aa

Jan. 7, 1945	7.12	Mar. 14, 1946	7.53	Dec. 3, 1946	6.11
Mar. 25	7.14	Apr. 11	7.55	Jan. 7, 1947	6.67
Apr. 29	7.25	June 6	7.35	Mar. 13	6.98
July 29	7.19	July 11	7.75	May 13	7.00
Oct. 14	7.67	Aug. 8	7.48	July 12	6.06
Dec. 13	7.22	Sept. 6	8.19	Sept. 8	6.80
Jan. 17, 1946	7.25	Oct. 8	4.52	Nov. 4	7.87
Feb. 14	7.25	Nov. 8	6.18		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

9-21-7da

Date	Water level	Date	Water level	Date	Water level
Jan. 7, 1945	6.75	Mar. 14, 1946	6.50	Nov. 8, 1946	6.14
Mar. 25	6.67	Apr. 11	6.80	Dec. 3	6.17
Apr. 29	6.61	May 9	6.94	Jan. 7, 1947	6.31
July 29	6.79	June 6	6.74	Mar. 13	6.40
Oct. 14	6.92	July 11	7.10	May 13	6.33
Dec. 13	6.77	Aug. 8	7.10	July 12	5.93
Jan. 17, 1946	6.88	Sept. 6	7.15	Sept. 8	6.75
Feb. 14	6.56	Oct. 8	4.13	Nov. 4	6.92

9-21-12cb

Oct. 19, 1945	11.33	July 11, 1946	11.52	Jan. 7, 1947	9.99
Dec. 13	11.24	Aug. 8	12.35	Mar. 13	10.40
Jan. 17, 1946	11.15	Sept. 5	12.22	May 13	10.00
Mar. 14	10.91	Oct. 8	9.29	July 12	9.50
Apr. 10	10.06	Nov. 7	9.80	Sept. 8	11.12
May 9	11.41	Dec. 3	9.45	Nov. 4	10.85
June 6	11.33				

9-21-18aa

Jan. 7, 1945	5.43	Apr. 11, 1946	5.04	Dec. 5, 1946	3.88
Mar. 25	5.20	May 9	5.50	Jan. 7, 1947	4.45
Apr. 29	5.19	June 6	5.32	Mar. 13	4.65
July 29	4.84	July 11	5.76	May 13	4.40
Oct. 14	5.30	Aug. 8	5.81	July 12	3.49
Dec. 13	5.38	Sept. 6	5.82	Sept. 9	4.89
Feb. 14, 1946	5.17	Oct. 8	2.99	Nov. 4	5.70
Mar. 14	5.08	Nov. 8	4.05		

9-21-18da

Jan. 5, 1945	5.41	Mar. 14, 1946	5.07	Nov. 8, 1946	3.97
Mar. 25	5.05	Apr. 11	5.00	Dec. 3	3.89
Apr. 29	5.14	May 9	5.30	Jan. 7, 1947	4.46
July 29	4.99	June 6	5.37	Mar. 13	4.67
Oct. 14	5.40	July 11	5.61	May 13	4.45
Dec. 13	5.34	Aug. 8	5.66	July 12	3.57
Jan. 17, 1946	5.18	Sept. 6	5.90	Sept. 9	5.32
Feb. 14	5.08	Oct. 8	2.72	Nov. 4	5.71

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

9-21-19aal

Date	Water level	Date	Water level	Date	Water level
Jan. 7, 1945	3.80	Apr. 11, 1946	3.84	Dec. 3, 1946	3.25
Mar. 25	3.82	May 9	4.10	Jan. 7, 1947	3.30
Apr. 29	3.79	June 6	4.07	Mar. 13	3.40
July 29	4.22	July 11	4.63	May 13	3.75
Oct. 14	3.93	Aug. 8	4.62	July 12	2.70
Dec. 13	4.02	Sept. 6	4.60	Sept. 9	4.85
Feb. 14, 1946	3.68	Oct. 8	1.45	Nov. 4	4.52
Mar. 14	3.68	Nov. 8	3.14		

9-21-19aa2

Jan. 7, 1945	0.57	Mar. 14, 1946	0.57	Nov. 8, 1946	0,17
Mar. 25	.72	Apr. 11	.58	Dec. 3	.30
Apr. 29	.70	May 9	1.06	Jan. 7, 1947	.09
July 29	1.27	June 6	1.07	Mar. 13	.25
Oct. 14	1.02	July 11	1.62	May 13	.73
Dec. 13	.92	Aug. 8	1.57	July 12	+ .16
Jan. 17, 1946	.69	Sept. 6	1.48	Sept. 9	1.92
Feb. 14	.58	Oct. 8	+ .74	Nov. 4	1.40

9-21-19da

Jan. 7, 1945	3.09	Feb. 15, 1946	3.70	Nov. 8, 1946	3.60
9	3.49	Mar. 15	4.51	Dec. 3	3.66
Feb. 17	3.40	Apr. 11	3.73	Jan. 6, 1947	2.70
Mar. 25	2.97	May 9	3.85	Mar. 13	2.88
Apr. 29	2.92	June 5	3.79	May 13	3.89
July 29	3.95	July 11	4.20	July 12	3.20
Oct. 14	3.68	Aug. 8	4.20	Sept. 9	4.85
Dec. 13	3.63	Sept. 6	4.08	Nov. 4	4.23
Jan. 17	3.47	Oct. 8	2.11		

9-21-19dd

Jan. 7, 1945	5.04	Feb. 15, 1946	5.09	Nov. 8, 1946	5.24
9	5.16	Mar. 15	5.23	Dec. 3	5.32
Feb. 17	5.13	Apr. 11	5.44	Jan. 7, 1947	4.62
Mar. 25	4.67	May 9	5.56	Mar. 13	5.32
Apr. 29	4.62	June 5	5.47	May 13	5.64
July 29	5.80	July 11	6.00	July 12	4.66
Oct. 14	5.27	Aug. 8	6.04	Sept. 9	6.65
Dec. 13	5.34	Sept. 6	5.82	Nov. 4	5.97
Jan. 17, 1946	5.18	Oct. 8	3.11		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

9-21-24aa

Date	Water level	Date	Water level	Date	Water level
May 15, 1945	4.10	May 9, 1946	4.37	Jan. 7, 1947	2.98
Oct. 19	3.93	June 6	4.30	Mar. 12	3.02
Dec. 13	3.94	July 11	4.89	May 13	3.04
Jan. 17, 1946	3.80	Aug. 8	4.96	July 12	1.97
Feb. 14	3.72	Sept. 6	4.77	Sept. 8	2.79
Mar. 14	3.62	Nov. 8	2.54	Nov. 4	4.05
Apr. 10	3.54	Dec. 3	2.36		

9-21-29bc

Jan. 7, 1945	2.76	Feb. 15, 1946	2.70	Nov. 8, 1946	2.57
9	2.75	Mar. 15	2.75	Dec. 3	2.72
Feb. 17	2.74	Apr. 11	2.95	Jan. 7, 1947	2.67
Mar. 25	2.93	May 9	3.02	Mar. 13	2.80
Apr. 29	2.80	June 5	2.87	May 13	3.07
July 29	3.56	July 11	3.53	July 12	2.10
Oct. 14	3.09	Aug. 8	3.50	Sept. 9	4.14
Dec. 13	2.88	Sept. 6	3.25	Nov. 4	3.35
Jan. 17, 1946	2.79	Oct. 8	2.61		

9-21-30da

Jan. 7, 1945	6.26	Feb. 15, 1946	6.22	Nov. 8, 1946	6.11
9	6.28	Mar. 15	6.22	Dec. 3	6.07
Feb. 17	6.28	Apr. 11	6.23	Jan. 8, 1947	6.20
Mar. 25	5.34	May 9	6.24	Mar. 13	6.24
Apr. 29	6.35	June 5	6.18	May 13	6.22
July 29	6.49	July 11	6.47	July 12	6.05
Oct. 14	6.45	Aug. 8	6.65	Sept. 9	6.88
Dec. 13	6.26	Sept. 6	6.43	Nov. 5	6.45
Jan. 17, 1946	6.28	Oct. 8	3.63		

9-21-31aal

Jan. 7, 1945	14.38	Feb. 15, 1946	13.85	Nov. 8, 1946	12.62
9	14.38	Mar. 15	13.79	Dec. 3	12.40
Feb. 17	14.34	Apr. 11	13.82	Jan. 8, 1947	12.86
Mar. 25	14.29	May 9	13.75	Mar. 13	13.06
Apr. 29	14.32	June 5	13.53	May 13	12.67
July 29	14.03	July 11	13.99	July 12	12.15
Oct. 14	14.53	Aug. 8	18.45	Sept. 9	14.69
Dec. 13	14.12	Sept. 6	14.82	Nov. 5	13.86
Jan. 17, 1946	14.00	Oct. 8	11.82		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

9-21-31da

Date	Water level	Date	Water level	Date	Water level
Jan. 7, 1945	11.46	Feb. 15, 1946	10.35	Oct. 8, 1946	8.70
9	11.44	Mar. 15	10.11	Nov. 8	8.45
Feb. 17	11.29	Apr. 11	10.15	Dec. 3	8.16
Mar. 25	11.13	May 9	10.09	Jan. 8, 1947	8.58
Apr. 29	11.11	June 5	9.92	Mar. 13	8.84
July 29	10.88	July 11	11.18	May 13	11.25
Oct. 14	11.38	Aug. 8	13.07	July 12	7.68
Dec. 13	11.25	Sept. 6	11.63	Nov. 5	10.44
Jan. 17, 1946	10.57				

9-21-31dd

Jan. 9, 1945	a 9.07	Jan. 17, 1946	7.94	Sept. 6, 1946	8.57
Feb. 17	a 8.92	Feb. 15	7.72	Oct. 8	4.16
Mar. 7	a 8.80	28	a 7.60	Nov. 8	5.95
Apr. 18	a 8.73	Apr. 4	a 7.42	Dec. 3	5.60
May 4	a 8.69	10	7.43	Jan. 8, 1947	5.87
June 1	a 8.58	May 9	7.53	Mar. 13	6.02
July 3	a 8.51	June 5	7.28	May 13	5.63
Aug. 8	a 8.52	July 11	7.61	July 12	5.02
Sept. 4	a 8.35	Aug. 8	8.50	Sept. 9	7.56
Nov. 21	a 8.29	19	a 8.96	Nov. 5	7.27
Dec. 13	8.19				

9-22-17dd

Jan. 9, 1945	7.48	Jan. 9, 1946	a 5.27	Aug. 9, 1946	5.39
Feb. 17	6.91	17	5.45	20	a 5.33
Mar. 7	a 6.68	Feb. 15	5.20	Oct. 9	2.62
Apr. 18	a 6.11	28	a 5.08	Nov. 9	3.15
May 4	a 6.00	Mar. 15	4.91	Dec. 5	2.98
June 4	a 5.89	Apr. 4	a 4.78	Jan. 9, 1947	3.11
July 3	a 5.70	11	4.91	Mar. 18	2.47
Aug. 8	a 5.30	May 10	4.89	May 14	2.47
Sept. 4	a 5.20	June 5	4.68	July 14	1.58
Oct. 19	a 5.20	11	a 4.78	Sept.10	3.90
Nov. 1	a 5.13	July 12	5.13	Nov. 6	3.10
Dec. 14	5.61				

a Measurements supplied by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

9-22-23cd

Date	Water level	Date	Water level	Date	Water level
Jan. 17, 1946	17.28	July 12, 1946	17.07	Jan. 9, 1947	16.26
Feb. 15	17.00	Sept. 6	18.35	Mar. 18	16.10
Mar. 15	16.82	Oct. 9	16.54	May 14	15.75
Apr. 11	16.83	Nov. 9	16.25	July 14	15.39
May 10	16.92	Dec. 5	16.11	Sept.10	18.86
June 5	16.68				

9-22-25dc

Jan. 9, 1945	7.05	Sept. 4, 1945	5.99	Dec. 5, 1946	a 3.54
Feb. 17	7.07	Nov. 21	5.86	Jan. 9, 1947	a 3.60
Mar. 7	6.99	Jan. 18, 1946	5.34	Mar. 18	a 3.26
Apr. 18	6.78	Feb. 28	5.20	May 14	a 3.37
May 4	6.28	Apr. 4	4.89	July 14	a 2.70
June 4	6.40	May 7	5.08	Sept.10	a 4.84
July 3	6.29	July 11	5.06	Nov. 6	a 4.17
Aug. 8	6.10	Aug. 20	5.76		

9-23-2dc

Jan. 17, 1946	17.38	July 12, 1946	17.55	Jan. 9, 1947	15.18
Feb. 15	17.28	Aug. 9	18.24	Mar. 18	15.00
Mar. 15	17.15	Oct. 9	16.40	May 14	14.76
Apr. 11	17.07	Nov. 9	15.46	July 14	14.02
May 10	17.32	Dec. 5	15.06	Nov. 6	15.35
June 5	17.28				

9-23-3cc

Jan. 9, 1946	11.78	May 14, 1946	11.07	Sept.10, 1946	12.34
Mar. 18	11.42	July 14	10.74	Nov. 6	11.75

9-24-1dc

Sept. 7, 1946	17.90	Jan. 9, 1947	17.12	July 14, 1947	17.30
Oct. 9	16.81	Mar. 18	17.62	Sept.10	16.65
Nov. 9	16.75	May 14	17.52	Nov. 6	15.77
Dec. 5	16.89				

a Measurements made by Geological Survey observer; earlier measurements made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

10-20-35bb

Date	Water level	Date	Water level	Date	Water level
Sept. 6, 1946	17.78	Jan. 7, 1947	15.82	July 12, 1947	14.80
Oct. 8	16.49	Mar. 13	16.12	Sept. 8	16.72
Nov. 7	15.78	May 13	15.96	Nov. 4	16.75
Dec. 3	15.58				

10-21-6da

Jan. 7, 1945	7.95	May 9, 1946	8.38	Dec. 3, 1946	8.30
Mar. 25	8.18	June 6	8.64	Jan. 7, 1947	8.56
Apr. 29	8.30	July 11	8.79	Mar. 13	7.82
July 29	8.23	Aug. 8	8.90	May 13	7.65
Oct. 14	7.94	Sept. 6	8.90	July 12	7.52
Jan. 17, 1946	7.75	Oct. 9	7.86	Sept. 8	7.20
Mar. 14	7.95	Nov. 8	8.55	Nov. 4	7.03
Apr. 11	8.08				

10-21-7aa

Jan. 7, 1945	8.60	Mar. 14, 1946	8.78	Nov. 8, 1946	7.78
Mar. 25	8.72	Apr. 11	8.89	Dec. 3	7.51
Apr. 29	8.93	May 9	9.38	Jan. 7, 1947	7.52
July 29	7.67	June 6	8.87	Mar. 13	7.59
Oct. 14	8.22	July 11	10.56	May 13	7.44
Dec. 13	8.30	Aug. 8	10.08	July 12	6.10
Jan. 17, 1946	8.79	Sept. 6	9.90	Sept. 8	6.42
Feb. 14	8.75	Oct. 9	7.70	Nov. 4	7.53

10-21-7da

Jan. 7, 1945	9.21	Mar. 14, 1946	8.66	Nov. 8, 1946	8.05
Mar. 25	9.25	Apr. 11	8.60	Dec. 3	7.82
Apr. 29	9.44	May 9	8.82	Jan. 7, 1947	8.06
July 29	7.75	June 6	10.26	Mar. 13	8.04
Oct. 14	8.94	July 11	10.83	May 13	7.82
Dec. 13	8.46	Aug. 8	9.50	July 12	6.10
Jan. 17, 1946	8.40	Sept. 6	10.35	Sept. 8	6.75
Feb. 14	8.47	Oct. 9	7.73	Nov. 4	7.89

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

10-21-18aa

Date	Water level	Date	Water level	Date	Water level
Jan. 7, 1945	8.63	Mar. 14, 1946	8.83	Dec. 3, 1946	8.43
Mar. 25	8.74	Apr. 11	8.94	Jan. 7, 1947	7.27
Apr. 29	9.02	May 9	8.96	Mar. 13	7.37
July 29	7.62	June 6	9.46	May 13	7.07
Oct. 14	8.66	July 11	10.13	July 12	4.60
Dec. 13	8.79	Aug. 8	9.71	Sept. 8	5.76
Jan. 17, 1946	8.86	Sept. 6	9.78	Nov. 4	7.07
Feb. 14	8.89	Nov. 8	7.31		

10-21-18dd

Jan. 7, 1945	13.47	Mar. 14, 1946	13.72	Nov. 8, 1946	12.47
Mar. 25	13.63	Apr. 11	13.82	Dec. 3	12.25
Apr. 29	13.95	May 9	14.30	Jan. 7, 1947	12.17
July 29	12.29	June 6	14.32	Mar. 13	12.15
Oct. 14	12.65	July 11	15.12	May 13	11.90
Dec. 13	13.68	Aug. 8	15.50	July 12	8.92
Jan. 17, 1946	13.77	Sept. 6	17.02	Sept. 8	10.64
Feb. 14	13.74	Oct. 9	14.30	Nov. 4	11.48

10-21-19aa

Jan. 7, 1945	15.73	Mar. 14, 1946	16.07	Nov. 8, 1946	15.01
Mar. 25	15.81	Apr. 11	16.24	Dec. 3	14.72
Apr. 29	16.24	May 9	17.00	Jan. 7, 1947	14.49
July 29	14.94	June 6	16.28	Mar. 13	14.34
Oct. 14	15.92	July 11	17.05	May 13	14.25
Dec. 13	15.97	Aug. 8	17.93	July 12	12.50
Jan. 17, 1946	16.05	Sept. 6	17.49	Sept. 8	12.88
Feb. 14	16.07	Oct. 9	16.20	Nov. 4	13.55

10-21-19da

Jan. 7, 1945	15.53	Mar. 14, 1946	16.10	Nov. 8, 1946	14.78
Mar. 25	15.70	Apr. 11	15.85	Dec. 3	14.44
Apr. 29	15.97	May 9	16.88	Jan. 7, 1947	14.21
July 29	16.29	June 6	15.73	Mar. 13	14.18
Oct. 14	15.85	July 11	16.43	May 13	14.03
Dec. 13	15.70	Aug. 8	18.47	July 12	11.82
Jan. 17, 1946	15.96	Sept. 6	17.05	Sept. 8	13.68
Feb. 14	15.98	Oct. 9	15.72	Nov. 4	13.41

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

10-21-23ab

Date	Water level	Date	Water level	Date	Water level
Feb. 14, 1946	12.14	Aug. 8, 1946	13.94	Jan. 7, 1947	9.80
Mar. 14	12.10	Sept. 7	11.72	Mar. 13	10.04
Apr. 10	12.10	Oct. 8	10.99	May 13	9.64
May 9	12.47	Nov. 8	9.72	July 12	8.15
June 6	12.77	Dec. 3	9.53	Nov. 4	10.81
July 11	13.40				

10-21-30aa

Jan. 7, 1945	8.04	Mar. 14, 1946	8.40	Nov. 8, 1946	6.84
Mar. 25	8.16	Apr. 11	8.60	Dec. 3	6.38
Apr. 29	8.47	May 9	9.52	Jan. 7, 1947	6.48
July 29	8.50	June 6	8.95	Mar. 13	6.58
Oct. 14	8.45	July 10	9.72	May 13	6.40
Dec. 13	8.51	Aug. 8	10.02	July 12	4.37
Jan. 17, 1946	8.49	Sept. 6	9.74	Sept. 8	6.04
Feb. 14	8.46	Oct. 9	6.99	Nov. 4	6.69

10-21-30da

Jan. 7, 1945	8.74	Mar. 14, 1946	9.06	Nov. 8, 1946	6.94
Mar. 25	8.82	Apr. 11	9.20	Dec. 3	6.55
Apr. 29	9.01	May 9	10.07	Jan. 7, 1947	7.02
July 29	6.77	June 6	8.07	Mar. 13	7.25
Oct. 14	8.96	July 11	9.75	May 13	6.97
Dec. 13	9.23	Aug. 8	8.17	July 12	4.37
Jan. 17, 1946	9.18	Sept. 6	9.24	Sept. 8	6.12
Feb. 14	9.16	Oct. 9	5.68	Nov. 4	7.65

10-21-31aa

Jan. 7, 1945	5.93	Mar. 14, 1946	6.06	Dec. 3, 1946	3.48
Mar. 25	5.95	Apr. 11	5.92	Jan. 7, 1947	4.12
Apr. 29	6.02	May 9	7.00	Mar. 13	4.47
July 29	4.54	June 6	6.46	May 13	4.10
Oct. 14	6.08	July 11	7.19	July 12	2.53
Dec. 13	5.68	Aug. 8	5.95	Sept. 8	4.07
Jan. 17, 1946	5.85	Sept. 6	6.16	Nov. 4	5.05
Feb. 14	5.94	Nov. 8	3.68		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

10-21-31da

Date	Water level	Date	Water level	Date	Water level
Jan. 7, 1945	7.18	Mar. 14, 1946	7.08	Dec. 3, 1946	4.81
Mar. 25	7.19	Apr. 11	6.98	Jan. 7, 1947	5.50
Apr. 29	7.18	May 9	7.70	Mar. 13	6.04
July 29	6.21	June 6	8.05	May 13	5.50
Oct. 14	7.47	July 11	8.35	July 12	3.50
Dec. 13	8.04	Aug. 8	7.50	Sept. 8	4.48
Jan. 17, 1946	6.94	Sept. 6	7.55	Nov. 4	6.74
Feb. 14	6.95	Nov. 8	4.89		

10-22-11ab

Jan. 17, 1946	8.15	July 11, 1946	9.25	Jan. 8, 1947	6.25
Feb. 14	8.37	Aug. 8	9.69	Mar. 13	6.89
Mar. 14	8.46	Oct. 9	4.53	May 13	6.78
Apr. 11	8.60	Nov. 9	5.68	July 12	4.57
May 9	8.92	Dec. 4	5.58	Nov. 5	6.81
June 6	8.73				

10-22-29aa

May 15, 1945	4.09	May 9, 1946	4.76	Dec. 4, 1946	3.19
Oct. 19	4.63	June 6	5.35	Jan. 8, 1947	3.01
Dec. 14	4.58	July 11	6.13	Mar. 13	2.79
Jan. 17, 1946	4.46	Aug. 8	6.47	May 13	2.41
Feb. 14	4.36	Sept. 6	6.31	July 12	1.52
Mar. 14	4.19	Oct. 9	3.08	Sept. 9	3.20
Apr. 10	4.18	Nov. 9	4.71	Nov. 5	3.86

10-23-5bb

Jan. 17, 1946	6.76	July 11, 1946	8.40	Mar. 13, 1947	5.35
Feb. 14	6.62	Sept. 6	8.32	May 13	5.22
Mar. 14	6.44	Oct. 8	6.42	July 12	4.57
Apr. 10	6.48	Nov. 9	5.84	Sept. 9	6.66
May 9	7.30	Dec. 4	4.29	Nov. 5	7.30
June 5	7.17	Jan. 8, 1947	4.85		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

10-23-9aa

Date	Water level	Date	Water level	Date	Water level
May 15, 1945	15.05	May 9, 1946	14.92	Dec. 4, 1946	11.35
Oct. 19	13.62	June 6	14.44	Jan. 8, 1947	12.00
Dec. 14	14.07	July 11	16.33	Mar. 13	12.76
Jan. 17, 1946	14.82	Aug. 8	15.21	May 13	12.35
Feb. 14	14.29	Sept. 6	13.90	July 12	11.02
Mar. 15	14.24	Oct. 9	11.72	Sept. 9	11.81
Apr. 10	14.36	Nov. 9	11.62		

10-23-29bb

Sept. 7, 1946	6.51	Jan. 9, 1947	5.19	July 14, 1947	4.19
Oct. 9	2.02	Mar. 18	5.87	Sept.10	6.40
Nov. 9	4.84	May 14	5.55	Nov. 6	7.25
Dec. 5	4.73				

10-23-30bc

Jan. 17, 1946	10.20	July 9, 1946	10.76	Jan. 9, 1947	8.24
Feb. 14	10.25	12	10.63	Mar. 18	8.97
Mar. 15	10.55	Sept. 6	9.09	May 14	8.52
Apr. 11	10.37	Oct. 9	5.80	July 14	7.57
May 9	10.76	Nov. 9	7.12	Sept.10	6.42
June 4	10.91	Dec. 5	7.16	Nov. 6	9.52
5	9.97				

10-24-7bb

Jan. 17, 1946	13.18	July 12, 1946	13.52	Jan. 9, 1947	12.46
Feb. 15	13.17	Aug. 8	12.66	Mar. 18	12.70
Mar. 15	13.14	Sept. 7	13.12	May 14	12.55
Apr. 11	13.26	Oct. 9	10.35	July 14	11.79
May 9	13.32	Nov. 9	12.12	Sept.10	12.68
June 5	13.29	Dec. 5	12.20	Nov. 6	12.50

10-24-15cc

Jan. 17, 1946	7.35	July 11, 1946	7.66	Mar. 18, 1947	4.85
Feb. 15	7.20	Sept. 7	7.83	May 14	4.65
Mar. 15	7.07	Oct. 9	4.37	July 14	3.78
Apr. 11	7.15	Nov. 9	5.25	Sept.10	4.82
May 9	7.52	Dec. 5	4.94	Nov. 6	5.08
June 5	7.49	Jan. 9, 1947	5.03		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

10-24-17bb

Date	Water level	Date	Water level	Date	Water level
Jan. 6, 1945	5.97	Apr. 4, 1946	5.68	Jan. 9, 1947	a 4.40
Feb. 17	6.95	May 7	5.69	Mar. 18	a 4.90
Mar. 7	6.90	June 11	5.45	May 14	a 4.78
Apr. 18	7.01	July 10	5.66	July 14	a 3.00
Nov. 1	4.76	Aug. 20	4.08	Sept.10	a 3.74
Jan. 9, 1946	5.62	Nov. 9	a 2.72	Nov. 6	a 3.05
Feb. 28	5.68	Dec. 5	a 3.65		

11-21-31dd

Jan. 7, 1945	26.60	Mar. 14, 1946	27.13	Nov. 8, 1946	25.08
Mar. 25	27.05	Apr. 11	27.29	Dec. 3	25.34
Apr. 29	27.32	May 9	27.20	Jan. 7, 1947	25.55
July 29	25.31	June 6	26.19	Mar. 13	25.78
Oct. 14	25.98	July 11	26.27	May 13	26.05
Dec. 13	26.58	Aug. 8	31.51	July 12	24.57
Jan. 17, 1946	26.86	Sept. 6	26.05	Sept. 8	22.77
Feb. 14	27.02	Oct. 9	24.74	Nov. 4	23.96

11-22-28aa

Jan. 17, 1946	27.72	July 11, 1946	28.05	Mar. 13, 1947	27.04
Feb. 14	27.25	Sept. 6	30.89	May 13	26.70
Mar. 14	27.13	Oct. 8	29.21	July 12	26.08
Apr. 11	27.14	Nov. 9	28.26	Sept. 9	27.54
May 9	27.17	Dec. 4	27.87	Nov. 5	26.72
June 6	26.92	Jan. 8, 1947	27.58		

11-23-21bc

Jan. 17, 1946	14.73	June 5, 1946	14.54	Jan. 8, 1947	13.57
Feb. 14	14.52	July 11	15.11	Mar. 13	13.93
Mar. 14	14.73	Oct. 8	13.07	May 13	13.86
Apr. 11	14.96	Nov. 9	13.03	July 12	12.40
May 9	14.77	Dec. 4	13.17	Nov. 5	13.36

11-23-23cc

Sept. 6, 1946	5.28	Jan. 8, 1947	2.42	July 12, 1947	2.29
Oct. 8	.42	Mar. 13	2.00	Sept. 9	3.40
Nov. 9	2.25	May 13	2.57	Nov. 5	3.37
Dec. 4	2.19				

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

11-24-16bb

Date	Water level	Date	Water level	Date	Water level
Jan. 16, 1946	6.42	July 11, 1946	7.44	Jan. 8, 1947	5.05
Feb. 14	6.58	Aug. 8	8.01	Mar. 14	5.46
Mar. 15	6.49	Sept. 6	8.42	May 13	5.12
Apr. 10	6.67	Oct. 9	3.56	July 12	4.70
May 9	6.26	Nov. 8	4.67	Sept. 9	6.29
June 5	7.07	Dec. 4	4.39	Nov. 5	6.46

11-24-20ca

Oct. 19, 1945	11.72	May 9, 1946	12.66	Mar. 14, 1947	10.59
Dec. 15	12.26	June 5	12.81	May 13	10.44
Jan. 16, 1946	12.45	July 11	13.07	July 12	9.52
Feb. 14	12.45	Nov. 9	10.50	Sept. 9	10.65
Mar. 15	12.58	Dec. 4	10.14	Nov. 5	12.19
Apr. 10	13.72	Jan. 8, 1947	10.33		

11-24-24cb

Nov. 9, 1946	7.58	Mar. 13, 1947	8.12	Sept. 9, 1947	8.20
Dec. 4	6.91	May 13	7.85	Nov. 5	9.69
Jan. 8, 1947	7.79	July 12	6.97		

11-25-8ad

Jan. 5, 1945	2.61	Sept. 7, 1945	2.22	Oct. 30, 1946	a 1.33
Feb. 8	1.95	Oct. 3	2.67	Dec. 4	a 1.33
Mar. 1	1.91	Jan. 9, 1946	2.09	Jan. 8, 1947	a 1.93
Apr. 4	2.33	Feb. 27	2.09	Mar. 14	a 1.71
May 4	2.20	Apr. 10	2.07	May 14	a 2.28
June 1	1.51	May 16	2.94	July 13	a 1.77
July 13	1.94	June 6	2.33	Sept. 9	a 3.98
Aug. 8	2.35	Aug. 6	3.90	Nov. 5	a 2.98

11-25-16bb

Sept. 9, 1947	6.05	Nov. 5, 1947	5.69		

a Measurements made by Geological Survey observer; earlier measurements were made by the Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

11-25-19cc

Date	Water level	Date	Water level	Date	Water level
Jan. 8, 1945	7.88	Sept.14, 1945	7.88	Dec. 5, 1946	a 5.69
Feb. 14	7.75	Nov. 15	7.85	Jan. 9, 1947	a 6.22
Mar. 6	7.80	Jan. 15, 1946	7.90	Mar. 17	a 6.74
Apr. 6	7.93	Apr. 8	7.81	May 14	a 6.66
May 2	7.94	May 17	7.90	July 14	a 5.42
June 11	7.96	June 10	8.27	Sept.10	a 6.49
July 5	7.92	Aug. 6	7.16	Nov. 6	a 7.08
Aug. 6	7.89	Oct. 30	a 6.04		

11-25-21cc

Oct. 19, 1945	8.43	June 5, 1946	7.88	Jan. 9, 1947	8.74
Dec. 14	9.30	July 12	8.47	Mar. 17	9.20
Jan. 17, 1946	9.50	Aug. 8	7.32	May 14	8.98
Feb. 15	9.68	Sept. 7	6.88	July 14	6.86
Mar. 15	9.71	Oct. 9	7.70	Sept.10	6.92
Apr. 11	9.78	Nov. 9	8.20	Nov. 6	9.27
May 9	7.34	Dec. 5	8.42		

11-25-34bc

Jan. 17, 1946	13.80	July 12, 1946	14.35	Mar. 18, 1947	13.18
Feb. 15	13.82	Sept. 7	13.55	May 14	13.32
Mar. 15	13.84	Oct. 9	13.05	July 14	12.27
Apr. 11	13.97	Nov. 9	12.77	Sept.10	12.58
May 9	14.11	Dec. 5	12.72	Nov. 6	12.12
June 5	14.11	Jan. 9, 1947	12.84		

12-24-30ab

Jan. 16, 1946	42.92	June 5, 1946	42.72	Mar. 14, 1947	43.47
Feb. 14	42.89	Oct. 8	44.65	May 14	43.30
Mar. 15	42.75	Nov. 9	43.82	July 13	43.12
Apr. 10	42.89	Dec. 4	44.07	Sept. 9	44.85
May 9	42.50	Jan. 8, 1947	44.29	Nov. 5	44.69

a Measurements made by Geological Survey observer; earlier measurements were made by the Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dawson County--Continued

12-25-34cc

Date	Water level	Date	Water level	Date	Water level
Oct. 19, 1945	28.43	June 5, 1946	29.07	Jan. 8, 1947	28.95
Dec. 14	28.49	July 11	30.40	Mar. 14	29.02
Jan. 16, 1946	28.57	Sept. 6	29.69	May 14	29.08
Feb. 14	28.71	Oct. 9	29.18	July 13	27.72
Mar. 15	28.75	Nov. 9	28.89	Sept. 9	27.78
Apr. 10	29.02	Dec. 4	28.80	Nov. 5	27.50
May 9	29.05				

Dodge County

A17-5-2bb

Sept. 3, 1946	4.80	Jan. 3, 1947	2.96	July 7, 1947	2.79
Oct. 11	3.99	Mar. 4	2.79	Sept. 3	4.72
Nov. 5	3.84	May 6	2.75	Nov. 10	4.33
Dec. 10	2.32				

A17-6-6aa

June 22, 1945	0.68	June 3, 1946	2.44	Jan. 3, 1947	1.92
Oct. 16	1.82	July 8	1.99	Mar. 4	1.53
Jan. 2, 1946	2.10	Aug. 6	3.09	May 6	1.34
Feb. 12	1.85	Sept. 4	3.69	July 7	1.67
Mar. 12	1.44	Oct. 11	3.41	Sept. 3	3.57
Apr. 8	1.92	Nov. 5	2.84	Nov. 10	3.40
May 7	1.78	Dec. 10	1.58		

A17-6-8bc

Feb. 12, 1946	3.00	Aug. 6, 1946	5.19	Mar. 4, 1947	2.52
Mar. 12	2.93	Sept. 4	5.55	May 6	3.07
Apr. 8	3.39	Oct. 11	4.32	July 7	3.00
May 7	3.62	Nov. 5	4.00	Sept. 3	6.03
June 3	4.40	Dec. 10	3.35	Nov. 10	5.23
July 8	4.08	Jan. 3, 1947	4.04		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dodge County--Continued

A17-6-15aa

Date	Water level	Date	Water level	Date	Water level
Jan. 24, 1947	2.24	May 6, 1947	2.46	Sept. 3, 1947	4.30
Mar. 4	1.90	July 7	2.46	Nov. 10	3.48

A17-8-4aa

June 22, 1945	3.35	June 3, 1946	5.66	Jan. 3, 1947	5.77
Oct. 16	4.72	July 8	5.00	Mar. 4	5.69
Jan. 2, 1946	4.85	Aug. 5	5.83	May 6	5.02
Feb. 12	4.76	Sept. 3	7.10	July 7	3.40
Mar. 12	5.20	Oct. 11	6.26	Sept. 4	5.90
Apr. 8	5.20	Nov. 5	5.69	Nov. 11	5.57
May 6	5.17	Dec. 10	5.48		

A17-8-4ad

June 22, 1945	1.74	Feb. 12, 1946	6.20	May 6, 1946	6.07
Oct. 16	5.46	Mar. 12	5.93	June 3	6.42
Jan. 2, 1946	6.18	Apr. 8	6.92	July 8	a 5.69

A17-8-4dd

June 22, 1945	3.71	June 3, 1946	8.28	Jan. 3, 1947	8.51
Oct. 16	8.06	July 8	8.28	Mar. 4	8.59
Jan. 2, 1946	8.19	Aug. 5	8.30	May 6	7.95
Feb. 12	8.27	Sept. 3	8.37	July 7	3.70
Mar. 12	8.28	Oct. 11	8.49	Sept. 4	8.76
Apr. 8	8.28	Nov. 5	8.48	Nov. 11	9.67
May 6	8.30	Dec. 10	8.45		

A17-8-9da

June 22, 1945	4.15	June 3, 1946	9.60	Jan. 3, 1947	9.74
Oct. 16	7.84	July 8	8.82	Mar. 4	9.88
Jan. 2, 1946	9.88	Aug. 5	9.45	May 6	8.53
Feb. 12	9.27	Sept. 3	9.66	July 7	5.24
Mar. 12	9.09	Oct. 11	10.14	Sept. 4	8.55
Apr. 8	9.22	Nov. 5	9.89	Nov. 11	9.59
May 6	9.40	Dec. 10	9.33		

a Well destroyed after this date.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dodge County--Continued

A17-8-16aa

Date	Water level	Date	Water level	Date	Water level
June 22, 1945	6.44	Feb. 12, 1946	10.60	May 6, 1946	11.10
Oct. 16	9.03	Mar. 12	10.81	June 3	11.28
Jan. 2, 1946	10.18	Apr. 8	10.97	July 8	a 11.03

A17-8-16ad

June 22, 1945	6.11	June 3, 1946	9.76	Jan. 3, 1947	9.99
Oct. 16	7.95	July 8	9.11	Mar. 4	10.23
Jan. 2, 1946	8.98	Aug. 5	9.52	May 6	9.55
Feb. 12	9.42	Sept. 3	9.72	July 7	7.15
Mar. 12	9.59	Oct. 11	10.08	Sept. 4	7.97
Apr. 8	9.63	Nov. 5	10.16	Nov. 11	9.02
May 6	9.69	Dec. 10	9.82		

A17-8-22cb

June 22, 1945	2.07	June 3, 1946	2.96	Jan. 3, 1947	3.74
Oct. 16	3.92	July 8	2.42	Mar. 4	3.00
Jan. 2, 1946	4.71	Aug. 5	3.68	May 6	2.26
Feb. 12	3.45	Sept. 3	4.27	July 7	1.09
Mar. 12	2.87	Oct. 11	4.90	Sept. 4	3.73
Apr. 8	2.49	Nov. 5	4.62	Nov. 11	5.10
May 6	2.25	Dec. 10	3.35		

A17-8-28ad

June 22, 1945	1.21	June 3, 1946	3.59	Jan. 3, 1947	3.62
Oct. 16	3.91	July 8	3.10	Mar. 4	3.18
Jan. 2, 1946	3.83	Aug. 5	4.13	May 6	2.53
Feb. 12	3.30	Sept. 3	4.35	July 7	1.19
Mar. 12	2.98	Oct. 11	4.30	Sept. 4	4.15
Apr. 8	3.09	Nov. 5	3.77	Nov. 11	4.54
May 6	3.14	Dec. 10	3.40		

A17-8-28dd

June 22, 1945	3.06	May 6, 1946	4.22	Oct. 11, 1946	2.39
Oct. 16	4.42	June 3	3.80	Nov. 5	4.16
Jan. 2, 1946	2.97	July 8	5.40	Dec. 10	3.96
Feb. 12	2.48	Aug. 5	5.57	Jan. 3, 1947	3.83
Mar. 12	2.58	Sept. 3	4.90	Mar. 4	b 2.52
Apr. 8	3.84				

a Well destroyed after this date.
b Measuring point destroyed after this date.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Dodge County--Continued

A18-5-23bb

Date	Water level	Date	Water level	Date	Water level
Oct. 11, 1946	8.73	Mar. 4, 1947	7.22	May 6, 1947	6.95

A18-6-25cc

Jan. 23, 1947	8.68	Mar. 4, 1947	8.20	May 6, 1947	6.92

A18-7-36cb

Jan. 22, 1947	3.28	Mar. 4, 1947	3.00	May 6, 1947	2.16

A18-8-28da

June 22, 1945	63.80	June 3, 1946	64.39	Jan. 3, 1947	64.60
Oct. 16	63.88	July 8	64.32	Mar. 4	64.63
Jan. 2, 1946	63.11	Aug. 5	64.42	May 6	64.45
Feb. 12	64.17	Sept. 3	64.42	July 7	64.19
Mar. 12	64.24	Oct. 11	64.39	Sept. 4	64.25
Apr. 8	64.29	Nov. 5	64.51	Nov. 11	64.00
May 6	64.33	Dec. 10	64.54		

A18-8-28dd

June 22, 1945	26.21	June 3, 1946	25.88	Jan. 3, 1947	25.71
Oct. 12	26.05	July 8	25.87	Mar. 4	25.68
Jan. 2, 1946	26.01	Aug. 5	25.83	May 6	25.72
Feb. 12	25.96	Sept. 3	25.82	July 7	25.64
Mar. 12	25.97	Oct. 11	25.27	Sept. 4	25.62
Apr. 8	25.95	Nov. 5	25.70	Nov. 11	25.66
May 6	25.92	Dec. 10	25.66		

A18-8-33aa

Jan. 2, 1946	5.30	July 8, 1946	5.27	Jan. 3, 1947	5.39
Feb. 6	5.04	Aug. 5	5.32	Mar. 4	5.45
12	5.30	Sept. 3	5.30	May 6	5.46
Mar. 12	5.34	Oct. 11	5.29	July 7	3.80
Apr. 8	5.35	Nov. 5	5.28	Sept. 4	5.39
May 6	5.34	Dec. 10	5.31	Nov. 11	5.28

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Gosper County

8-21-3dc

Date	Water level	Date	Water level	Date	Water level
Feb. 15, 1946	13.86	Aug. 9, 1946	13.46	Mar. 18, 1947	13.79
Mar. 15	13.77	Sept. 6	13.40	May 14	12.82
Apr. 11	13.55	Oct. 9	12.79	July 14	11.10
May 10	13.26	Nov. 15	13.00	Sept.10	14.50
June 5	13.26	Dec. 5	13.29	Nov. 6	13.28
July 12	12.90	Jan. 10, 1947	13.51		

Hall County

9-10-4dc

Feb. 15, 1946	5.34	Aug. 9, 1946	6.76	Mar. 19, 1947	4.72
Mar. 13	5.15	Sept. 7	6.87	May 14	6.95
Apr. 11	5.34	Oct. 4	6.45	July 16	4.82
May 10	6.01	Nov. 15	5.87	Sept.11	6.68
June 4	5.55	Dec. 6	4.70	Nov. 7	6.70
July 12	6.50	Jan. 10, 1947	5.25		

9-11-8bc

Dec. 12, 1945	6.37	June 7, 1946	6.49	Dec. 2, 1946	4.65
Jan. 18, 1946	5.92	July 10	6.73	Jan. 6, 1947	5.71
Feb. 13	5.92	Aug. 7	7.62	Mar. 7	5.62
Mar. 13	5.93	Sept. 5	7.82	May 12	5.80
Apr. 10	5.90	Oct. 4	7.18	July 10	5.60
May 8	6.35	Nov. 6	5.75	Nov. 3	7.39

9-11-14cb

Feb. 15, 1946	7.12	Aug. 9, 1946	8.87	Mar. 19, 1947	7.10
Mar. 13	7.48	Sept. 7	8.81	May 10	7.90
Apr. 11	7.59	Oct. 4	8.09	July 16	7.03
May 10	7.92	Nov. 15	7.57	Sept.11	8.77
June 5	7.80	Dec. 6	7.13	Nov. 7	7.92
July 12	8.61	Jan. 10, 1947	7.54		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Hall County--Continued

9-11-21bb

Date	Water level	Date	Water level	Date	Water level
May 10, 1946	8.24	Oct. 4, 1946	8.50	May 14, 1947	7.86
June 5	8.16	Nov. 15	7.71	July 16	7.89
July 12	8.86	Dec. 6	7.44	Sept.11	9.44
Aug. 9	9.43	Jan. 10, 1947	7.74	Nov. 7	9.15
Sept. 7	9.52	Mar. 19	7.52		

9-12-1dc

Oct. 18, 1945	4.11	June 7, 1946	5.19	Dec. 2, 1946	3.29
Dec. 12	5.02	July 10	5.42	Jan. 6, 1947	4.15
Jan. 18, 1946	4.97	Aug. 7	6.68	Mar. 8	4.12
Feb. 13	4.93	Sept. 5	7.26	May 12	4.24
Mar. 13	4.75	Oct. 4	6.77	July 10	5.03
Apr. 10	4.37	Nov. 12	3.80	Nov. 3	7.59
May 8	4.89				

Table 11.—Water-level measurements in wells, in feet below land-surface datum—Continued

Hall County—Continued

9-12-9ba.

Water level, 1945: May 15, 22.61; Oct. 18, 21.72; Dec. 12, 21.88.

Lowest daily water level, Dec. 27, 1945 to Mar. 26, 1947; accuracy of record for May 10-17 is questionable

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	-	21.97	22.00	21.95	21.78	-	-	21.86	22.40	23.30	22.82	21.47	-	-	-	21.07
2	-	21.94	22.00	21.96	21.79	-	-	21.85	22.43	23.32	22.81	21.49	20.90	-	-	-
3	-	21.94	21.98	21.93	21.82	21.90	-	21.83	22.48	23.33	22.80	21.50	20.91	-	-	-
4	-	21.96	21.97	21.95	21.84	-	-	-	22.52	23.33	22.80	21.50	20.89	21.02	-	-
5	-	21.96	21.97	21.94	21.83	-	-	-	22.57	23.33	22.79	21.47	20.89	20.99	-	-
6	-	22.02	21.98	21.93	21.79	-	22.03	-	22.60	23.35	22.77	21.43	20.88	20.98	-	-
7	-	22.02	21.97	21.95	21.78	21.89	22.06	-	22.62	23.35	22.73	-	20.87	21.04	-	-
8	-	21.98	22.00	21.95	21.80	21.89	22.08	-	22.66	23.35	22.67	-	20.89	21.06	21.18	21.12
9	-	21.99	22.00	21.95	21.80	21.96	22.07	-	22.71	23.35	22.53	-	20.89	21.06	21.18	21.15
10	-	21.99	21.95	21.96	21.74	21.96	22.06	21.90	22.74	23.35	22.46	-	-	20.99	21.17	21.15
11	-	21.98	21.96	21.91	21.83	21.97	-	-	22.77	23.35	22.24	-	20.84	21.00	21.18	21.12
12	-	22.00	21.95	21.89	21.83	21.97	-	21.92	22.80	23.35	22.07	-	20.90	20.99	21.19	21.14
13	-	21.98	21.95	21.90	21.79	21.96	-	21.91	22.84	-	21.98	-	20.90	20.98	21.16	21.14
14	-	21.96	21.96	21.90	21.80	21.98	-	21.94	22.87	-	21.92	-	20.89	21.04	21.15	21.14
15	-	21.97	21.96	21.89	21.82	21.99	-	21.94	22.90	-	21.86	21.27	20.87	21.07	21.12	21.15
16	-	21.94	21.97	21.90	21.83	21.98	-	21.93	22.93	23.10	21.81	21.26	20.95	21.07	21.07	-
17	-	21.95	21.98	21.90	21.81	21.98	-	21.93	22.95	23.09	21.78	21.18	20.95	21.09	21.05	-
18	-	21.94	21.96	21.90	21.82	-	-	21.94	-	23.08	-	21.11	20.93	21.09	21.07	-
19	-	21.94	21.95	21.88	21.86	-	-	21.96	-	23.06	21.59	21.06	-	21.05	21.05	21.14
20	-	21.97	21.95	21.85	21.86	-	-	21.98	-	23.02	21.60	21.04	-	-	21.05	21.14
21	-	21.97	21.93	21.81	21.89	-	-	21.99	-	22.98	21.58	21.07	-	-	21.03	21.12
22	-	21.96	21.94	21.81	21.89	-	-	22.00	-	22.96	21.56	21.05	-	-	21.05	21.09
23	-	21.96	21.95	21.79	21.88	-	-	22.07	23.14	22.94	21.54	20.98	-	-	21.06	21.10
24	-	21.96	21.96	21.79	21.88	22.00	-	22.09	23.15	22.92	21.53	21.00	-	-	21.06	21.14
25	-	21.95	21.93	21.79	21.89	-	21.85	22.13	23.18	22.91	21.51	20.99	-	21.10	21.07	21.15
26	-	22.00	21.96	21.79	-	-	21.84	22.15	23.20	22.90	21.50	20.95	-	21.09	21.08	21.14
27	22.00	21.98	21.97	21.80	-	22.03	21.84	22.20	23.21	22.88	-	20.97	20.88	21.13	21.06	-
28	21.96	21.99	21.95	21.77	-	22.03	21.84	22.23	23.23	22.85	-	20.92	-	21.13	21.05	-
29	21.95	21.94	-	21.79	-	22.02	21.84	22.26	23.26	22.84	21.49	20.92	-	21.08	-	-
30	21.97	21.96	-	21.81	21.89	-	21.85	22.30	23.27	22.83	21.51	-	-	21.12	-	-
31	21.98	21.96	-	21.80	-	-	-	22.34	23.29	-	21.50	-	-	21.13	-	-

Water level, 1947: May 12, 20.68; July 10, 19.63; Nov. 3, 22.12.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Hall County--Continued

10-9-10bb

Date	Water level	Date	Water level	Date	Water level
Feb. 11, 1946	7.97	Aug. 5, 1946	8.90	Jan. 10, 1947	7.75
Mar. 11	7.80	Sept. 3	9.35	Mar. 7	7.68
Apr. 8	7.81	Oct. 7	8.74	May 8	7.50
May 6	8.26	Nov. 4	8.12	July 10	7.23
June 3	7.46	Dec. 6	7.41	Sept.11	9.39
July 8	8.27				

10-9-27bb

Jan. 5, 1946	14.75	July 8, 1946	15.01	Dec. 6, 1946	14.74
Feb. 11	14.35	Aug. 5	15.32	Jan. 10, 1947	14.62
Mar. 11	14.52	Sept. 3	15.51	Mar. 8	14.35
Apr. 8	14.60	Oct. 7	15.28	May 8	14.25
May 6	14.85	Nov. 4	15.05	July 16	a13.78
June 3	14.77				

10-9-28cc

May 6, 1946	14.63	Oct. 7, 1946	15.01	May. 8, 1947	14.24
June 3	14.57	Nov. 4	14.81	July 16	13.77
July 8	14.70	Dec. 6	14.52	Sept.11	14.96
Aug. 5	15.14	Jan. 10, 1947	14.45	Nov.. 7	14.84
Sept. 3	15.32	Mar. 8	14.19		

10-10-8cc

May 15, 1945	21.76	May 8, 1946	21.87	Dec. 2, 1946	21.10
Oct. 18	21.49	June 7	21.77	Jan. 6, 1947	21.36
Dec. 12	21.58	July 10	21.97	Mar. 8	21.29
Jan. 18, 1946	20.69	Aug. 7	23.75	May 8	21.20
Feb. 13	21.78	Sept. 5	24.08	July 10	20.11
Mar. 13	21.72	Oct. 4	22.54	Nov. 3	21.85
Apr. 10	21.72	Nov. 6	22.11		

10-10-13dd

May 8, 1946	4.16	Oct. 4, 1946	3.85	May 8, 1947	3.88
June 3	3.73	Nov. 4	4.04	July 16	3.46
July 8	4.16	Dec. 6	3.79	Sept.11	4.80
Aug. 6	4.27	Jan. 10, 1947	2.97	Nov. 7	4.22
Sept. 3	4.21	Mar. 7	3.34		

a Well sealed up after this date.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Hall County--Continued

10-11-15dc

Date	Water level	Date	Water level	Date	Water level
Oct. 18, 1945	17.77	June 6, 1946	18.76	Jan. 6, 1947	18.32
Dec. 12	17.99	Aug. 7	21.02	Mar. 7	18.40
Jan. 18, 1946	18.16	Sept. 5	21.12	May 12	17.97
Feb. 13	18.35	Oct. 4	20.22	July 10	15.56
Mar. 13	18.31	Nov. 6	19.20	Sept. 5	18.72
Apr. 10	18.66	Dec. 2	18.70	Nov. 3	17.48
May 8	18.66				

10-11-30bc

May 15, 1945	20.78	May 8, 1946	20.55	Dec. 2, 1946	20.72
Oct. 18	21.87	June 7	20.52	Jan. 6, 1947	20.40
Dec. 12	20.56	July 10	20.40	Mar. 8	20.21
Jan. 18, 1946	20.54	Aug. 7	21.93	May 12	19.95
Feb. 13	20.52	Sept. 5	22.40	July 10	18.88
Mar. 13	20.51	Oct. 4	21.91	Nov. 3	19.04
Apr. 10	20.47	Nov. 6	20.97		

10-12-20dd

Feb. 13, 1946	28.89	June 7, 1946	29.03	Nov. 6, 1946	29.93
Mar. 13	28.85	July 10	28.78	Dec. 2	29.74
Apr. 10	28.77	Sept. 5	30.67	Measurements	
May 8	28.83	Oct. 4	30.29	discontinued	

11-9-27cb

Jan. 22, 1945	7.42	Apr. 8, 1946	7.56	Oct. 7, 1946	7.91
May 14	6.75	May 6	7.23	Nov. 4	6.26
Aug. 6	a 5.75	June 3	6.80	Dec. 6	6.49
Oct. 29	a 6.75	July 8	7.03	Jan. 10, 1947	6.79
Jan. 5, 1946	7.31	Aug. 5	7.45	Mar. 7	6.96
Feb. 11	7.39	Sept. 3	7.96	Measurements	
Mar. 11	7.42			discontinued	

a Measurements supplied by Grand Island Water Department.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Hall County--Continued

11-10-14dd

Date	Water level	Date	Water level	Date	Water level
Feb. 13, 1946	10.95	Aug. 6, 1946	11.68	Mar. 7, 1947	10.82
Mar. 13	10.99	Sept. 5	10.92	May 8	10.50
Apr. 9	11.09	Oct. 4	11.03	July 10	9.15
May 8	11.14	Nov. 6	10.54	Sept. 5	9.60
June 4	10.90	Dec. 2	10.42	Nov. 3	9.72
July 9	10.54	Jan. 6, 1947	10.47		

11-10-16bb

May 8, 1946	11.07	Oct. 4, 1946	11.02	May 8, 1947	10.44
June 4	10.81	Nov. 6	10.64	July 10	9.79
July 9	10.75	Dec. 2	10.56	Sept. 5	9.79
Aug. 6	10.79	Jan. 6, 1947	10.40	Nov. 3	9.80
Sept. 5	10.96				

11-10-27dc

May 8, 1946	17.13	Oct. 4, 1946	17.66	May 8, 1947	16.73
June 7	17.72	Nov. 6	17.29	July 10	15.79
July 10	17.15	Dec. 2	17.15	Sept. 5	15.43
Aug. 6	17.40	Jan. 6, 1947	16.88	Nov. 3	16.00
Sept. 5	17.45	Mar. 7	16.91		

Table 11.—Water-level measurements in wells, in feet below land-surface datum—Continued

Hall County—Continued

11-11-25cc.

Lowest daily water level, 1946-47
(Taken from recorder charts)

Day	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	-	-	17.03	16.93	-	16.77	16.72	16.70	16.64	16.57	a13.44	14.01	15.63	16.05	16.18	16.28
2	-	-	17.02	16.92	-	16.77	16.72	16.70	16.64	16.57	a13.51	14.01	15.65	16.06	16.18	16.29
3	-	-	17.02	-	-	16.77	16.72	16.70	16.64	16.57	a13.58	14.03	15.66	16.06	16.17	16.30
4	-	b17.10	17.02	-	-	16.77	16.72	16.70	16.63	16.57	a13.64	14.05	15.67	16.07	16.18	16.30
5	b16.80	-	17.02	-	-	16.77	16.72	16.69	16.63	16.57	a13.71	14.14	15.67	16.07	16.19	16.30
6	-	-	17.01	-	-	16.77	16.72	16.69	16.63	16.56	a13.79	14.25	15.71	16.07	16.18	16.31
7	-	-	17.00	-	16.81	16.76	16.72	16.72	16.62	16.57	a13.84	14.35	15.73	16.08	16.19	16.32
8	-	-	17.00	-	16.80	16.76	16.74	16.72	16.62	16.57	a13.90	14.44	15.76	16.08	16.19	16.32
9	-	-	17.00	-	16.81	16.76	16.74	16.72	16.62	16.56	a13.95	14.50	15.78	16.08	16.80	16.32
10	-	-	16.99	-	16.81	16.76	16.73	16.72	16.62	16.55	a13.95	14.56	15.80	16.08	16.20	16.32
11	-	-	16.99	-	16.81	16.76	16.73	16.69	16.62	16.56	14.35	14.65	15.85	16.08	16.20	16.32
12	-	-	16.99	-	16.81	16.76	16.73	16.71	16.62	16.56	14.35	14.71	15.88	16.09	16.20	16.33
13	-	-	16.99	-	16.80	16.76	16.73	16.71	16.62	16.55	14.34	14.77	15.89	16.10	16.20	16.33
14	-	-	16.98	-	16.80	16.76	16.73	16.71	16.62	16.54	14.31	14.83	15.93	16.09	16.20	16.32
15	-	-	16.98	-	16.80	16.76	16.72	16.70	16.62	16.53	14.30	14.90	15.94	16.09	16.21	16.33
16	-	-	16.97	-	16.80	16.76	16.72	16.69	16.62	16.52	14.28	14.95	15.95	16.09	16.22	16.34
17	-	-	16.98	-	16.79	16.76	16.72	16.68	16.61	16.49	14.27	15.00	15.95	16.10	16.22	16.34
18	-	-	16.98	-	16.79	61.75	16.72	16.68	16.61	16.47	14.26	15.05	15.97	16.10	16.22	16.34
19	-	-	16.97	-	16.79	16.75	16.72	16.68	16.61	16.45	14.23	15.10	15.98	16.11	16.23	16.35
20	-	-	16.97	-	16.78	16.74	16.72	16.67	16.61	16.40	14.16	15.18	15.98	16.11	16.23	16.36
21	-	-	16.97	-	16.77	16.73	16.72	16.67	16.60	16.37	14.17	15.24	16.00	16.11	16.25	16.37
22	-	-	16.97	-	16.77	16.73	16.72	16.67	16.59	16.36	14.14	15.29	16.02	16.12	16.26	16.36
23	-	-	16.96	-	16.77	16.72	16.72	16.66	16.59	16.32	14.13	15.34	16.02	16.13	16.26	16.37
24	-	-	16.95	-	16.77	16.72	16.71	16.66	16.59	16.04	14.12	15.42	16.03	16.14	16.26	16.38
25	-	-	16.96	-	16.77	16.72	16.70	16.66	16.59	15.64	14.10	15.47	16.04	16.15	16.27	16.38
26	-	-	16.96	-	16.77	16.72	16.71	16.66	16.58	14.49	14.08	15.48	16.04	16.15	16.27	16.37
27	-	-	16.96	-	16.77	16.72	16.71	16.66	16.58	a13.14	14.06	15.51	16.04	16.16	16.28	16.37
28	-	-	16.95	-	16.77	16.72	16.70	16.66	16.57	a13.11	14.05	15.53	16.05	16.17	16.28	16.38
29	-	-	16.95	-	16.77	-	16.70	16.65	16.57	a13.23	14.04	15.54	16.05	16.17	16.29	16.37
30	-	17.03	16.93	-	16.77	-	16.70	16.64	16.57	a13.35	14.02	15.57	16.05	16.17	16.29	16.38
31	-	17.03	-	-	16.76	-	16.70	-	16.57	-	14.03	15.60	-	16.18	-	16.38

a Recorder disturbed by flood; readings may be in error.
b Measurements made previous to installation of recorder.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Hall County--Continued

11-11-32cb

Date	Water level	Date	Water level	Date	Water level
Oct. 18, 1945	35.64	May 8, 1946	35.10	Dec. 2, 1946	36.02
Dec. 12	35.26	June 7	35.01	Jan. 6, 1947	35.10
Jan. 18, 1946	35.32	July 10	34.98	Mar. 10	35.77
Feb. 13	35.27	Sept. 4	36.75	May 12	35.52
Mar. 13	35.20	Oct. 4	36.55	July 10	35.11
Apr. 10	35.12	Nov. 6	36.08	Nov. 3	36.42

11-11-36cb

Oct. 18, 1945	23.65	June 7, 1946	23.27	Dec. 2, 1946	23.75
Dec. 12	23.33	July 10	23.16	Jan. 6, 1947	23.55
Jan. 18, 1946	23.33	Aug. 7	25.05	Mar. 7	23.45
Feb. 13	23.34	Sept. 4	26.07	May 12	23.31
Mar. 13	23.32	Oct. 4	24.62	July 10	21.15
Apr. 10	23.29	Nov. 6	23.88	Nov. 3	23.16
May 8	23.30				

11-12-34dc

June 7, 1946	25.70	Nov. 6, 1946	26.29	May 12, 1947	26.05
July 10	25.68	Dec. 2	26.24	July 10	25.72
Sept. 5	26.82	Jan. 6, 1947	26.17	Sept. 5	26.78
Oct. 4	26.68	Mar. 10	26.17	Nov. 3	26.60

12-9-32aa2

Feb. 13, 1946	12.27	Sept. 4, 1946	13.35	Mar. 8, 1947	12.21
Mar. 12	12.14	Oct. 4	13.10	May 8	11.75
Apr. 9	12.08	Nov. 6	12.56	July 10	10.67
May 8	12.15	Dec. 2	12.39	Nov. 3	12.53
Aug. 6	13.02	Jan. 6, 1947	12.30		

12-11-24cd

May 8, 1946	11.29	Oct. 4, 1946	12.26	May 8, 1947	10.66
June 4	11.34	Nov. 6	11.74	July 10	6.42
July 9	11.54	Dec. 2	11.44	Sept. 5	7.80
Aug. 6	11.85	Jan. 6, 1947	11.29	Nov. 3	9.41
Sept. 5	12.10	Mar. 8	11.30		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Hamilton County

11-8-28bc

Date	Water level	Date	Water level	Date	Water level
Feb. 11, 1946	30.04	Sept. 3, 1946	32.23	May 8, 1947	30.35
Mar. 11	30.19	Oct. 12	32.11	July 10	29.80
Apr. 8	30.35	Nov. 4	30.78	Sept.11	31.92
May 6	30.59	Dec. 6	30.47	Oct. 23	31.00
June 3	30.37	Jan. 10, 1947	30.59	Nov. 3	30.92
July 8	30.86	Mar. 7	29.95		

13-5-19aa

Feb. 11, 1946	25.35	Aug. 5, 1946	27.28	Mar. 3, 1947	25.16
Mar. 11	25.10	Sept. 3	26.68	May 7	24.90
Apr. 8	25.25	Oct. 12	26.17	July 7	24.60
May 6	25.50	Nov. 4	25.73	Oct. 22	26.90
June 3	25.62	Dec. 9	24.97	Nov. 10	26.72
July 8	26.05	Jan. 2, 1947	25.28		

13-6-27cc

Jan. 10, 1946	8.90	Aug. 5, 1946	10.52	Mar. 3, 1947	8.96
Feb. 11	8.91	Sept. 3	10.45	May 7	8.69
Mar. 11	8.79	Oct. 12	9.37	July 7	8.09
Apr. 8	8.86	Nov. 4	9.52	Sept. 3	10.11
May 6	9.55	Dec. 9	9.03	Oct. 25	10.15
June 3	9.20	Jan. 2, 1947	9.29	Nov. 10	10.00
July 8	9.40				

Howard County

13-9-26dd

May 8, 1946	8.99	Oct. 3, 1946	9.68	May 8, 1947	6.98
June 4	7.59	Nov. 6	9.19	July 10	5.54
July 9	7.73	Dec. 2	8.09	Sept. 5	7.90
Aug. 6	9.10	Jan. 6, 1947	8.10	Nov. 3	8.49
Sept. 4	9.68	Mar. 7	7.85		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Kearney County

8-13-12cb

Date	Water level	Date	Water level	Date	Water level
Feb. 15, 1946	6.89	Aug. 9, 1946	7.12	Mar. 19, 1947	5.70
Mar. 13	6.84	Sept. 7	6.82	May 14	5.77
Apr. 11	6.69	Oct. 4	6.11	July 15	5.20
May 10	6.99	Nov. 15	5.21	Sept.11	6.84
June 5	6.96	Dec. 6	4.84	Nov. 7	6.92
July 12	6.70	Jan. 10, 1947	5.55		

8-13-16bc

Sept. 7, 1946	6.77	Jan. 10, 1947	4.65	July 15, 1947	3.98
Oct. 4	5.75	Mar. 19	4.60	Sept.11	6.30
Nov. 15	4.39	May 14	4.65	Nov. 7	5.84
Dec. 6	4.15				

8-14-13db

Oct. 18, 1945	8.77	June 5, 1946	8.63	Jan. 10, 1947	7.52
Dec. 12	8.64	July 12	8.10	Mar. 19	7.36
Jan. 17, 1946	8.71	Aug. 9	9.66	May 14	7.77
Feb. 15	8.36	Sept. 7	9.42	July 15	6.92
Mar. 13	8.32	Oct. 4	8.30	Sept.10	8.19
Apr. 11	8.29	Nov. 15	6.59	Nov. 7	8.87
May 10	8.67	Dec. 6	7.00		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Kearney County--Continued

8-14-19cc

Date	Water level	Date	Water level	Date	Water level
Feb. 15, 1946	5.32	Aug. 9, 1946	6.05	Mar. 19, 1947	3.89
Mar. 13	5.10	Sept. 7	6.18	May 14	4.29
Apr. 11	5.20	Oct. 10	2.72	July 15	3.50
May 10	5.52	Nov. 15	2.38	Sept.11	5.42
June 5	5.64	Dec. 6	3.10	Nov. 7	5.33
July 12	5.35	Jan. 10, 1947	4.05		

8-14-23ba

May 10, 1946	5.02	Oct. 4, 1946	4.60	May 14, 1947	4.23
June 5	4.89	Nov. 15	2.63	July 15	3.54
July 12	4.68	Dec. 6	3.45	Sept.11	5.75
Aug. 9	5.25	Jan. 10,, 1947	3.95	Nov. 7	5.37
Sept. 7	4.88	Mar. 19	3.65		

8-15-21dc

Feb. 15, 1946	6.03	Aug. 9, 1946	6.85	Mar. 19, 1947	4.68
Mar. 13	5.88	Sept. 7	7.00	May 14	5.22
Apr. 11	5.92	Oct. 10	3.60	July 15	4.95
May 10	6.32	Nov. 15	3.20	Sept.11	7.25
June 5	6.27	Dec. 6	3.99	Nov. 7	6.57
July 12	6.46	Jan. 10, 1947	4.97		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Kearney County--Continued

8-16-23dd

Date	Water level	Date	Water level	Date	Water level
Feb. 15, 1946	4.94	Aug. 9, 1946	5.65	Mar. 19, 1947	3.64
Mar. 13	4.82	Sept. 7	5.56	May 14	4.17
Apr. 11	4.96	Oct. 10	2.22	July 15	3.59
May 10	5.35	Nov. 15	2.55	Sept.10	5.45
June 5	5.22	Dec. 6	3.10	Nov. 7	5.08
July 12	5.28	Jan. 10, 1947	3.88		

8-16-28aa

Sept. 7, 1946	7.60	Jan. 10, 1947	5.57	July 15, 1947	5.43
Oct. 10	4.36	Mar. 19	5.62	Sept.10	6.96
Nov. 15	4.58	May 14	5.82	Nov. 7	6.82
Dec. 6	4.90				

Lincoln County

11-26-16bb

Jan. 8, 1945	9.89	Sept.14, 1945	9.50	Dec. 4, 1946	a 9.17
Feb. 14	9.99	Nov. 15	9.28	Jan. 9, 1947	a 9.62
Mar. 6	10.13	Jan. 15, 1946	10.18	Mar. 17	a10.13
Apr. 6	10.37	Apr. 8	10.95	May 14	a10.32
May 2	10.38	May 17	10.83	July 14	a 8.48
June 1	10.42	June 10	10.82	Sept.10	a 9.07
July 5	10.35	Aug. 2	10.45	Nov. 6	a 9.23
Aug. 6	10.13	Oct. 30	a 9.00		

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Lincoln County--Continued

12-26-35db

Date	Water level	Date	Water level	Date	Water level
Oct. 9, 1946	10.32	Jan. 8, 1947	10.09	July 13, 1947	7.32
31	9.94	Mar. 14	10.08	Sept. 9	9.74
Dec. 4	9.74	May 14	9.94	Nov. 5	10.38

12-27-14aa

Jan. 5, 1945	6.04	Oct. 3, 1945	6.33	Oct. 31, 1946	a 5.87
Feb. 8	6.12	Jan. 9, 1946	5.57	Dec. 4	a 5.73
Mar. 1	6.11	Feb. 27	5.61	Jan. 8, 1947	a 5.56
Apr. 4	6.29	Apr. 10	5.83	Mar. 14	a 5.86
May 4	6.27	May 16	6.16	May 14	a 5.80
June 1	6.12	June 6	5.23	July 13	a 5.30
13	6.24	Aug. 6	6.17	Sept. 9	a 6.10
Aug. 8	6.35	Oct. 9	a 5.17	Nov. 5	a 6.04
Sept. 7	6.09				

12-27-16aa

Jan. 8, 1945	4.60	Sept. 1, 1945	4.76	Dec. 4, 1946	a 4.18
Feb. 17	4.55	Oct. 8	4.62	Jan. 8, 1947	a 4.39
Mar. 3	4.58	Jan. 9, 1946	4.12	Mar. 14	a 4.43
Apr. 4	4.63	Apr. 10	4.44	May 13	a 4.45
May 2	4.54	May 16	4.67	July 13	a 3.35
June 1	4.02	Aug. 6	4.47	Sept. 9	a 4.73
July 3	4.57	July 31	4.54	Nov. 5	a 5.05
Aug. 6	4.29	Oct. 30	a 4.22		

12-27-20dd

Jan. 11, 1945	14.37	Sept.14, 1945	14.15	Dec. 4, 1946	a14.10
Feb. 14	14.26	Nov. 9	14.11	Jan. 9, 1947	a14.12
Mar. 1	14.25	Jan. 15, 1946	14.22	Mar. 17	a14.16
Apr. 6	14.22	Apr. 8	15.22	May 14	a14.16
May 2	14.21	May 17	14.34	July 13	a13.17
June 1	14.20	June 8	14.11	Sept.10	a14.05
July 5	14.18	Aug. 2	14.39	Nov. 6	a14.09
Aug. 6	14.18	Oct. 30	a14.15		

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Lincoln County--Continued

12-27-27ad

Date	Water level	Date	Water level	Date	Water level
Jan. 8, 1945	3.26	Sept.14, 1945	3.75	Dec. 5, 1946	a 4.37
Feb. 14	2.97	Nov. 7	4.89	Jan. 9, 1947	a 4.49
Mar. 6	2.90	Jan. 15, 1946	4.88	Mar. 17	a 4.52
Apr. 6	3.09	Apr. 8	4.61	May 14	a 4.44
May 2	3.10	May 17	5.00	July 14	a 2.68
June 1	3.12	June 8	4.47	Sept.10	a 5.02
July 5	3.15	Aug. 2	5.40	Nov. 7	a 4.59
Aug. 6	3.35	Oct. 30	a 4.53		

12-27-28dd

Sept.10, 1947	12.50	Nov. 7, 1947	12.62		

12-27-36ad

Jan. 8, 1945	4.85	Sept.14, 1945	4.90	Dec. 5, 1946	a 4.86
Feb. 14	4.85	Nov. 7	4.93	Jan. 9, 1947	a 4.53
Mar. 6	4.87	Jan. 15, 1946	4.78	Mar. 17	a 5.00
Apr. 6	4.93	Apr. 8	5.16	May 14	a 4.90
May 2	4.96	May 17	5.44	July 14	a 5.02
June 1	4.95	June 8	4.44	Sept.10	a 4.75
July 5	4.92	Aug. 2	3.89	Nov. 7	a 4.93
Aug. 6	4.89	Oct. 30	a 4.72		

12-28-9bc

Jan. 8, 1945	5.18	Sept.14, 1945	5.36	Dec. 4, 1946	a 4.77
Feb. 14	4.98	Jan. 15, 1946	5.09	Jan. 9, 1947	a 5.00
Mar. 1	5.14	Apr. 8	5.13	Mar. 17	a 5.07
Apr. 6	5.18	May 17	5.30	May 14	a 5.24
May 2	5.22	June 8	5.06	July 13	a 5.06
June 1	5.24	Aug. 2	5.79	Sept.10	a 5.82
July 5	5.30	Oct. 30	a 5.12	Nov. 5	a 4.15
Aug. 6	5.40				

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Lincoln County--Continued

12-28-14dd

Date	Water level	Date	Water level	Date	Water level
Jan. 11, 1945	28.45	Nov. 9, 1945	27.88	Dec. 5, 1946	a27.59
Feb. 14	28.32	Jan. 15, 1946	27.87	Jan. 9, 1947	a27.60
Mar. 1	28.31	Apr. 8	27.91	Mar. 17	a27.59
Apr. 6	28.32	May 17	27.98	May 14	a27.70
May 2	28.34	June 8	28.02	July 13	a27.50
June 1	28.32	Aug. 2	28.25	Sept.10	a27.82
Aug. 6	28.21	Oct. 30	a27.79	Nov. 5	a27.48
Sept.14	28.01				

12-28-15ba

Jan. 11, 1945	12.29	Sept.14, 1945	12.51	Dec. 5, 1946	a11.99
Feb. 14	12.24	Nov. 9	12.17	Jan. 9, 1947	a12.04
Mar. 1	12.27	Jan. 15, 1946	12.21	Mar. 17	a12.25
Apr. 6	12.36	Apr. 8	12.35	May 14	a12.22
May 2	12.40	May 17	12.57	July 13	a11.22
June 1	12.43	June 8	12.39	Sept.10	a11.35
July 5	12.46	Aug. 2	12.51	Nov. 5	a12.29
Aug. 6	12.55	Oct. 30	a11.96		

13-27-32bd

Jan. 5, 1945	3.04	Sept. 7, 1945	2.40	Oct. 31, 1946	a 3.24
Feb. 17	2.90	Oct. 3	2.45	Dec. 4	a 2.95
Mar. 1	3.07	Jan. 9, 1946	2.30	Jan. 8, 1947	a 3.15
Apr. 4	3.09	Feb. 27	2.55	Mar. 14	a 3.00
May 4	2.70	Apr. 10	2.79	May 13	a 3.19
June 4	2.12	May 16	3.55	July 13	a 2.81
July 13	3.44	June 6	2.81	Sept. 9	a 4.32
Aug. 8	3.00	Aug. 6	4.19	Nov. 5	a 3.88

13-28-16dd

Sept. 9, 1947	6.16	Nov. 5, 1947	5.85		

13-28-21da

Jan. 8, 1945	4.55	Apr. 10, 1946	2.02	Mar. 14, 1947	a 1.76
Feb. 7	4.21	June 7	2.44	May 13	a 2.35
Mar. 3	3.85	Aug. 6	5.71	July 13	a 2.92
Apr. 4	3.12	Oct. 31	a 2.25	Sept. 9	a 5.74
June 1	1.37	Dec. 4	a 1.59	Nov. 5	a 5.15
Jan. 9, 1946	1.71	Jan. 9, 1947	a 2.55		

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Lincoln County--Continued

13-28-25bc

Date	Water level	Date	Water level	Date	Water level
Dec. 4, 1946	3.62	Mar. 14, 1947	3.50	Sept. 9, 1947	6.21
Jan. 8, 1947	4.24	July 13	4.63	Nov. 5	5.97

13-28-28cc

Sept. 9, 1947	3.33	Nov. 5, 1947	3.07		

13-28-29cc

Jan. 8, 1945	5.32	Aug. 6, 1945	5.07	Jan. 8, 1947	a 5.18
Feb. 7	5.28	Oct. 8	5.42	Mar. 17	a 5.29
Mar. 3	5.29	Jan. 9, 1946	4.89	May 13	a 5.50
Apr. 4	5.41	Apr. 10	5.14	July 13	a 5.27
May 2	5.26	May 16	5.46	Sept. 9	a 6.39
June 1	4.94	Oct. 31	a 4.72	Nov. 5	a 5.79
July 5	5.13	Dec. 4	a 5.00		

13-28-31cc

Jan. 5, 1945	5.09	Sept.14, 1945	5.50	Dec. 4, 1946	a 3.66
Mar. 1	5.33	Jan. 15, 1946	4.54	Jan. 9, 1947	a 4.23
Apr. 5	5.55	Apr. 5	4.82	Mar. 17	a 4.66
May 2	5.58	May 17	5.24	May 14	a 5.62
June 1	5.60	June 10	4.92	July 13	a 5.58
July 5	5.69	Aug. 2	4.73	Sept.10	a 5.19
Aug. 6	5.70	Oct. 30	a 3.39	Nov. 5	a 4.82

13-29-4cc

Jan. 10, 1945	5.65	Aug. 6, 1945	5.71	Oct. 31, 1946	a 5.32
Feb. 8	5.61	Sept. 1	5.79	Dec. 4	a 5.12
Mar. 1	5.60	Oct. 17	5.91	Jan. 9, 1947	a 5.48
Apr. 4	5.66	Jan. 8, 1946	5.53	Mar. 14	a 5.59
May 2	5.52	Apr. 5	5.40	May 13	a 5.18
June 1	5.46	June 7	5.56	July 13	a 4.45
July 5	5.62	Aug. 2	6.19	Sept. 9	a 6.17

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Lincoln County--Continued

13-29-6ba

Date	Water level	Date	Water level	Date	Water level
Jan. 10, 1945	3.01	Sept. 1, 1945	3.06	Dec. 4, 1946	a 2.74
Feb. 11	2.82	Oct. 17	3.08	Jan. 9, 1947	a 3.50
Mar. 1	2.93	Jan. 8, 1946	2.55	Mar. 14	a 3.05
Apr. 4	3.04	Apr. 5	2.62	May 13	a 3.17
May 2	3.00	June 7	2.83	July 13	a 3.61
June 1	2.90	Aug. 2	4.00	Sept. 9	a 4.40
July 5	3.00	Oct. 31	a 2.95	Nov. 5	a 4.70
Aug. 6	3.02				

13-29-20bb

Feb. 14, 1945	6.54	Sept. 1, 1945	6.65	Dec. 4, 1946	a 6.15
Mar. 1	6.52	Jan. 15, 1946	6.69	Jan. 9, 1947	a 6.28
Apr. 5	6.63	Apr. 5	6.41	Mar. 17	a 6.42
May 2	6.65	May 17	6.59	May 13	a 6.23
June 1	6.64	June 13	6.02	July 13	a 6.22
July 5	6.63	Aug. 2	6.69	Sept.10	a 6.80
Aug. 6	6.60	Oct. 30	a 5.94	Nov. 5	a 6.93

13-29-25bb

Jan. 8, 1945	4.82	Sept. 1, 1945	4.95	Dec. 4, 1946	a 4.34
Feb. 7	4.85	Oct. 8	4.82	Jan. 9, 1947	a 4.59
Mar. 3	4.87	Jan. 9, 1946	4.66	Mar. 17	a 4.85
Apr. 4	4.92	Apr. 10	4.51	May 13	a 5.07
May 2	4.64	May 16	4.92	July 13	a 4.31
June 1	4.64	Aug. 6	5.09	Sept. 9	a 5.30
July 5	4.64	Oct. 31	a 4.15	Nov. 5	a 5.16
Aug. 6	4.92				

13-29-35bb

Dec. 4, 1946	16.13	May 14, 1947	17.85	Sept.10, 1947	15.02
Jan. 9, 1947	16.56	July 13	15.85	Nov. 5	15.29
Mar. 17	17.68				

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Lincoln County--Continued

13-30-3ad

Date	Water level	Date	Water level	Date	Water level
Jan. 10, 1945	4.23	Aug. 6, 1945	4.24	Dec. 4, 1946	a 3.97
Feb. 11	4.09	Oct. 17	4.31	Jan. 9, 1947	a 4.41
Mar. 1	4.13	Jan. 8, 1946	4.05	Mar. 14	a 4.45
Apr. 4	4.26	Apr. 5	4.07	May 13	a 4.47
May 2	4.15	June 7	3.94	July 13	a 4.40
June 1	4.06	Aug. 2	5.42	Sept. 9	a 6.57
July 5	4.20	Oct. 31	a 4.00	Nov. 5	a 4.93

13-30-4cd

May 24, 1946	b 6.70	Oct. 15, 1946	b 5.80	Mar. 17, 1947	7.11
July 9	b 6.75	30	6.54	May 13	7.15
Aug. 2	b 7.00	Dec. 4	6.47	July 13	5.42
Sept.12	b 6.80	14	b 6.60	Sept. 9	7.54
24	b 6.80	Jan. 9, 1947	6.64	Nov. 5	7.30
Oct. 9	4.97				

13-30-9cb

July 11, 1946	b 2.70	Oct. 15, 1946	b 1.60	Mar. 17, 1947	2.05
Aug. 2	b 3.24	31	1.85	May 13	2.11
Sept.12	b 3.00	Dec. 4	1.55	July 13	2.30
24	b 2.90	14	b 1.75	Sept. 9	3.14
Oct. 9	1.31	Jan. 9, 1947	2.20	Nov. 5	2.69

13-30-13dd

Jan. 5, 1945	10.48	Sept. 1, 1945	10.20	Dec. 4, 1946	a 9.78
Feb. 11	10.31	Jan. 15, 1946	10.14	Jan. 9, 1947	a 9.71
Mar. 1	10.26	Apr. 5	9.82	Mar. 17	a 9.75
Apr. 5	10.31	May 17	10.18	May 13	a 9.51
May 2	10.30	June 13	9.96	July.13	a 9.49
June 1	10.30	Aug. 2	11.39	Sept.10	a11.46
July 5	10.26	Oct. 30	a10.01	Nov. 5	a10.87
Aug. 6	10.24				

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.
b Measurements made by Platte Valley Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

13-30-21bb Lincoln County--Continued

Date	Water level	Date	Water level	Date	Water level
Jan. 5, 1945	12.36	Feb. 20, 1946	a11.80	Oct. 9, 1946	b12.12
Feb. 11	12.08	Mar. 22	a11.70	15	a12.10
Mar. 1	11.99	Apr. 5	11.67	30	b11.94
Apr. 5	12.08	25	a11.70	Dec. 4	b11.75
May 2	12.02	May 4	a11.70	14	a11.60
June 1	12.01	17	11.70	Jan. 9, 1947	b11.57
July 5	11.98	June 1	a11.70	Mar. 17	b11.44
Aug. 6	11.96	13	11.88	May 13	b11.42
Sept. 1	11.95	Aug. 2	12.89	July 13	b11.22
Nov. 9	12.16	9	a12.80	Sept. 9	b12.32
Jan. 15, 1946	11.94	Sept. 12	a12.70	Nov. 5	b11.94
21	a12.00	24	a12.75		

14-30-9ca

May 23, 1946	c 4.50	Oct. 31, 1946	4.16	May 13, 1947	3.63
25	c 3.90	Dec. 4	3.78	July 13	4.00
July 11	c 5.00	18	c 4.00	Sept. 9	5.61
Sept.12	c 6.05	Jan. 9, 1947	4.17	Nov. 5	5.30
Oct. 9	3.90	Mar. 17	3.74		

14-30-16db

May 23, 1946	c 1.50	Dec. 4, 1946	0.55	May 13, 1947	0.88
July 11	c 2.50	18	c .85	July 13	1.79
Sept.12	c 2.00	Jan. 9, 1947	.38	Sept. 9	2.69
Oct. 9	..40	Mar. 17	.40	Nov. 5	1.35
30	.79				

14-30-21cd

May 24, 1946	c 3.80	Dec. 4, 1946	3.40	May 13, 1947	3.52
July 11	c 3.80	18	c 3.50	July 13	3.80
Sept.12	c 3.70	Jan. 9, 1947	3.41	Sept. 9	3.87
Oct. 9	2.89	Mar. 17	3.35	Nov. 5	3.91
31	3.38				

a Measurements made by Platte Valley Public Power and Irrigation District; other measurements January 1945 to August 1946 were made by Central Nebraska Public Power and Irrigation District.
b Measurements made by Geological Survey observer.
c Measurements made by Platte Valley Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Lincoln County--Continued

14-30-28dc

Date	Water level	Date	Water level	Date	Water level
May 24, 1946	a 5.30	Dec. 4, 1946	5.57	May 13, 1947	6.04
July 11	a 5.60	18	a 5.65	July 13	5.61
Sept.12	a 6.10	Jan. 9, 1947	5.95	Sept. 9	6.05
Oct. 9	5.51	Mar. 17	6.03	Nov. 5	6.05
31	5.62				

14-30-33cd

May 9, 1946	6.30	Oct. 5, 1946	7.20	Jan. 9, 1947	6.75
14	6.43	7	6.70	Mar. 17	6.88
24	6.20	9	a 6.14	May 13	6.68
29	6.10	10	6.20	July 13	6.99
June 18	6.47	31	a 6.43	Sept. 9	7.86
Sept.12	7.30	Dec. 4	a 6.31	Nov. 5	7.35

Merrick County

11-8-3dd

May 7, 1946	2.31	Oct. 3, 1946	2.29	May 8, 1947	2.34
June 4	2.10	Nov. 5	1.04	July 10	1.85
July 9	2.90	Dec. 2	1.88	Sept. 5	3.32
Aug. 6	3.09	Jan. 6, 1947	1.95	Nov. 3	2.27
Sept. 4	3.22	Mar. 7	1.54		

12-7-7aa

Jan. 4, 1946	6.36	July 9, 1946	6.62	Jan. 6, 1947	6.24
Feb. 13	6.37	Aug. 6	6.98	Mar. 6	6.25
Mar. 12	6.20	Sept. 4	7.32	May 8	5.62
Apr. 9	6.11	Oct. 3	7.26	July 10	4.34
May 7	6.46	Nov. 6	6.64	Sept. 5	6.55
June 4	6.37	Dec. 2	6.00	Nov. 3	7.12

12-8-7dc

May 8, 1946	12.50	Oct. 3, 1946	12.40	Mar. 7, 1947	11.15
June 4	11.32	Nov. 6	11.73	May 8	10,92
July 9	10.87	Dec. 2	11.44	July 10	9.44
Sept. 4	13.79	Jan. 6, 1947	11.26	Nov. 3	10.98

a Measurements made by Platte Valley Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Merrick County--Continued

12-8-28dc

Date	Water level	Date	Water level	Date	Water level
Jan. 4, 1946	1.95	Aug. 6, 1946	2.87	Mar. 7, 1947	1.52
Feb. 13	1.80	Sept. 4	3.40	May 8	1.00
Apr. 9	1.59	Oct. 3	3.32	July 10	.59
May 7	1.96	Nov. 6	2.20	Sept. 5	3.02
June 4	1.55	Dec. 2	1.24	Nov. 3	3.30
July 9	2.15	Jan. 6, 1947	1.52		

13-6-2bc

Jan. 4, 1946	5.36	July 9, 1946	5.46	Jan. 3, 1947	5.09
Feb. 12	5.29	Aug. 6	6.59	Mar. 7	5.10
Mar. 12	5.04	Sept. 4	6.66	May 7	5.57
Apr. 9	4.87	Oct. 3	6.59	July 8	4.41
May 7	5.11	Nov. 6	5.82	Sept. 4	6.72
June 4	5.08	Dec. 2	4.62	Nov. 11	8.91

13-6-7bb

Jan. 4, 1946	5.58	July 9, 1946	5.45	Jan. 6, 1947	5.15
Feb. 13	5.61	Aug. 6	5.96	Mar. 7	5.26
Mar. 12	5.45	Sept. 4	6.45	May 8	4.47
Apr. 9	5.18	Oct. 3	6.50	July 10	4.09
May 7	5.48	Nov. 6	5.78	Sept. 5	5.98
June 4	5.20	Dec. 2	5.00	Nov. 3	6.54

13-6-19cb

Jan. 4, 1946	4.24	July 9, 1946	4.47	Jan. 6, 1947	4.50
Feb. 13	4.34	Aug. 6	5.18	Mar. 7	4.39
Mar. 12	4.13	Sept. 4	5.50	May 8	3.68
Apr. 9	3.98	Oct. 3	5.58	July 10	3.10
May 7	4.17	Nov. 6	5.00	Sept. 5	5.13
June 4	3.87	Dec. 2	4.31	Nov. 3	5.74

13-6-28bb

Apr. 8, 1946	5.99	Sept. 4, 1946	7.49	Mar. 7, 1947	5.16
May 7	6.18	Oct. 3	7.00	May 7	5.80
June 4	6.32	Nov. 6	6.78	July 8	5.47
July 9	6.77	Dec. 2	5.85	Sept. 4	7.40
Aug. 6	7.25	Jan. 6, 1947	5.12	Nov. 3	7.15

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Merrick County--Continued

13-7-4bc

Date	Water level	Date	Water level	Date	Water level
Jan. 4, 1946	7.19	July 9, 1946	6.77	Jan. 6, 1947	6.57
Feb. 13	7.20	Aug. 6	6.77	Mar. 6	6.88
Mar. 12	7.34	Sept. 4	7.07	May 8	6.29
Apr. 9	7.38	Oct. 3	7.20	July 10	5.23
May 7	7.46	Nov. 6	6.73	Sept. 5	5.95
June 4	6.20	Dec. 2	6.48	Nov. 3	6.06

13-7-29cb

Mar. 12, 1946	2.07	Sept. 4, 1946	3.74	Mar. 7, 1947	2.20
Apr. 9	2.62	Oct. 3	3.58	May 8	2.52
May 7	2.88	Nov. 6	1.00	July 10	2.75
June 4	1.98	Dec. 2	1.88	Sept. 5	3.64
July 9	3.58	Jan. 6, 1947	2.50	Nov. 3	3.02
Aug. 6	4.07				

14-4-18bb

Apr. 9, 1946	3.98	Oct. 10, 1946	3.89	May 7, 1947	3.97
May 7	4.04	Nov. 4	4.22	July 7	3.46
July 8	4.53	Dec. 9	3.52	Sept. 3	5.45
Aug. 5	5.29	Jan. 2, 1947	4.06	Nov. 10	4.92
Sept. 3	5.72	Mar. 7	3.68		

14-5-9cc

Mar. 7, 1947	5.50	July 8, 1947	4.57	Nov. 11, 1947	7.14
May 7	4.80	Sept. 4	6.65		

14-6-15bb

Jan. 14, 1946	3.73	July 9, 1946	4.02	Jan. 3, 1947	3.18
Feb. 12	3.74	Aug. 6	5.02	Mar. 7	3.00
Mar. 12	3.05	Sept. 4	5.64	May 7	2.93
Apr. 9	3.44	Oct. 10	3.30	July 8	3.02
May 7	3.55	Nov. 6	3.55	Sept. 4	5.48
June 4	2.88	Dec. 10	2.60	Nov. 11	4.85

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Merrick County--Continued

14-7-21cb

Dec. 12, 1945	7.65	July 9, 1946	7.72	Jan. 6, 1947	6.47
Jan. 4, 1946	7.42	Aug. 6	8.12	Mar. 7	6.33
Feb. 13	7.36	Sept. 4	8.29	May 8	5.87
Mar. 12	7.18	Oct. 3	7.94	July 10	5.39
Apr. 9	6.94	Nov. 6	6.95	Sept. 5	8.02
May 7	7.32	Dec. 2	6.24	Nov. 3	7.96
June 4	6.82				

14-7-26cc

Apr. 9, 1946	12.95	Sept. 4, 1946	12.84	Mar. 7, 1947	12.46
May 7	13.00	Oct. 3	12.95	May 8	12.04
June 4	12.66	Nov. 6	12.79	July 10	11.07
July 9	12.47	Dec. 2	12.69	Sept. 5	11.17
Aug. 6	12.70	Jan. 6, 1947	12.48	Nov. 3	11.27

15-4-15dd

Jan. 4, 1946	7.95	July 9, 1946	7.75	Jan. 3, 1947	6.79
Feb. 12	7.96	Aug. 6	8.02	Mar. 6	7.06
Mar. 12	7.76	Sept. 4	8.30	May 7	6.16
Apr. 9	7.36	Oct. 10	7.71	July 8	5.50
May 7	7.46	Nov. 6	7.44	Sept. 4	8.29
June 4	7.77	Dec. 10	6.28	Nov. 11	8.90

15-4-31cc

Jan. 4, 1946	3.86	July 9, 1946	3.89	Jan. 3, 1947	3.52
Feb. 12	3.96	Aug. 6	4.70	Mar. 7	3.38
Mar. 12	3.67	Sept. 4	5.02	May 7	2.97
Apr. 9	3.44	Oct. 10	4.44	July 8	3.00
May 7	3.28	Nov. 6	4.56	Sept. 4	4.89
June 4	3.40	Dec. 10	3.11	Nov. 11	5.22

15-5-8dd

Apr. 9, 1946	14.02	Sept. 4, 1946	13.83	Mar. 7, 1947	13.37
May 7	14.14	Oct. 10	13.21	May 7	13.00
June 4	14.15	Nov. 6	13.67	July 8	11.15
July 9	13.80	Dec. 10	13.19	Sept. 4	11.19
Aug. 6	13.68	Jan. 3, 1947	13.07	Nov. 11	11.93

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Merrick County--Continued

15-5-27dd

Date	Water level	Date	Water level	Date	Water level
Apr. 9, 1946	3.46	Sept. 4, 1946	4.49	Mar. 7, 1947	3.46
May 7	3.35	Oct. 10	4.09	May 7	2.64
June 4	3.06	Nov. 6	3.84	July 8	1.92
July 9	3.41	Dec. 10	3.03	Sept. 4	4.05
Aug. 6	4.14	Jan. 3, 1947	3.32	Nov. 11	4.62

16-3-7dd

Sept. 4, 1947	4.94	Nov. 11, 1947	4.97		

16-3-27cc

Oct. 17, 1945	6.52	June 4, 1946	6.67	Jan. 3, 1947	6.44
Dec. 14	7.11	July 9	6.22	Mar. 6	6.40
Jan. 4, 1946	6.54	Aug. 6	7.44	May 7	5.67
Feb. 12	6.40	Sept. 4	7.99	July 8	4.39
Mar. 12	6.35	Oct. 10	7.44	Sept. 4	7.50
Apr. 9	6.32	Nov. 6	6.91	Nov. 11	7.35
May 7	6.29	Dec. 10	6.24		

Phelps County

8-17-19db

Oct. 19, 1945	11.88	June 5, 1946	12.35	Jan. 10, 1947	11.54
Dec. 12	12.18	July 11	12.45	Mar. 18	11.79
Jan. 17, 1946	12.30	Aug. 9	12.92	May 14	11.25
Feb. 15	12.31	Sept. 7	12.74	July 15	10.00
Mar. 15	12.29	Nov. 15	11.38	Sept.10	11.12
Apr. 11	12.28	Dec. 6	11.04	Nov. 7	11.50
May 10	12.52				

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Phelps County--Continued

8-17-24bc

Date	Water level	Date	Water level	Date	Water level
Oct. 19, 1945	9.39	June 5, 1946	9.59	Jan. 10, 1947	8.27
Dec. 12	9.33	July 12	9,87	Mar. 18	8.23
Jan. 17, 1946	9.20	Aug. 9	10.18	May 14	8.35
Feb. 15	9.12	Sept. 7	10.44	July 15	7.98
Mar. 15	9.13	Nov. 15	9.68	Sept.10	10.52
Apr. 11	9.17	Dec. 6	7.75	Nov. 7	9.40
May 10	9.53				

8-18-9db

Oct. 19, 1945	3.97	Jan. 17, 1946	3.40	Mar. 18, 1947	3.79

8-18-16cc

Feb. 15, 1946	8.10	Aug. 9, 1946	9.26	Mar. 14, 1947	7.30
Mar. 15	8.04	Sept. 7	8.60	May 14	7.19
Apr. 11	7.97	Oct. 10	7.32	July 15	6.02
May 10	8.11	Nov. 15	6.82	Sept.10	8.68
June 5	7.93	Dec. 5	6.69	Nov. 7	7.55
July 12	8.20	Jan. 10, 1947	7.10		

8-18-24bb

Feb. 15, 1946	9.60	Aug. 9, 1946	9.74	Mar. 18, 1947	7.82
Mar. 15	9.50	Sept. 7	10.05	May 14	7.49
Apr. 11	9.30	Oct. 10	9.21	July 15	6.85
May 10	9.56	Nov. 15	8.51	Sept.10	8.08
June 5	9.10	Dec. 6	8.28	Nov. 7	8.20
July 12	9.32	Jan. 10, 1947	7.60		

8-19-7dc

Feb. 15, 1946	5.18	Aug. 9, 1946	6.48	Mar. 18, 1947	4.47
Mar. 15	5.14	Sept. 6	5.93	May 14	5.33
Apr. 11	5.36	Oct. 9	4.59	July 15	4.24
May 10	5.69	Nov. 15	4.71	Sept.10	6.15
June 5	5.05	Dec. 5	4.52	Nov. 6	5.49
July 12	5.98	Jan. 10, 1947	4.46		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Phelps County--Continued

8-19-14dc

Date	Water level	Date	Water level	Date	Water level
Feb. 15, 1946	12.57	Sept. 6, 1946	13.22	Mar. 18, 1947	11.23
Mar. 15	12.45	Oct. 9	12.41	May 14	11.23
Apr. 11	12.38	Nov. 15	11.12	July 15	10.19
May 10	12.57	Dec. 5	10.95	Sept.10	12.02
June 5	12.25	Jan. 10, 1947	11.39	Nov. 7	11.70
July 12	12.79				

8-20-8cd

Jan. 15, 1946	8.22	July 11, 1946	7.35	Jan. 10, 1947	6.78
Feb. 15	8.20	Aug. 9	8.90	Mar. 18	7.27
Mar. 15	8.26	Sept. 6	6.60	May 14	6.80
Apr. 11	7.83	Oct. 9	5.71	July 15	5.38
May 10	7.45	Nov. 15	5.85	Sept.10	6.89
June 5	7.38	Dec. 5	5.88	Nov. 6	7.23

8-20-9cd

Jan. 9, 1945	4.00	Sept. 7, 1945	4.00	Dec. 5, 1946	a 2.80
Feb. 17	4.03	Nov. 24	4.03	Jan. 10, 1947	a 2.95
Mar. 9	4.14	Jan. 18, 1946	3.90	Mar. 18	a 3.47
Apr. 18	4.89	Apr. 10	4.07	May 14	a 3.78
May 4	4.00	May 9	4.36	July 15	a 2.72
June 4	3.98	Aug. 19	4.38	Sept.10	a 4.36
July 3	4.95	Nov. 15	a 2.70	Nov. 6	a 3.69
Aug. 8	3.90				

8-20-14db

Jan. 9, 1945	5.28	Aug. 8, 1945	5.25	Mar. 18, 1947	a 3.85
Feb. 17	5.25	Sept. 7	5.20	May 15	4.21
Mar. 9	5.33	Nov. 24	5.22	June 20	3.54
Apr. 18	5.05	Jan. 18, 1946	5.14	July 31	3.48
May 4	5.21	Apr. 10	5.27	Sept. 3	4.58
June 4	5.12	May 9	5.52	Oct. 7	4.48
July 3	5.18	Aug. 19	5.41		

a Measurements made by Geological Survey observer; earlier measurements were made by Central Nebraska Public Power and Irrigation District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Platte County

A17-1-14cc

Date	Water level	Date	Water level	Date	Water level
Jan. 18, 1945	9.80	Feb. 12, 1946	9.40	Nov. 5, 1946	a 9.90
May 17	9.50	Mar. 26	9.40	Dec. 10	a 9.31
June 28	8.10	Apr. 12	9.40	Jan. 2, 1947	a 9.58
July 30	7.50	May 17	9.50	Mar. 6	a 9.45
Aug. 20	8.00	June 13	9.60	May 6	a 9.17
Oct. 17	8.90	July 19	9.20	July 8	a 7.44
Nov. 7	9.00	Aug. 9	9.50	Sept. 4	a 8.59
Dec. 13	9.20	Oct. 11	a 9.58	Nov. 11	a 9.14
Jan. 28, 1946	9.40	25	9.50		

A17-1-14dd

Jan. 17, 1945	5.80	Apr. 12, 1946	5.10	Dec. 18, 1946	5.00
June 27	3.70	May 17	5.30	Jan. 2, 1947	a 5.11
July 30	2.90	June 13	5.50	Mar. 6	a 5.07
Aug. 20	4.10	July 19	4.90	May 6	a 4.58
Oct. 17	4.70	Oct. 11	a 5.45	July 8	a 3.15
Jan. 28, 1946	5.20	25	5.40	Sept. 4	a 5.20
Feb. 12	5.05	Nov. 5	a 5.47	Nov. 11	a 5.46
Mar. 26	4.90	Dec. 10	a 4.85		

A17-1-17dd

Jan. 18, 1945	8.70	Mar. 26, 1946	8.20	Dec. 10, 1946	a 8.11
June 28	6.10	Apr. 19	8.40	Jan. 2, 1947	a 8.41
July 30	5.20	May 22	8.70	Mar. 6	a 8.23
Aug. 20	7.00	June 13	8.90	May 6	a 7.46
Nov. 7	8.50	July 19	8.40	July 8	a 5.41
Dec. 13	8.90	Aug. 9	9.10	Sept. 4	a 8.50
Jan. 28, 1946	8.70	Oct. 11	a 9.30	Nov. 11	a 8.96
Feb. 12	8.75	Nov. 5	a 9.00		

A17-1-25aa

Jan. 17, 1945	8.70	Mar. 26, 1946	7.40	Dec. 10, 1946	a 7.76
June 27	5.70	Apr. 12	7.50	18	7.90
July 30	4.00	May 17	7.60	Jan. 2, 1947	a 7.99
Aug. 20	5.10	June 10	7.70	Mar. 6	a 8.20
Oct. 5	6.10	July 15	7.10	May 6	a 7.54
Nov. 7	6.50	Oct. 4	8.20	July 8	a 5.40
Dec. 21	7.10	11	a 8.20	Sept. 4	a 7.51
Jan. 14, 1946	7.30	Nov. 5	a 8.34	Nov. 11	a 8.15
Feb. 12	7.50				

a Measurements made by Geological Survey observer; other measurements were made by Loup River Public Power District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Platte County--Continued

A17-1-29da

Date	Water level	Date	Water level	Date	Water level
Jan. 4, 1946	10.60	Apr. 12, 1946	10.40	Dec. 18, 1946	10.50
7	10.50	May 13	10,60	Jan. 2, 1947	a10.48
10	10.50	June 7	10.70	Mar. 6	a10.29
14	10.50	July 15	10.20	May 6	a 9.84
17	10.50	Oct. 4	11.40	July 8	a 7.82
Feb. 12	10.40	Nov. 5	a10.97	Sept. 4	a10.66
Mar. 26	10.30	Dec. 10	a10.48	Nov. 11	a11.28

A17-1-30cc

Jan. 12, 1945	2.74	June 8, 1945	1.34	Mar. 22, 1946	2.60
22	2.21	July 6	2.50	Apr. 22	3.30
Feb. 2	2.50	26	2.26	May 27	3.30
13	2.28	Aug. 16	3,30	July 12	3.30
Mar. 15	2.24	29	3.70	Aug. 12	3.80
29	2.85	Sept.12	3.90	22	a 3.90
Apr. 11	2.86	Oct. 8	3.50	Oct. 11	2.80
23	2.47	Nov. 19	3.50	Nov. 12	2.70
May 11	2.80	Dec. 22	3,30	Mar. 6, 1947	a 2.75
23	2.16	Feb. 26, 1946	2.50		

A17-1-31bb

Jan. 12, 1945	2.77	June 21, 1945	2.10	Apr. 22, 1946	3.10
22	2.58	July 6	2.30	May 27	3.10
Feb. 2	2.68	26	2.20	July 12	3.10
13	2.48	Aug. 16	3.00	Aug. 12	3.50
Mar. 15	2.37	29	3,40	Oct. 11	a 2.70
29	2.78	Sept.12	3.60	Nov. 5	a 2.92
Apr. 11	2.77	Oct. 8	3,20	12	2.50
23	2.50	Nov. 19	3,10	Dec. 10	a 2.74
May 11	2.58	Dec. 22	3.20	Jan. 2, 1947	a 2.86
23	2.04	Feb. 26, 1946	2.60	Mar. 6	a 2.68
June 8	1.73	Mar. 22	2.60	May 7	ab 2.76

a Measurements made by Geological Survey observer; other measurements were made by Loup River Public Power District.
b Well destroyed after this date.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Platte County--Continued

A17-1-36bc

Date	Water level	Date	Water level	Date	Water level
Oct. 11, 1946	6.72	Jan. 2, 1947	5.82	July 8, 1947	3.93
Nov. 5	6.10	Mar. 6	5.42	Nov. 11	6.77
Dec. 10	5.60	May 6	5.05		

16-2-1cb

Mar. 5, 1947	5.19	July 8, 1947	3.16	Nov. 11, 1947	6.19
May 7	4.14	Sept. 4	5.99		

16-2-9cc

Feb. 12, 1946	3.84	Aug. 6, 1946	4.44	Mar. 6, 1947	3.33
Mar. 12	3.34	Sept. 4	4.80	May 7	2.77
Apr. 9	3.50	Oct. 10	3.66	July 8	2.87
May 7	3.22	Nov. 5	3.55	Sept. 4	4.53
June 4	3.81	Dec. 10	1.55	Nov. 11	3.91
July 9	3.71	Jan. 3, 1947	3.59		

16-2-12ab

Oct. 17, 1945	9.58	July 9, 1946	8.96	Jan. 3, 1947	8.72
Jan. 4, 1946	9.36	Aug. 6	10.25	Mar. 6	8.64
Feb. 12	9.14	Sept. 4	10.67	May 7	7.53
Mar. 12	8.92	Oct. 10	10.39	July 8	6.53
Apr. 9	8.80	Nov. 5	9.70	Sept. 4	10.20
May 7	8.84	Dec. 10	8.33	Nov. 11	10.20
June 4	9.19				

17-1-2cc

Jan. 19, 1945	10.80	Mar. 15, 1946	10.10	Nov. 29, 1946	9.80
June 28	9.70	Apr. 19	10.60	Dec. 10	a 9.89
July 23	9.00	May 29	10.70	Jan. 2, 1947	a10.19
Aug. 17	9.70	June 21	10.10	Mar. 6	a10.29
Oct. 12	10.50	July 12	8.20	May 7	a10.05
Nov. 15	10.60	Aug. 22	11.10	July 7	a 9.00
Dec. 21	10.70	Oct. 11	a10.61	Sept. 4	a10.64
Jan. 11, 1946	10.60	28	10.40	Nov. 11	a10.74
Feb. 25	8.30	Nov. 5	a10.39		

a Measurements made by Geological Survey observer; other measurements were made by Loup River Public Power District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Platte County--Continued

17-1-5ad

Date	Water level	Date	Water level	Date	Water level
Jan. 19, 1945	3.60	Feb. 25, 1946	2.70	Dec. 5, 1946	1.50
May 17	2.50	Mar. 11	2.80	10	a 1.50
June 28	2.00	Apr. 11	2.80	Jan. 2, 1947	a 2.07
July 23	1.40	June 24	2.40	Mar. 6	a 2.00
Aug. 13	2.20	Aug. 22	3.70	May 7	a 1.70
Oct. 12	2.90	Oct. 3	3.30	July 7	a 1.23
Nov. 15	3.00	11	a 1.64	Sept. 4	a 2.86
Dec. 18	3.10	Nov. 5	a 2.10	Nov. 11	a 2.76
Jan. 11, 1946	3.00				

17-1-7ac

Jan. 18, 1945	7.80	Apr. 11, 1946	7.20	Dec. 10, 1946	a 5.74
June 28	5.60	May 22	7.20	18	5.80
July 23	4.50	June 24	5.30	Jan. 2, 1947	a 6.06
Aug. 13	5.50	July 19	6.40	Mar. 6	a 6.28
Oct. 12	6.70	Aug. 22	7.20	May 7	a 5.58
Nov. 15	7.00	Oct. 3	7.60	July 7	a 3.60
Dec. 21	7.40	11	a 7.35	Sept. 4	a 6.18
Jan. 11, 1946	7.40	Nov. 5	a 6.50	Nov. 11	a 7.32
Mar. 11	7.40				

17-1-14cc

Jan. 18, 1945	10.20	Mar. 11, 1946	10.00	Dec. 5, 1946	9.50
June 28	9.70	Apr. 11	10.00	10	a 9.42
July 23	9.20	May 17	10.00	Jan. 2, 1947	a 9.53
Aug. 13	9.70	June 24	9.30	Mar. 6	a 9.72
Oct. 12	10.20	July 6	9.70	May 7	a 9.65
Nov. 15	10.20	Oct. 3	10.30	July 7	a 9.06
Dec. 21	10.40	11	a10.00	Sept. 4	a10.77
Jan. 11, 1946	10.30	Nov. 5	a10.10	Nov. 11	a11.00

17-1-34dc

Jan. 4, 1946	8.54	July 9, 1946	8.11	Jan. 3, 1947	8.36
Feb. 12	8.40	Aug. 6	9.23	Mar. 6	8.14
Mar. 12	8.25	Sept. 4	9.40	May 7	7.59
Apr. 9	8.27	Oct. 10	9.16	July 7	6.29
May 7	8.39	Nov. 5	8.78	Sept. 4	9.05
June 4	8.59	Dec. 10	8.14	Nov. 11	9.25

a Measurements made by Geological Survey observer; other measurements were made by Loup River Public Power District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Platte County--Continued

17-2-2cd

Date	Water level	Date	Water level	Date	Water level
Jan. 4, 1946	6.49	Dec. 10, 1946	5.53	July 8, 1947	4.59
Feb. 11	6.47	Jan. 2, 1947	5.79	Sept. 4	6.83
May 7	6.13	Mar. 6	6.11	Oct. 22	6.92
Nov. 5	6.08	May 7	5.81	Nov. 11	6.73

17-2-4bc

Jan. 15, 1945	10.00	Nov. 12, 1945	10.50	Oct. 21, 1946	9.90
Apr. 24	9.10	Dec. 12	10.30	Nov. 5	a 9.95
May 11	9.34	Jan. 9, 1946	10.20	Dec. 10	a 9.21
17	9.00	Mar. 21	9.80	Jan. 2, 1947	a 9.51
31	7.93	May 8	10.10	Mar. 6	a 9.52
June 4	7.76	June 14	10.20	May 7	a 9.16
11	7.24	July 8	9.10	July 8	a 7.60
25	8.00	Aug. 8	10.80	Sept. 4	a11.12
July 23	8.30	Oct. 11	a10.32	Nov. 11	a10.98
Oct. 12	10.60				

a Measurements made by Geological Survey observer; other measurements were made by Loup River Public Power District.

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Polk County

14-4-19ab

Date	Water level	Date	Water level	Date	Water level
Feb. 11, 1946	4.13	Aug. 5, 1946	5.75	Mar. 3, 1947	4.38
Mar. 11	4.21	Sept. 3	5.94	May 7	4.37
Apr. 8	4.40	Oct. 10	2.54	July 7	4.28
May 6	4.28	Nov. 4	4.58	Sept. 3	6.02
June 3	4.32	Dec. 9	4.02	12	5.75
July 8	4.97	Jan. 2, 1947	4.54	Nov. 10	5.50

15-2-4dc

Apr. 9, 1946	6.25	Sept. 3, 1946	7.69	Mar. 3, 1947	6.72
May 7	6.34	Oct. 12	7.75	May 7	5.80
June 3	6.92	Nov. 4	7.49	July 7	4.50
July 8	6.94	Dec. 9	6.49	Sept. 3	7.21
Aug. 5	7.42	Jan. 2, 1947	6.79	Nov. 10	7.80

15-2-7bb

Feb. 11, 1946	6.84	Aug. 5, 1946	8.08	Mar. 3, 1947	6.66
Mar. 11	6.50	Sept. 3	8.18	May 7	6.22
Apr. 8	6.55	Oct. 12	7.70	July 7	5.98
May 6	6.35	Nov. 4	7.30	Sept. 3	8.06
June 3	6.92	Dec. 9	6.40	Nov. 10	8.43
July 8	7.25	Jan. 2, 1947	6.84		

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Polk County--Continued

15-3-3dc

Date	Water level	Date	Water level	Date	Water level
Sept. 3, 1947	5.44	Nov. 10, 1947	6.42		

15-3-20cc

Feb. 11, 1946	5.55	Aug. 5, 1946	7.24	Mar. 3, 1947	5.49
Mar. 11	5.34	Sept. 3	7.49	May 7	5.20
Apr. 8	5.64	Oct. 12	6.49	July 7	5.08
May 6	5.26	Nov. 4	6.19	Sept. 3	7.48
June 3	6.19	Dec. 9	5.00	Nov. 10	7.63
July 8	6.27	Jan. 2, 1947	5.76		

15-3-23dc

Sept. 3, 1947	9.84	Nov. 10, 1947	10.45		

15-4-35dc

Feb. 11, 1946	19.78	Aug. 5, 1946	20.89	Mar. 3, 1947	19.77
Mar. 11	19.79	Sept. 3	21.00	May 7	19.42
Apr. 8	19.74	Oct. 12	20.65	July 7	18.45
May 6	19.92	Nov. 4	20.45	Sept. 3	20.44
June 3	18.78	Dec. 9	19.98	12	20.01
July 8	19.81	Jan. 2, 1947	20.61	Nov. 10	20.49

16-1-14bb

Feb. 11, 1946	5.98	Aug. 5, 1946	6.15	Mar. 3, 1947	5.10
Mar. 11	5.75	Sept. 3	6.38	May 7	4.74
Apr. 8	5.86	Oct. 12	6.08	July 7	3.72
May 6	5.36	Nov. 4	5.65	Sept. 3	6.14
June 3	5.69	Dec. 9	4.63	Oct. 21	6.35
July 8	5.44	Jan. 2, 1947	5.15	Nov. 10	6.35

16-1-36cd

Feb. 11, 1946	20.23	Sept. 3, 1946	21.07	Mar. 3, 1947	21.15
Mar. 11	20.39	Oct. 12	20.89	May 7	20.91
Apr. 8	20.48	Nov. 4	21.28	July 7	19.32
May 6	20.61	Dec. 9	20.91	Sept. 3	20.27
June 3	21.71	Jan. 2, 1947	21.03	Nov. 10	20.76
July 8	20.54				

Table 11.--Water-level measurements in wells, in feet below land-surface datum--Continued

Polk County--Continued

16-2-23dc

Date	Water level	Date	Water level	Date	Water level
Feb. 11, 1946	7.58	Sept. 3, 1946	8.18	Mar. 3, 1947	7.14
Mar. 11	7.40	Oct. 12	8.07	May 7	6.80
Apr. 8	7.17	Nov. 4	7.82	July 7	5.92
May 6	7.37	Dec. 9	7.20	Sept. 3	8.05
July 8	7.44	Jan. 2, 1947	7.35	Nov. 10	8.24
Aug. 5	7.95				

Saunders County

A17-5-23bb

Oct. 11, 1946	1.13	Jan. 3, 1947	1.26	July 7, 1947	1.59
Nov. 5	1.19	Mar. 4	1.23	Sept. 3	3.35
Dec. 10	1.09	May 6	1.41	Nov. 10	2.73

Table 12.--Logs of auger test holes

North Platte profile

14-30-9ca. Ground altitude, 2,832 feet; depth to water, 6.4 feet, May 8, 1946.

	Feet
Loam, fine and medium sandy, light brownish gray	0.0 - 2.2
Sand, fine to medium, light brownish gray	2.2 - 3.5
Sand, fine, dark brownish gray	3.5 - 4.6
Sand, fine to medium, light brown	4.6 - 7.0
Sand, fine to medium, light bluish gray	7.0 - 10.0

14-30-16db. Ground altitude, 2,806 feet; depth to water, 1.8 feet, May 8, 1946.

Loam, silty and fine sandy, dark gray to medium gray	0.0 - 3.4
Sand, very fine, bluish gray	3.4 - 4.7
Sand, fine to medium, bluish gray	4.7 - 7.0

14-30-21cd. Ground altitude, 2,801 feet; depth to water, 3.5 feet, May 7, 1946.

Soil	0.0 - 0.2
Sand, fine to medium, with scattered pebbles, light brown	0.2 - 1.6
Sand, medium to coarse, with scattered pebbles, light brown	1.6 - 3.4
Sand, coarse, with numerous pebbles, brownish gray	3.4 - 4.0
Gravel, fine, with scattered large pebbles; some sand in thin layers	4.0 - 6.5

14-30-28dc. Ground altitude, 2,798 feet; depth to water, 5.1 feet, May 7, 1946.

Loam, fine sandy, dark gray	0.0 - 1.2
Sand, medium, with scattered pebbles, light brown	1.2 - 2.4
Sand, medium, with scattered pebbles; some black staining	2.4 - 3.3
Gravel, fine, black-stained and iron-stained, grading downward to light pinkish brown	3.3 - 5.9
Gravel, fine, light pinkish brown	5.9 - 7.9
Clay, silty, black	7.9 - 8.0
Clay, light gray	8.0 - 8.1
Gravel, fine	8.1 - 8.2

Table 12.--Logs of auger test holes--Continued

North Platte profile--Continued

14-30-33cd. Ground altitude, 2,801 feet; depth to water, 6.2 feet, May 7, 1946.

	Feet
Loam, sandy, with scattered pebbles, dark gray.	0.0 - 1.5
Loam, grading downward to fine sand, light brown. . . .	1.5 - 2.0
Sand, fine, light brown	2.0 - 4.0
Loam, clayey and silty, dark brownish gray.	4.0 - 5.3
Sand, fine, clayey, brownish gray, grading downward to light-brown medium sand with some iron-staining . . .	5.3 - 6.2
Sand, medium, light brown	6.2 - 6.9
Sand, medium, with interlaminated streaks of fine and medium gravel	6.9 - 9.2

13-30-4cd. Ground altitude, 2,802 feet; depth to water, 6.6 feet, May 7, 1946.

Loam, fine sandy, brownish gray	0.0 - 2.3
Gravel, fine to medium, and medium sand, light brown. .	2.3 - 3.5
Gravel, fine, and coarse sand, light pinkish brown. . .	3.5 - 8.3
Sand, medium coarse, light pinkish brown.	8.3 - 9.6

13-30-9cb. Ground altitude, 2,800 feet; depth to water, 3.65 feet, May 7, 1946.

Clay, dark gray	0.0 - 5.0
Clay, medium greenish gray, grading downward to medium-gray fine sand.	5.0 - 6.2
Sand, fine to medium, light gray, grading downward to light-brown medium sand	6.2 - 7.4

13-30-21bb. Ground altitude, 2,820 feet; depth to water, 11.8 feet, May 7, 1946.

Loam, silty, brownish gray.	0.0 - 1.3
Silt, light brown	1.3 - 5.3
Silt, slightly clayey, light brown.	5.3 - 14.8

Table 12.--Logs of auger test holes--Continued

Maxwell profile

13-28-16dd. Ground altitude, not known; depth to water, 5.5 feet, August 19, 1947.

	Feet
Sand, loamy, light gray	0.0 - 1.5
Sand, very fine, light brownish gray	1.5 - 3.0
Sand, clayey, dark gray	3.0 - 4.8
Clay, sandy, light gray	4.8 - 7.0
Sand, fine, clayey, light gray	7.0 - 9.0
Clay, dark gray	9.0 - 9.5
Clay, greenish, with white concretions	9.5 - 11.8
Sand, clayey, black	11.8 - 12.8
Sand, fine, light brownish gray, iron stained	12.8 - 16.7

13-28-28bd. Ground altitude, not known; depth to water, 5.5 feet, August 19, 1947.

Loam, silty and very fine sandy, gray	0.0 - 1.1
Silt, clayey, brownish gray	1.1 - 2.6
Sand, medium to coarse, light pinkish brownish gray	2.6 - 9.0

13-28-28cc. Ground altitude, not known; depth to water 3.3 feet, August 18, 1947.

Loam, very fine sandy, light gray	0.0 - 1.0
Clay, very fine sandy, black	1.0 - 1.4
Sand, fine to medium, light pinkish brown	1.4 - 3.6
Sand, fine to coarse, with scattered pebbles	3.6 - 5.5

12-28-6ba. Ground altitude, not known; depth to water, 1.5 feet August 19, 1947.

Loam, very fine sandy and clayey, brown	0.0 - 1.0
Clay, sandy, dark bluish gray	1.0 - 2.1
Sand, medium to coarse, with scattered medium pebbles, light pinkish brownish gray	2.1 - 6.0

12-29-1dd. Ground altitude, not known; depth to water, 15.5 feet, August 19, 1947.

Loess, medium to light brown	0.0 - 16.5
Loess, clayey, medium brown	16.5 - 22.5

Table 12.--Logs of auger test holes--Continued

Brady profile

12-27-14aa. Ground altitude, not known; depth to water, 6.1 feet, August 15, 1947.

	Feet	
Loam, fine, sandy, light brownish gray	0.0	- 2.0
Sand, very fine, light brown	2.0	- 4.0
Clay, very fine sandy, brownish gray	4.0	- 5.3
Clay, light brown, iron stained	5.3	- 6.3
Clay, very fine sandy, dark gray	6.3	- 7.5
Sand, fine to medium, green	7.5	- 8.6
Gravel, coarse, and sand, green	8.6	- 10.0

12-27-14cc. Ground altitude, not known; depth to water, 5.3 feet, August 18, 1947.

Loam, very fine sandy, gray	0.0	- 1.5
Clay, silty and very fine sandy, black	1.5	- 3.0
Sand, fine, light brown	3.0	- 5.4
Sand, medium to coarse, with some coarse gravel, light brown, iron-stained	5.4	- 6.0
Sand, medium to coarse with considerable coarse gravel, black	6.0	- 8.0
Sand, fine to medium, light brown	8.0	- 9.0

12-27-27ab. Ground altitude, not known; depth to water, 8.5 feet, August 16, 1947.

Loam, very fine sandy, brownish gray	0.0	- 2.1
Clay, very fine sandy, light gray with white streaks	2.1	- 8.3
Clay, very fine sandy, light bluish gray, iron-stained	8.3	- 10.0
Sand, fine, grading downward to coarse sand with scattered pebbles, light pinkish brownish gray	10.0	- 13.0

12-27-28dd. Ground altitude, not known; depth to water, 12.4 feet, August 16, 1947.

Loam, silty, gray	0.0	- 1.8
Clay, silty, light brown	1.8	- 18.3
Clay, silty, black	18.3	- 18.7
Clay, silty, alternating dark and light gray laminae	18.7	- 23.5
Sand, fine, light brownish gray	23.5	- 26.5

Table 12.--Logs of auger test holes--Continued

Gothenburg profile

11-25-9aa. Ground altitude, not known; depth to water, not reached, August 15, 1947.

	Feet
Sand, very fine, loamy, light brown.	0.0 - 1.0
Silt, fine sandy, grayish brown	1.0 - 1.8
Clay, very fine sandy, dark gray	1.8 - 2.2
Clay, very fine sandy, light brown	2.2 - 20.7
Clay, very fine sandy, light brownish gray	20.7 - 25.1

11-25-16bb. Ground altitude, not known; depth to water, 5.5 feet, August 13, 1947.

Silt, sandy, brownish gray	0.0 - 1.2
Sand, fine silty, light brown.	1.2 - 2.5
Clay, silty, dark gray	2.5 - 3.6
Clay, sandy, light brown	3.6 - 4.4
Sand, fine to medium, light brown.	4.4 - 5.3
Clay, light blue to black	5.3 - 6.4
Clay, light blue	6.4 - 6.8
Sand, fine to medium, bluish gray.	6.8 - 9.6

11-25-20cc. Ground altitude, not known; depth to water, 4.9 feet, August 14, 1947.

Clay, loamy, dark gray	0.0 - 1.8
Clay, silty, light brown	1.8 - 14.5

11-25-30cd. Ground altitude, not known; depth to water, 11.6 feet, August 14, 1947.

Silt, loamy, gray.	0.0 - 2.0
Clay, silty, light brown	2.0 - 15.3

Cozad profile

11-23-14aa. Ground altitude, 2,526 feet; depth to water, 18.2 feet, August 15, 1946.

Silt, brownish gray.	0.0 - 1.7
Silt, clayey, light brownish gray.	1.7 - 4.8
Silt, clayey, light brown.	4.8 - 11.8
Clay, silty, light brownish gray	11.8 - 22.0

Table 12.--Logs of auger test holes--Continued

Cozad profile--Continued

11-23-23cc. Ground altitude, 2,496 feet; depth to water, 5.7 feet, August 15, 1946.

	Feet
Loam, silty, brownish gray	0.0 - 2.0
Clay, light brownish gray	2.0 - 3.5
Clay, light brown with whitish streaks	3.5 - 6.4
Clay, light gray with whitish streaks	6.4 - 11.0
Sand, fine, clayey, orange brownish gray	11.0 - 11.9

11-23-27cd. Ground altitude, 2,507 feet; depth to water, 18.5 feet, August 15, 1946.

Loam, silty, brownish gray	0.0 - 2.0
Silt, light brownish gray	2.0 - 3.5
Silt, light brown	3.5 - 13.0
Silt, clayey, light brownish gray	13.0 - 18.5
Clay, silty, light brownish gray with some iron-staining	18.5 - 22.5

11-23-33dd. Ground altitude, 2,486 feet; depth to water, 7.2 feet, August 15, 1946.

Silt, brownish gray	0.0 - 1.5
Silt, clayey, buff	1.5 - 4.5
Clay, plastic, light brownish gray	4.5 - 6.3
Clay, light brownish gray with some iron-staining	6.3 - 10.0
Clay, light brownish gray	10.0 - 11.1

10-23-9aa. Ground altitude, 2,485 feet; depth to water, 13.6 feet, August 14, 1946.

Silt, medium brownish gray	0.0 - 2.3
Silt, dark brownish gray	2.3 - 3.3
Silt, clayey, medium brownish gray	3.3 - 5.5
Clay, light brown	5.5 - 8.0
Clay, brownish gray	8.0 - 10.0
Clay, light brown	10.0 - 12.0
Clay, brownish gray with white streaks	12.0 - 12.6
Clay, fine sandy, whitish gray	12.6 - 15.1
Sand, fine, clayey, whitish gray, grading downward to medium sand	15.1 - 17.0

Table 12.--Logs of auger test holes--Continued

Cozad profile--Continued

10-23-17aa. Ground altitude, 2,477 feet; depth to water, 4.8 feet, August 14, 1946.

	Feet
Silt, light brownish gray	0.0 - 1.8
Silt, sandy, light brown	1.8 - 2.9
Sand, fine, light pinkish brown	2.9 - 3.5
Sand, medium, with scattered pebbles, light pinkish brown	3.5 - 4.5
Gravel, coarse, dark brownish gray with some black pebbles	4.5 - 5.0
Gravel, coarse, iron-stained	5.0 - 6.0
Gravel, medium, clayey, light gray with some iron-staining	6.0 - 6.4
Gravel, medium, light pinkish gray	6.4 - 9.0

10-23-29bb. Ground altitude, 2,481 feet; depth to water, 6.4 feet, August 14, 1946.

Silt, brownish gray with limy concretions	0.0 - 3.0
Silt, light brownish gray, with white streaks	3.0 - 4.5
Silt, clayey, medium brownish gray	4.5 - 5.0
Silt, clayey, dark brownish gray	5.0 - 5.5
Clay, very fine sandy, medium brownish gray	5.5 - 6.5
Clay, sandy, light brownish gray	6.5 - 7.5
Clay, sandy, light brown to light gray, with some iron-staining	7.5 - 8.0
Sand, fine, clayey, light brownish gray with iron-staining	8.0 - 10.0
Sand, coarse to medium gravel, light pinkish brownish gray	10.0 - 10.3

10-23-30cd. Ground altitude, 2,479 feet; depth to water, 4.3 feet, August 14, 1946.

Silt, brownish gray	0.0 - 1.7
Silt, clayey, brownish gray to dark gray	1.7 - 3.6
Clay, light gray, white-streaked	3.6 - 5.0
Sand, fine, light brownish gray	5.0 - 7.2

9-24-1aa. Ground altitude, 2,491 feet; depth to water, 5.2 feet, August 14, 1946.

Silt, clayey, medium brownish gray grading downward to dark brownish gray	0.0 - 3.5
Clay, fine sandy, light brownish gray	3.5 - 7.5
Sand, fine to medium, with scattered medium-size pebbles, light brown with some iron-staining	7.5 - 10.0

Table 12.--Logs of auger test holes--Continued

Cozad profile--Continued

9-24-1dc. Ground altitude, 2,523 feet; depth to water, 17.9 feet, August 13, 1946.

	Feet
Loam, silty, brownish gray	0.0 - 1.4
Silt, very fine sandy, brownish gray	1.4 - 3.5
Silt, clayey, dark brownish gray to black	3.5 - 5.0
Silt, clayey, medium brownish gray	5.0 - 6.4
Silt, clayey, light brownish gray	6.4 - 13.2
Clay, dark brownish gray	13.2 - 13.6
Clay, medium brownish gray	13.6 - 18.1
Clay, sandy, light brown	18.1 - 23.0

Lexington profile

11-21-31dd. Ground altitude, 2,465 feet; depth to water, 32.0 feet, August 13, 1946.

Loam, silty, dark brownish gray	0.0 - 1.0
Silt, medium brown gray	1.0 - 1.9
Silt, light brown	1.9 - 3.6
Silt, light brownish gray	3.6 - 11.4
Loam, clayey, dark brownish gray	11.4 - 13.1
Silt, clayey, light brownish gray	13.1 - 16.2
Silt, clayey, medium brownish gray	16.2 - 17.3
Silt, clayey, light brownish gray	17.3 - 23.0
Clay, light brownish gray	23.0 - 28.0

10-21-6da. Ground altitude, 2,441 feet; depth to water, 11.0 feet, August 13, 1946.

Loam, silty, dark brownish gray	0.0 - 1.6
Silt, clayey, light brownish gray	1.6 - 3.1
Silt, clayey, medium brownish gray	3.1 - 4.3
Clay, light brownish gray with white streaks	4.3 - 8.7
Clay, medium brownish gray with numerous small limy concretions	8.7 - 15.0

10-21-7dd. Ground altitude, 2,433 feet; depth to water, 10.5 feet, August 8, 1946.

Silt, clayey, dark brownish gray	0.0 - 2.3
Clay, light brownish gray, with scattered limy concretions	2.3 - 12.4
Clay, fine sandy, light brownish gray	12.4 - 14.0

Table 12.--Logs of auger test holes--Continued

Lexington profile--Continued

10-21-18da. Ground altitude, 2,431 feet; depth to water, 15.8 feet, August 9, 1946.

	Feet
Loam, clayey, dark brownish gray	0.0 - 2.1
Silt, clayey, medium brownish gray	2.1 - 3.5
Silt, clayey, light brownish gray	3.5 - 5.6
Silt, clayey, medium brownish gray, with scattered small limy concretions	5.6 - 7.8
Silt, clayey, light brownish gray	7.8 - 8.7
Clay, medium to light brownish gray, with white streaks	8.7 - 13.8
Clay, very fine sandy, light brownish gray	13.8 - 15.7
Clay, very fine sandy, bluish gray	15.7 - 17.1
Clay, very fine sandy, dark bluish gray, grading downward to light gray with white streaks	17.1 - 20.0

10-21-30aa. Ground altitude, 2,417 feet; depth to water, 10.5 feet, August 8, 1946.

Loam, silty, medium brownish gray	0.0 - 1.3
Silt, clayey, with scattered limy concretions, dark brownish gray	1.3 - 4.3
Silt, clayey, with scattered limy concretions, light brown	4.3 - 7.6
Clay, light brownish gray, with some iron-staining	7.6 - 9.2
Clay, very fine sandy, light brownish gray with some iron-staining	9.2 - 12.0
Sand, fine to coarse, light brownish gray with some iron-staining, grading downward to fine to medium gravel, light pinkish brownish gray	12.0 - 13.2

10-21-31aa. Ground altitude, 2,410 feet; depth to water, 6.2 feet, August 8, 1946.

Loam, clayey, dark brownish gray	0.0 - 1.5
Clay, sandy, with scattered limy concretions, medium brownish gray with some iron-staining	1.5 - 5.1
Clay, grading downward to sandy clay, light brownish gray with iron-staining	5.1 - 7.6
Sand, fine grading downward to medium, light pinkish brownish gray	7.6 - 9.2

Table 12.--Logs of auger test holes--Continued

Lexington profile--Continued

9-21-6ad. Ground altitude, 2,403 feet; depth to water, 7.9 feet, August 7, 1946.

	Feet
Loam, sandy, dark brownish gray	0.0 - 0.4
Sand, fine, silty, medium brownish gray, with scattered limy concretions	0.4 - 2.3
Silt, fine sandy, medium brownish gray	2.3 - 3.1
Silt, sandy, medium brownish gray, with scattered limy concretions	3.1 - 3.9
Clay, sandy, medium brownish gray	3.9 - 4.1
Clay, sandy, light brownish gray with white streaks	4.1 - 5.6
Sand, fine to medium, with scattered pebbles, light pinkish brown	5.6 - 8.9
Sand, coarse, grading downward to medium gravel, light pinkish brownish gray	8.9 - 10.9

9-21-7aa. Ground altitude, 2,401 feet; depth to water, 7.5 feet, August 7, 1946.

Loam, silty, light brownish gray	0.0 - 1.3
Clay, silty, brownish gray	1.3 - 1.6
Clay, silty, brownish gray with white streaks	1.6 - 3.9
Clay, brownish gray, with scattered limy concretions	3.9 - 5.4
Clay, sandy, dark brownish gray, with scattered limy concretions	5.4 - 6.5
Sand, fine grading downward to medium, light pinkish brownish gray with some iron-staining	6.5 - 7.9
Sand, medium, brownish gray with heavy iron-staining	7.9 - 8.5
Sand, fine, yellowish brown	8.5 - 9.0
Gravel, medium, light pinkish brown	9.0 - 10.7

9-21-18aa. Ground altitude, 2,399 feet; depth to water, 5.8 feet, August 7, 1946.

Loam, silty, brownish gray	0.0 - 0.5
Silt, light brownish gray	0.5 - 1.8
Clay, sandy, brownish gray	1.8 - 2.5
Clay, sandy, light brownish gray	2.5 - 3.5
Sand, fine grading downward to medium and then to coarse, with scattered pebbles, light pinkish brown with some iron-staining	3.5 - 6.0
Sand, coarse, and gravel, light pinkish brownish gray	6.0 - 8.7

Table 12.--Logs of auger test holes--Continued

Lexington profile--Continued

9-21-19aa. Ground altitude, 2,397 feet; depth to water, 4.6 feet, August 7, 1946.

	Feet
Loam, clayey, very dark gray	0.0 - 1.0
Clay, fine sandy, brownish gray with iron-staining	1.0 - 2.8
Sand, fine, clayey, brownish gray with iron-staining	2.8 - 3.9
Sand, fine to coarse, light brownish gray with iron-staining	3.9 - 4.5
Gravel, medium, light pinkish brownish gray	4.5 - 5.0
Gravel, medium grading downward to coarse, light pinkish-brownish gray	5.0 - 7.6

9-21-29bc. Ground altitude, 2,394 feet; depth to water, 4.0 feet, August 7, 1946.

Silt, clayey, very dark gray	0.0 - 2.0
Clay, fine sandy, dark brownish gray with iron-staining	2.0 - 3.1
Clay, fine sandy, light brownish gray, with iron-staining	3.1 - 3.4
Sand, medium to coarse, with scattered pebbles, light pinkish brown	3.4 - 4.8
Sand, coarse, grading downward to medium and coarse gravel, brownish gray	4.8 - 7.0

9-21-31aa. Ground altitude, 2,405 feet; depth to water, 14.0 feet, August 7, 1946.

Loam, silty, brownish gray	0.0 - 0.5
Silt, very compact, light brownish gray	0.5 - 2.5
Silt, clayey, light buff	2.5 - 4.0
Silt, clayey, light brownish gray	4.0 - 4.8
Silt, clayey, medium brownish gray	4.8 - 7.7
Clay, silty, medium brownish gray	7.7 - 8.0
Clay, sandy, medium brownish gray	8.0 - 9.0
Clay, dark brownish gray	9.0 - 11.5
Clay, very dark gray, carbonaceous	11.5 - 12.2
Clay, containing minute white concretions, dark brownish gray grading downward to medium brownish gray	12.2 - 13.6
Clay, very fine sand, light brownish gray with white streaks	13.6 - 14.5
Sand, fine, clayey, dark brownish gray	14.5 - 15.0
Sand, fine to coarse, with scattered pebbles, light pinkish brownish gray with iron-staining	15.0 - 17.0

Table 12.--Logs of auger test holes--Continued

Lexington profile--Continued

9-21-31dd. Ground altitude, 2,400 feet; depth to water, 9.8 feet, August 12, 1946.

	Feet
Loam, silty, brownish gray	0.0 - 1.5
Silt, dark brownish gray	1.5 - 2.5
Silt, clayey, light brownish gray	2.5 - 2.7
Clay, fine sandy, light brownish gray	2.7 - 9.0
Clay, fine sandy, dark brownish gray	9.0 - 9.4
Clay, sandy, light brownish gray	9.4 - 12.7
Clay, sandy, light gray	12.7 - 13.0

Overton profile

10-20-35bb. Ground altitude, 2,359 feet; depth to water, 18.2 feet, August 6, 1946.

Loam, silty, dark brownish gray	0.0 - 2.5
Clay, medium brownish gray	2.5 - 3.0
Clay, light brownish gray with white streaks	3.0 - 6.5
Clay, medium brown with white streaks	6.5 - 7.4
Clay, light brown, white streaked	7.4 - 15.5
Clay, very fine sandy, medium brownish gray	15.5 - 20.6
Clay, fine sandy, light brownish gray	20.6 - 21.6
Sand, fine to medium, light pinkish brownish gray	21.6 - 21.9

10-20-35cc. Ground altitude, 2,344 feet; depth to water, 9.0 feet, August 6, 1946.

Loam, silty, dark brownish gray	0.0 - 1.3
Silt, clayey, medium brownish gray	1.3 - 3.6
Clay, silty, light brownish gray	3.6 - 5.3
Clay, fine sandy, light brown	5.3 - 9.0
Sand, fine, clayey, light brown and grayish blue	9.0 - 11.0
Sand, fine to medium, light pinkish brown	11.0 - 12.0

Table 12.--Logs of auger test holes--Continued

Overton profile--Continued

9-20-3dd. Ground altitude, 2,344 feet; depth to water, 10.6 feet, August 6, 1946.

	Feet	
Loam, silty, brownish gray	0.0	- 3.0
Clay, fine sandy, light brownish gray	3.0	- 4.4
Clay, sandy, light brown	4.4	- 6.0
Clay, silty, medium brown	6.0	- 8.5
Clay, silty, light brownish gray, with iron-staining	8.5	- 10.8
Clay, fine sandy, light bluish gray, with iron-staining	10.8	- 11.3
Sand, fine, light brownish gray, with iron-staining	11.3	- 13.6

9-20-15cd. Ground altitude, 2,335 feet; depth to water, 8.8 feet, August 1, 1946.

Loam, silty, brownish gray	0.0	- 1.1
Clay, silty, brownish gray	1.1	- 2.0
Silt, clayey, yellowish gray	2.0	- 4.4
Clay, silty, dark brown	4.4	- 7.2
Sand, fine, clayey and silty, brownish gray	7.2	- 7.4
Sand, fine, clayey and silty, creamy gray	7.4	- 8.0
Sand, medium to coarse, clayey near top, brownish gray	8.0	- 8.7
Sand, coarse, and fine gravel, medium brown	8.7	- 9.4
Gravel, fine to medium, and sand, medium to coarse	9.4	- 10.6
Sand, medium to coarse, light brown	10.6	- 11.8

9-20-27bb. Ground altitude, 2,337 feet; depth to water, 10.6 feet, August 2, 1946.

Loam, silty, brownish gray	0.0	- 1.1
Silt, light brown	1.1	- 6.9
Loam, clayey, medium to dark brownish gray	6.9	- 9.7
Clay, silty and sandy with scattered pebbles, brownish gray with creamy white streaks	9.7	- 10.0
Clay, sandy, brownish gray with creamy white streaks	10.0	- 10.5
Sand, fine, clayey and silty, gray	10.5	- 10.8
Sand, medium, with numerous small pebbles, light brown	10.8	- 12.0
Gravel and coarse sand, light pinkish brown	12.0	- 12.5

Table 12.--Logs of auger test holes--Continued

Overton profile--Continued

9-20-28dd. Ground altitude, 2,329 feet; depth to water, 4.7 feet, August 2, 1946.

	Feet		
Loam, clayey and sandy, brownish gray	0.0	-	1.2
Clay, silty and sandy, brownish gray	1.2	-	2.4
Clay, creamy gray	2.4	-	3.0
Clay, sandy, creamy gray	3.0	-	3.4
Sand, fine to medium, silty, brownish gray	3.4	-	4.6
Sand, coarse, and fine gravel, light brownish gray	4.6	-	5.6
Gravel, fine, and coarse sand, light brown	5.6	-	6.7
Sand, medium to coarse, with some fine gravel	6.7	-	7.7

9-20-33dd. Ground altitude, 2,329 feet; depth to water, 5.1 feet, August 2, 1946.

Loam, silty, brownish gray	0.0	-	1.1
Clay, silty, light brownish gray	1.1	-	2.1
Clay, silty, brownish gray	2.1	-	2.3
Silt, brown	2.3	-	2.7
Silt, sandy and clayey, black	2.7	-	4.0
Sand, medium to coarse, silty and clayey, black	4.0	-	4.2
Sand, coarse, and fine gravel, with some medium and fine sand, medium brownish gray to dark gray	4.2	-	7.7
Sand, coarse, and fine gravel, light brown	7.7	-	8.3

8-20-8cd. Ground altitude, 2,337 feet; depth to water, 8.5 feet, August 1, 1946.

Silt, light brown	0.0	-	4.1
Loam, clayey, brownish gray	4.1	-	5.4
Clay, brownish gray	5.4	-	8.0
Silt, clayey, brown	8.0	-	10.3
Sand and gravel, silty	10.3	-	12.0

Table 12.--Logs of auger test holes--Continued

Elm Creek profile

9-18-28ba. Ground altitude, 2,274 feet; depth to water, 12.0 feet, August 1, 1946.

	Feet		
Loam, silty, brownish gray	0.0	-	3.0
Silt, brown	3.0	-	4.5
Loam, silty, dark brownish gray	4.5	-	5.8
Clay, silty, brownish gray	5.8	-	14.0
Clay with small limy concretions, brownish gray	14.0	-	16.0

9-18-33ac. Ground altitude, 2,255 feet; depth to water, 5.3 feet, August 1, 1946.

Loam, clayey and silty, dark brownish gray	0.0	-	2.0
Clay, silty, with scattered limy concretions, dark brownish gray	2.0	-	2.8
Clay, silty, brownish gray	2.8	-	3.2
Clay, silty, light brownish gray	3.2	-	5.7
Clay, with small limy concretions, light brownish gray	5.7	-	6.0
Clay, sandy, brownish gray, grading downward to clayey sand	6.0	-	9.5

8-18-4cb. Ground altitude, 2,253 feet; depth to water, 9.6 feet, August 1, 1946.

Clay, silty, light brown (fill?)	0.0	-	0.2
Loam, clayey and silty, dark gray to black	0.2	-	1.2
Loam, clayey and silty, brownish gray	1.2	-	1.6
Silt, clayey, yellowish brown	1.6	-	3.6
Silt, clayey, brownish gray	3.6	-	5.7
Clay, dark gray to black, grading downward to brownish-gray clay with pea-size and larger limy concretions	5.7	-	6.7
Sand, medium, orange	6.7	-	8.9
Sand, medium, light gray with some iron-staining	8.9	-	10.3
Sand, medium, with scattered pebbles in upper part, brownish gray	10.3	-	12.6

Table 12.--Logs of auger test holes--Continued

Elm Creek profile--Continued

8-18-8da. Ground altitude, 2,250 feet; depth to water, 6.7 feet, July 31, 1946.

	Feet
Loam, fine sandy, brownish gray	0.0 - 2.5
Silt, slightly clayey, light brown	2.5 - 3.5
Silt, micaceous, medium brown	3.5 - 3.7
Sand, fine, light brown with some heavy iron-staining	3.7 - 3.9
Clay, silty, micaceous, brownish gray to dark gray to black	3.9 - 5.3
Clay, silty, micaceous, brownish gray	5.3 - 7.0
Sand, medium to coarse, light gray	7.0 - 7.8
Gravel, fine, and coarse sand, light brown	7.8 - 8.9
Sand, medium to coarse, light gray	8.9 - 9.7

8-18-16cc. Ground altitude, 2,251 feet; depth to water, 8.2 feet, July 31, 1946.

Loam, silty, gray	0.0 - 1.2
Silt, light brown	1.2 - 2.8
Silt, grading downward to fine sand, light brown	2.8 - 4.7
Sand, fine, light brown	4.7 - 5.0
Clay, silty and sandy, brownish gray	5.0 - 6.3
Sand, medium, light brown	6.3 - 7.5
Sand, medium, with scattered pebbles, grading downward to light-brown coarse sand	7.5 - 11.0

Table 12.--Logs of auger test holes--Continued

Kearney profile

8-16-3bb. Ground altitude, 2,192 feet; depth to water, not reached, July 31, 1946.

	Feet
Loam, silty, brownish gray	0.0 - 3.2
Loam, silty, brownish gray	3.2 - 6.0
Silt, slightly clayey, crumbly	6.0 - 7.0
Loam, silty, brownish gray, compact	7.0 - 8.2
Silt, slightly clayey, crumbly, light brown, with limy streaks	8.2 - 17.6
Silt, slightly clayey, crumbly grading downward to plastic, light brownish gray	17.6 - 24.0
Silt, slightly clayey, crumbly, brownish gray	24.0 - 25.4

8-16-9aa. Ground altitude, 2,158 feet; depth to water, 7.3 feet, July 31, 1946.

Loam, silty, brownish gray	0.0 - 2.3
Silt, light brown	2.3 - 3.6
Silt, clayey, light gray	3.6 - 5.3
Sand, fine, brownish gray	5.3 - 5.6
Sand, fine to medium, with numerous fine to medium gravel pebbles, brownish gray	5.6 - 6.0
Sand, medium, light brown	6.0 - 6.2
Clay, light gray	6.2 - 6.4
Sand, coarse, and fine gravel, light brown	6.4 - 7.1
Sand, medium to coarse, light brown	7.1 - 7.3
Gravel, fine to medium, sandy, light pinkish brown	7.3 - 8.9
Sand, medium, light gray	8.9 - 10.3

8-16-10cc. Ground altitude, 2,155 feet; depth to water, 3.5 feet, July 31, 1946.

Loam, silty, brownish gray	0.0 - 0.8
Sand, fine, silty, with scattered small pebbles, light brown with iron-staining	0.8 - 1.5
Sand, fine to medium, with scattered small pebbles, light brown with iron-staining	1.5 - 2.6
Sand, fine to medium, light gray	2.6 - 3.0
Gravel, fine to medium, and medium to coarse sand, light pinkish brownish gray	3.0 - 4.5
Sand, coarse, and fine gravel, light brownish gray	4.5 - 5.5
Sand, coarse, and fine gravel, light gray	5.5 - 6.5

Table 12.--Logs of auger test holes--Continued

Kearney profile--Continued

8-16-22bb. Ground altitude, 2,155 feet; depth to water, 5.4 feet, July 31, 1946.

	Feet		
Loam, silty, brownish gray	0.0	-	2.1
Silt, sand and gravel, interlayered, grading downward to coarse sand and gravel, light brownish gray	2.1	-	4.3
Sand, fine to medium, grading downward to fine gravel, iron-stained at top, black from 4.5 to 4.6 feet, light pinkish brownish gray below	4.3	-	6.0
Gravel, fine, sandy, light pinkish-brownish gray	6.0	-	7.2
Clay, medium gray	7.2	-	7.5
Sand, medium, pinkish gray	7.5	-	8.4

8-16-28aa. Ground altitude, 2,160 feet; depth to water, 7.5 feet, July 31, 1946.

Loam, fine sandy, brownish gray	0.0	-	2.4
Sand, fine to medium, light brown	2.4	-	4.7
Sand, medium to coarse, with scattered pebbles, light brown	4.7	-	7.7
Gravel, fine, and coarse sand, light brown and pinkish	7.7	-	8.2
Sand, medium to coarse, with scattered pebbles, light pinkish brown	8.2	-	9.2
Sand, coarse, and fine gravel, light pinkish brownish gray	9.2	-	10.5

Gibbon profile

9-14-4cd. Ground altitude, 2,088 feet; depth to water, 20.4 feet, May 9, 1946.

Loam, dark gray	0.0	-	3.4
Loam, clayey, medium brownish gray	3.4	-	5.1
Silt, clayey, light brown	5.1	-	12.1
Clay, silty, light brown	12.1	-	15.0
Clay, silty, grading downward to fine sand, light brown	15.0	-	18.0
Sand, fine, silty and clayey, light brown	18.0	-	21.4
Sand, fine, light brownish gray	21.4	-	22.0
Clay, light brown	22.0	-	22.6
Sand, fine to medium, clayey in part, light brownish gray with iron-staining near middle	22.6	-	23.4

Table 12.--Logs of auger test holes--Continued

Gibbon profile--Continued

9-14-15bb. Ground altitude, 2,081 feet; depth to water, 19.6 feet, May 3, 1946.

	Feet
Loam, brownish gray	0.0 - 3.0
Silt, light brownish gray	3.0 - 4.5
Clay, silty, dark brownish gray	4.5 - 5.7
Clay, light brownish gray grading downward to yellowish gray with iron-stained streaks and this grading downward to light-gray clay	5.7 - 15.0
Clay, light gray with iron-stained streaks	15.0 - 20.0
Sand, fine to medium, brownish gray	20.0 - 22.0

9-14-22bb. Ground altitude, 2,079 feet; depth to water, 16.3 feet, May 3, 1946.

Loam, brownish gray	0.0 - 1.6
Clay, silty, brownish gray with white streaks	1.6 - 3.0
Clay, silty, light yellowish gray with iron-staining in the lower part	3.0 - 10.8
Sand, very fine, light brown	10.8 - 14.3
Sand, medium, light brownish gray	14.3 - 16.4
Sand, medium, light pinkish brownish gray	16.4 - 19.3

9-14-28aa. Ground altitude, 2,077 feet; depth to water, 14.8 feet, May 3, 1946.

Loam, dark brownish gray	0.0 - 2.6
Loam, fine sandy, brownish gray	2.6 - 3.9
Sand, medium, with scattered pebbles, light brown	3.9 - 5.3
Sand, coarse, with numerous small pebbles, interlayered with medium and medium fine sand	5.3 - 9.1
Sand, medium, light brown	9.1 - 11.5
Sand, coarse, with numerous pebbles, grading downward to fine gravel, light pinkish brown	11.5 - 13.8
Sand, medium to coarse, light pinkish brown	13.8 - 15.8
Sand, coarse, light pinkish brown	15.8 - 16.8
Gravel, fine, light pinkish brown	16.8 - 17.8

Table 12.--Logs of auger test holes--Continued

Gibbon profile--Continued

9-14-34ba. Ground altitude, 2,074 feet; depth to water, 11.4 feet, May 3, 1946.

	Feet
Loam, brownish gray	0.0 - 1.7
Loam, sandy, brown	1.7 - 3.2
Sand, medium to coarse, with scattered pebbles, light brown	3.2 - 7.2
Sand, medium to coarse, with numerous pebbles, light brown	7.2 - 8.2
Sand, medium, light brown	8.2 - 9.7
Sand, medium to coarse, with scattered pebbles, light pinkish brown	9.7 - 12.0
Sand, medium to coarse, light pinkish gray	12.0 - 12.7
Gravel, fine to coarse, pinkish	12.7 - 13.7
Sand, medium to coarse, with scattered pebbles	13.7 - 14.4

9-14-34cd. Ground altitude, 2,066 feet; depth to water, 2.9 feet, May 2, 1946.

Loam, clayey, dark gray to black	0.0 - 1.6
Sand, medium to coarse, light brownish gray	1.6 - 2.6
Sand, coarse, with fine gravel and scattered pebbles	2.6 - 3.0
Gravel, fine, pinkish	3.0 - 3.7
Sand, medium, light gray	3.7 - 4.5
Gravel, fine, pinkish	4.5 - 5.1
Sand, medium to coarse, light pinkish gray	5.1 - 5.9

8-14-3dc. Ground altitude, 2,068 feet; depth to water, 7.5 feet, May 2, 1946.

Silt and very fine sand, brownish gray	0.0 - 1.3
Sand, very fine, light brownish gray	1.3 - 3.0
Silt, clayey, brownish gray	3.0 - 5.0
Sand, very fine, light brown	5.0 - 5.1
Clay, silty, black	5.1 - 6.8
Sand, medium to coarse, with scattered pebbles, iron-stained in part	6.8 - 8.1
Sand, medium to coarse, with scattered pebbles, pinkish gray with black streaks	8.1 - 9.3
Gravel, medium, and coarse sand, light pinkish gray with iron-staining from 10.0 to 10.3 feet	9.3 - 10.5

Table 12.--Logs of auger test holes--Continued

Gibbon profile--Continued

8-14-10dd. Ground altitude, 2,065 feet; depth to water, 4.9 feet, May 2, 1946.

	Feet		
Loam, silty, brownish gray	0.0	-	1.2
Loam, dark gray	1.2	-	1.5
Clay, silty, light brownish gray	1.5	-	2.8
Clay, light creamy gray	2.8	-	3.8
Sand, medium fine to coarse, light brownish gray	3.8	-	5.0
Sand, fine to medium, interbedded with coarse sand and fine gravel, light pinkish brownish gray	5.0	-	7.9

8-14-23ba. Ground altitude, 2,068 feet; depth to water, 5.0 feet, May 2, 1946.

Loam, silty, gray	0.0	-	1.5
Silt, brownish gray	1.5	-	3.4
Sand, very fine, brownish gray	3.4	-	3.7
Sand, medium to coarse, with scattered pebbles, light brownish gray	3.7	-	5.5
Sand, interbedded medium fine and coarse with scattered pebbles, light pinkish gray	5.5	-	8.0

8-14-23cd. Ground altitude, 2,071 feet; depth to water, 9.5 feet, May 2, 1946.

Silt, brownish gray	0.0	-	5.0
Sand, very fine, silty, light brown	5.0	-	8.0
Sand, medium fine to medium coarse, with scattered pebbles light brown	8.0	-	10.2
Sand, coarse, and fine gravel	10.2	-	11.4
Sand, medium fine, and fine gravel	11.4	-	12.5

Table 12.--Logs of auger test holes--Continued

Wood River profile

10-12-3dd. Ground altitude, 1,981 feet; depth to water, 32.0 feet, May 9, 1946.

	Feet	
Loam, brownish gray	0.0	- 1.8
Clay, silty, light brownish gray	1.8	- 9.9
Sand, fine, light brown	9.9	- 20.3
Silt and very fine sand, clayey, medium brown	20.3	- 22.9
Sand, very fine, and silty clay, medium brown	22.9	- 24.0
Clay, silty	24.0	- 25.3
Sand, medium, light brown	25.3	- 29.0
Silt, clayey, medium brown	29.0	- 29.3
Sand, medium, light brown	29.3	- 32.0

10-12-23aa. Ground altitude, 1,968 feet; depth to water, 18.0 feet, May 1, 1946.

Loam, clayey, medium gray	0.0	- 2.5
Clay, light brownish gray	2.5	- 5.0
Sand, coarse	5.0	- 5.2
Clay, light brownish gray	5.2	- 6.8
Sand, coarse, with scattered pebbles, light pinkish brown	6.8	- 9.2
Sand, medium and coarse interlaminated, with scattered pebbles in lower part, light brown	9.2	- 11.7
Gravel, fine to medium, and coarse sand, light pinkish brown	11.7	- 16.3
Sand, medium, light brown	16.3	- 18.3
Sand, coarse, with scattered pebbles	18.3	- 18.6
Sand, medium, coarse sand, and fine gravel interlaminated, light pinkish gray	18.6	- 20.0
Clay, light yellowish gray	20.0	- 20.3
Sand, fine and medium coarse, interlaminated	20.3	- 21.0

10-12-24dc. Ground altitude, 1,968 feet; depth to water, 19.3 feet, May 9, 1946.

Loam, brownish gray	0.0	- 2.6
Sand, very fine, silty, light brown	2.6	- 4.6
Sand, fine, with scattered pebbles, light brown	4.6	- 7.2
Sand, coarse, with scattered pebbles, brown	7.2	- 8.6
Sand, coarse, with scattered pebbles	8.6	- 9.1
Sand, fine and coarse, interlaminated with thin gravel streaks	9.1	- 11.2
Sand, medium to coarse, with numerous pebbles	11.2	- 13.2
Sand, coarse, with scattered pebbles, light pinkish brown	13.2	- 15.6

Table 12.--Logs of auger test holes--Continued

Wood River profile--Continued

10-12-36aa. Ground altitude, 1,966 feet; depth to water, 16.3 feet, April 30, 1946.

	Feet
Loam, silty, yellowish brown	0.0 - 2.7
Silt, light yellowish brown	2.7 - 3.6
Sand, medium, silty, with scattered pebbles	3.6 - 4.4
Sand, medium to coarse, light brown	4.4 - 6.0
Sand, coarse, and fine gravel, medium dark brown	6.0 - 7.4
Sand, fine to medium, with scattered small pebbles, light brown	7.4 - 8.5
Sand, medium, with numerous pebbles, light brown	8.5 - 10.6
Sand, medium to coarse, with scattered pebbles	10.6 - 12.2
Sand, medium to coarse, with numerous pebbles	12.2 - 15.0
Sand, medium coarse, with scattered pebbles	15.0 - 16.9
Sand, fine to medium, with numerous pebbles, light pinkish gray	16.9 - 17.6
Sand, fine to coarse, light pinkish gray	17.6 - 19.3

10-11-31dc. Ground altitude, 1,953 feet; depth to water, 4.6 feet, April 30, 1946.

Loam, clayey, dark gray	0.0 - 2.5
Clay, medium gray	2.5 - 3.3
Clay, silty, medium gray with yellow streaks	3.3 - 3.9
Sand, fine to medium, with scattered small pebbles, light gray	3.9 - 4.6
Sand, coarse, and fine to medium gravel, light pinkish gray	4.6 - 5.3
Sand, fine, with streak of fine gravel near middle	5.3 - 6.4
Gravel, fine to medium, light pinkish gray	6.4 - 7.6

9-11-5cc. Ground altitude, 1,957 feet; depth to water, 7.7 feet, April 30, 1946.

Loam, silty, brownish gray	0.0 - 2.9
Silt, somewhat clayey, light gray	2.9 - 4.0
Silt and very fine sand, light brownish gray	4.0 - 6.0
Sand, fine to medium coarse, with layer of light clay, 0.2 foot thick, near middle	6.0 - 7.6
Sand, coarse, light brown, grading downward to iron-stained fine gravel	7.6 - 8.2
Sand, coarse, and fine gravel with numerous medium-size pebbles, iron-stained	8.2 - 9.2
Sand, coarse, light brownish gray, grading downward to light-gray medium sand	9.2 - 10.7

Table 12.--Logs of auger test holes--Continued

Wood River profile--Continued

9-11-17ab. Ground altitude, 1,956 feet; depth to water, 5.8 feet, April 30, 1946.

	Feet
Sand, fine, light brownish gray	0.0 - 1.5
Loam, fine sandy, medium brownish gray	1.5 - 2.0
Clay, silty, light brownish gray	2.0 - 4.0
Clay, medium brownish gray	4.0 - 5.0
Clay, fine sandy, light gray	5.0 - 5.2
Sand, medium, iron-stained	5.2 - 6.0
Sand, coarse, and fine gravel, iron-stained	6.0 - 7.4
Sand, fine to medium, light gray, with layer of coarse sand and fine gravel 0.2 foot thick, near middle	7.4 - 8.8

9-11-21bb. Ground altitude, 1,958 feet; depth to water, 8.4 feet, April 30, 1946.

Loam, light brownish gray	0.0 - 0.7
Silt, light brown, grading downward to medium brownish gray	0.7 - 4.9
Sand, fine, medium brownish gray	4.9 - 7.8
Sand, fine to medium, with scattered small pebbles, light brownish gray	7.8 - 9.4
Sand, coarse, with numerous small and medium-sized pebbles, pinkish brownish gray	9.4 - 11.4

Grand Island profile

12-11-24cd. Ground altitude, 1,901 feet; depth to water, 11.2 feet, April 19, 1946.

Clay, silty, light yellowish gray	0.0 - 4.0
Clay, yellowish gray	4.0 - 6.2
Clay, brownish gray	6.2 - 6.5
Sand, fine, medium brown to light brown	6.5 - 12.4

Table 12.--Logs of auger test holes--Continued

Grand Island profile--Continued

12-10-30cc. Ground altitude, 1,896 feet; depth to water, 11.7 feet, April 19, 1946.

	Feet	
Loam, black to brownish gray	0.0	- 1.4
Silt, light brownish gray	1.4	- 3.0
Clay, medium brownish gray	3.0	- 4.7
Clay, silty, light gray	4.7	- 5.7
Clay, silty, yellowish gray to yellow	5.7	- 12.7
Sand, medium fine, medium gray	12.7	- 15.5

12-10-31dc. Ground altitude, 1,892 feet; depth to water, 12.3 feet, April 19, 1946.

Loam, brownish gray	0.0	- 4.0
Silt, brownish gray	4.0	- 7.1
Clay, silty, brownish gray	7.1	- 8.8
Clay, silty and sandy, brownish gray	8.8	- 10.0
Silt, bluish black, grading downward to dark blue-gray sandy clay	10.0	- 14.3
Sand, fine, light gray	14.3	- 15.5
Sand, medium, light gray	15.5	- 16.7

11-10-16bb. Ground altitude, 1,894 feet; depth to water, 12.1 feet, April 18, 1946.

Loam, fine sandy, brownish gray	0.0	- 1.9
Loam, fine to medium sandy, dark brownish gray	1.9	- 2.4
Sand, medium, light brown	2.4	- 5.0
Sand, coarse, with scattered pebbles, orange brown	5.0	- 9.9
Sand, coarse, with scattered pebbles, grading downward to fine gravel	9.9	- 12.7
Gravel, fine, light pinkish brown	12.7	- 15.1

11-10-16cd. Ground altitude, 1,893 feet; depth to water, 12.0 feet, April 18, 1946.

Loam, sandy, medium brown	0.0	- 2.8
Sand, medium, light brown	2.8	- 5.6
Sand, medium, interlaminated with coarser and finer streaks, scattered pebbles, light brown	5.6	- 11.4
Sand, medium, light brownish gray	11.4	- 15.0

Table 12.--Logs of auger test holes--Continued

Grand Island profile--Continued

11-10-22cc. Ground altitude, 1,891 feet; depth to water, 11.1 feet, April 18, 1946.

	Feet
Loam, loose, brownish gray	0.0 - 2.5
Silt, sandy and clayey	2.5 - 3.8
Sand, fine, light brown	3.8 - 5.5
Sand, medium, silty, medium brown to brownish gray	5.5 - 7.3
Sand, coarse, light brown; a layer of silty fine sand 0.2 foot thick near the middle	7.3 - 11.1
Sand, coarse, and fine gravel, grading downward to medium to fine sand, light brownish gray	11.1 - 14.1

11-10-27dc. Ground altitude, 1,896 feet; depth to water, 17.4 feet, April 18, 1946.

Loam, brownish gray	0.0 - 1.5
Sand, fine to medium, light brown	1.5 - 4.4
Sand, medium, light brown	4.4 - 8.1
Sand, medium to coarse, with scattered pebbles	8.1 - 16.5
Sand, coarse, with fine gravel	16.5 - 17.8
Sand, medium, light brownish gray	17.8 - 18.5
Sand, medium grading downward to coarse, light brownish gray	18.5 - 20.5

11-10-35cc. Ground altitude, 1,880 feet; depth to water, 5.0 feet, April 18, 1946.

Loam, sandy and gravelly, dark gray	0.0 - 1.3
Sand, medium, light brownish gray	1.3 - 2.3
Sand, medium to coarse, with some fine gravel, light pinkish gray	2.3 - 4.6
Sand, and gravel, medium pinkish gray	4.6 - 5.6
Sand, medium, medium light gray, with fine to medium gravel, from 7.8 to 8.0 feet	5.6 - 8.0

Table 12.--Logs of auger test holes--Continued

Grand Island profile--Continued

10-10-12bb. Ground altitude, 1,876 feet; depth to water, 6.8 feet, April 18, 1946.

	Feet		
Loam, dark gray	0.0	-	2.6
Clay, dark gray	2.6	-	3.8
Clay, brownish gray	3.8	-	4.5
Sand, clayey, light gray	4.5	-	5.4
Clay, medium gray	5.4	-	5.8
Sand, fine to medium, dark gray to black	5.8	-	8.1
Sand, coarse and fine, orange brown	8.1	-	9.8

10-10-12cd. Ground altitude, 1,878 feet; depth to water, 4.5 feet, April 18, 1946.

Loam, silty, brownish gray	0.0	-	1.9
Clay, silty, medium gray	1.9	-	2.8
Sand, fine to medium, medium gray to orange brown	2.8	-	3.4
Sand, medium to coarse, with scattered pebbles, medium brown	3.4	-	4.8
Sand, fine to medium, light brownish gray	4.8	-	5.5
Sand, coarse, with scattered pebbles	5.5	-	7.5

10-10-13dd. Ground altitude, 1,879 feet; depth to water, 4.0 feet, April 18, 1946.

Sand, fine, light brownish gray	0.0	-	1.5
Sand, very fine, silty, medium brownish gray	1.5	-	2.6
Clay, medium gray to black	2.6	-	3.3
Sand, medium to coarse, medium brownish gray	3.3	-	4.4
Sand, medium, light brownish gray	4.4	-	6.4
Sand, coarse, with scattered pebbles, light brownish gray	6.4	-	7.0

10-9-28cc. Ground altitude, 1,886 feet; depth to water, 13.8 feet, April 17, 1946.

Loam, brownish gray	0.0	-	2.2
Clay, silty, light yellowish gray	2.2	-	7.3
Clay, silty, medium yellowish gray	7.3	-	10.0
Sand, medium coarse, light brown	10.0	-	12.0
Sand, coarse, with scattered gravel pebbles	12.0	-	14.0
Sand, medium, light brownish gray	14.0	-	14.8
Sand, coarse, and fine gravel, light brown with some iron-staining	14.8	-	16.8

Table 12.--Logs of auger test holes--Continued

Grand Island profile--Continued

10-9-29ab. Ground altitude, 1,879 feet; depth to water, 6.5 feet, April 18, 1946.

	Feet		
Soil, fine sandy, medium gray	0.0	-	0.9
Sand, fine to medium, light brownish gray	0.9	-	5.5
Sand, fine to medium, iron-stained	5.5	-	6.5
Sand, fine, light gray	6.5	-	7.0
Sand, medium to coarse, with some iron-staining	7.0	-	8.0
Sand, fine, medium gray	8.0	-	9.3
Sand, coarse, medium gray	9.3	-	9.5

Chapman profile

13-9-26dd. Ground altitude, 1,890 feet; depth to water, 8.7 feet, April 17, 1946.

Loam, brownish gray	0.0	-	1.3
Loam, silty, light yellowish brown	1.3	-	4.2
Loam, similar to above, but somewhat clayey and slightly darker	4.2	-	5.3
Sand, fine, silty, medium yellowish brown	5.3	-	5.5
Clay, medium brownish gray grading downward to dark brownish gray and this grading downward to yellowish brown	5.5	-	8.7
Clay, yellowish brown, grading downward to silty clayey fine sand	8.7	-	10.5
Sand, fine, silty and clayey, light yellowish brown	10.5	-	11.3
Sand, medium, silty and clayey, light yellowish brown	11.3	-	11.7

13-9-36dc. Ground altitude, 1,814 feet; depth to water, 6.3 feet, April 17, 1946.

Loam, brownish gray	0.0	-	1.5
Loam, clayey, brownish gray with scattered white streaks and small pellets	1.5	-	3.9
Clay, yellowish gray, with numerous white streaks	3.9	-	4.5
Sand, fine, light brownish gray	4.5	-	6.2
Sand, fine, light brownish gray, grading downward to medium sand	6.2	-	7.3
Sand, medium with some coarse, light pinkish gray	7.3	-	8.3
Sand, medium, light pinkish gray	8.3	-	9.3

Table 12.--Logs of auger test holes--Continued

Chapman profile--Continued

12-9-1dd. Ground altitude, 1,813 feet; depth to water, 6.6 feet, April 17, 1946.

	Feet		
Loam, dark brownish gray	0.0	-	2.5
Loam, dark brownish gray, grading downward into sand	2.5	-	3.0
Sand, fine to medium, medium brown, with a few pebbles (one 1.5 inches long)	3.0	-	6.3
Sand, medium, medium brown	6.3	-	6.9
Sand, coarse, with fine gravel	6.9	-	7.9
Sand, coarse, with fine gravel, somewhat clayey	7.9	-	8.1
Sand, coarse, with fine gravel, grading downward to coarse sand	8.1	-	9.6

12-8-7dc. Ground altitude, 1,818 feet; depth to water, 11.8 feet, April 17, 1946.

Loam, dark brownish gray	0.0	-	2.3
Loam, clayey, dark brownish gray	2.3	-	4.1
Loam, clayey, dark brownish gray, with scattered light creamy gray powdery concentrations	4.1	-	5.4
Clay, light yellowish gray, grading downward into sand	5.4	-	5.8
Sand, medium, light brown, with scattered small pebbles	5.8	-	7.4
Sand, fine to medium, light brown	7.4	-	10.9
Sand, medium coarse, light brown, grading downward to fine gravel	10.9	-	12.9
Sand, coarse, light brown	12.9	-	13.8
Sand, coarse, light brown, with scattered small pebbles	13.8	-	14.8

12-8-17cd. Ground altitude, 1,819 feet; depth to water, 9.9 feet, April 17, 1946.

Loam, brownish gray	0.0	-	1.9
Sand, loamy, medium brown	1.9	-	2.6
Sand, fine to medium, with scattered small pebbles, medium brown, grading downward to light-brown, medium coarse sand	2.6	-	4.5
Sand, medium coarse with scattered small pebbles, light brown	4.5	-	7.5
Sand, coarse, with fairly numerous scattered small pebbles, light brown	7.5	-	8.6
Gravel, fine to medium, with coarse sand	8.6	-	10.6
Sand, coarse, light brown	10.6	-	12.9

Table 12.--Logs of auger test holes--Continued

Chapman profile--Continued

12-8-20dd. Ground altitude, 1,797 feet; depth to water, 5.8 feet, April 16, 1946.

	Feet
Loam, clayey, dark gray	0.0 - 1.0
Clay, silty, light gray	1.0 - 3.2
Clay, silty and sandy, light gray	3.2 - 4.1
Clay, very plastic, light bluish gray	4.1 - 5.1
Sand, fine, dark bluish gray	5.1 - 6.0
Sand, fine, medium bluish gray	6.0 - 7.0
Sand, fine to medium, grading downward from bluish gray to light brown	7.0 - 8.0
Sand, coarse, and fine gravel, light brown	8.0 - 8.8

12-8-28dc. Ground altitude, 1,801 feet; depth to water, 317 feet, April 16, 1946.

Loam, dark gray	0.0 - 0.7
Loam, sandy, brownish gray	0.7 - 1.1
Sand, fine, brown	1.1 - 2.0
Silt, clayey, light gray	2.0 - 3.0
Sand, fine to medium, light gray with iron-staining at top of interval	3.0 - 4.0
Sand, fine to medium, light brownish gray	4.0 - 5.0
Sand, fine to medium, bluish gray	5.0 - 5.6
Sand, fine to medium, brown	5.6 - 5.8
Sand, coarse, and fine to medium gravel, brownish gray	5.8 - 6.7

12-8-34cd. Ground altitude, 1,800 feet; depth to water 2.9 feet, April 16, 1946.

Loam, clayey, dark brownish gray	0.0 - 0.6
Silt, micaceous, light brownish gray	0.6 - 2.0
Silt with a little fine sand, medium brownish gray	2.0 - 2.7
Silt, clayey, light gray	2.7 - 2.9
Silt, clayey, dark gray	2.9 - 3.2
Sand, medium, with scattered pebbles, light gray	3.2 - 3.4
Sand, medium to medium coarse	3.4 - 4.8
Gravel, fine to medium coarse	4.8 - 5.9

Table 12.--Logs of auger test holes--Continued

Chapman profile--Continued

11-8-3dd. Ground altitude, 1,796 feet; depth to water, 2.2 feet, April 16, 1946.

	Feet
Loam, dark gray	0.0 - 0.6
Clay, silty, light gray	0.6 - 1.3
Sand, fine to medium	1.3 - 3.7
Sand, coarse, interlaminated with medium gravel	3.7 - 5.2

Central City profile

14-7-8dd. Ground altitude, 1,728 feet; depth to water, 3.0 feet, April 16, 1946.

Loam, clayey, dark gray	0.0 - 1.9
Clay, brownish gray	1.9 - 2.6
Clay, light brownish gray, with irregularly shaped pea-size pellets	2.6 - 4.0
Sand, fine, light brownish gray	4.0 - 4.5
Clay, silty, medium brownish gray	4.5 - 5.3
Clay, light brownish gray, with a few pellets not larger than coarse sand	5.3 - 7.5
Sand, clayey, bluish gray	7.5 - 8.0

14-7-16dd. Ground altitude, 1,731 feet; depth to water, 5.5 feet, April 16, 1946.

Loam, sandy, dark brownish gray	0.0 - 2.5
Sand, fine, light brownish gray	2.5 - 3.2
Sand, fine, medium brownish gray	3.2 - 4.2
Clay, silty, medium brownish gray	4.2 - 4.6
Sand, medium, medium brownish gray	4.6 - 6.0
Sand, coarse, with fine gravel	6.0 - 8.5

Table 12.--Logs of auger test holes--Continued

Central City profile--Continued

14-7-22dc. Ground altitude, 1,730 feet; depth to water, 10.8 feet, April 16, 1946.

	Feet	
Loam, sandy, brownish gray	0.0	- 3.2
Sand, fine, to medium, light brown	3.2	- 4.2
Sand, fine to medium, with scattered gravel pebbles in bottom part, light brown	4.2	- 8.6
Sand, medium, with scattered large pebbles (1 inch and larger)	8.6	- 11.0
Sand, medium, with scattered large pebbles, grading downward to coarse sand and fine gravel	11.0	- 11.4
Sand, coarse, with fine gravel	11.4	- 12.0
Sand, fine, to medium	12.0	- 12.8
Sand, very fine, light brownish gray	12.8	- 13.8

14-7-26cc. Ground altitude, 1,728 feet; depth to water, 13.9 feet, April 5, 1946.

Loam, dark brownish gray	0.0	- 2.2
Loam, sandy and clayey, medium brownish gray	2.2	- 3.3
Sand, medium to fine, silty, with rare gravel pebbles, light brown	3.3	- 5.3
Sand, medium to fine, light brown	5.3	- 7.0
Sand, medium to coarse, with scattered gravel pebbles	7.0	- 10.0
Sand, coarse, with some gravel	10.0	- 11.5
Gravel, sandy, some pebbles 1 inch in diameter	11.5	- 17.3

14-7-36cc. Ground altitude, 1,720 feet; depth to water, 7.7 feet, April 5, 1946.

Loam, sandy, dark brownish gray	0.0	- 2.5
Sand, silty, medium brownish gray	2.5	- 3.0
Sand, fine to medium, with a few scattered medium gravel pebbles	3.0	- 5.2
Sand, medium coarse, with some fine gravel	5.2	- 6.3
Sand, coarse, with some fine gravel, pink	6.3	- 7.7
Sand, coarse, and fine gravel	7.7	- 10.7

Table 12.--Logs of auger test holes--Continued

Central City profile--Continued

13-7-1dc. Ground altitude, 1,715 feet; depth to water, 4.7 feet, April 5, 1946.

	Feet
Loam, silty, black	0.0 - 1.3
Silt, slightly clayey, light brownish gray	1.3 - 2.8
Silt, slightly clayey and slightly sandy, light brownish gray	2.8 - 4.0
Sand, fine grading downward to medium coarse	4.0 - 4.8
Sand, medium coarse, pinkish	4.8 - 6.7
Sand, coarse, with some medium gravel	6.7 - 7.7

13-6-7dc. Ground altitude, 1,716 feet; depth to water, 7.0 feet, April 4, 1946.

Loam, clayey, black	0.0 - 1.2
Clay, plastic, brownish gray, grading downward into into silty clay which is less plastic and lighter in color	1.2 - 3.4
Sand, medium to coarse, with some fine gravel	3.4 - 7.2
Sand, medium to coarse	7.2 - 10.0

13-6-17cc. Ground altitude, 1,710 feet; depth to water, 3.2 feet, April 4, 1946.

Loam, silty, black grading downward to dark gray	0.0 - 0.7
Sand, fine, silty, medium brown	0.7 - 2.2
Sand, fine to medium, medium brown	2.2 - 3.2
Sand, medium to coarse, with some fine gravel, brownish gray	3.2 - 3.5
Sand, medium to coarse with some fine gravel, brownish gray, slightly lighter than above	3.5 - 6.2

13-6-28bb. Ground altitude, 1,713 feet; depth to water, 5.9 feet, April 4, 1946.

Loam, black	0.0 - 2.7
Loam, silty and sandy, medium brownish gray	2.7 - 4.0
Silt, light brownish gray	4.0 - 4.4
Sand, medium to coarse, with few scattered small gravel pebbles, light brownish gray	4.4 - 6.0
Sand, coarse, with few scattered gravel pebbles	6.0 - 9.0

Table 12.--Logs of auger test holes--Continued

Central City profile--Continued

13-6-28dd. Ground altitude, 1,716 feet; depth to water, 9.7 feet, April 4, 1946.

	Feet
Loam, dark brownish gray	0.0 - 1.5
Loam, silty and clayey, medium brownish gray	1.5 - 4.2
Loam, dark brownish gray	4.2 - 5.0
Loam, sandy, medium brownish gray	5.0 - 5.7
Sand, fine to medium, silty, light brown	5.7 - 7.8
Sand, very fine, silty, light brownish gray	7.8 - 8.9
Sand, coarse, with very few scattered gravel pebbles, light brownish gray	8.9 - 10.4
Sand, coarse, with some fine gravel	10.4 - 11.2
Sand, very coarse, with some gravel	11.2 - 12.5

Clarks profile

15-5-8dd. Ground altitude, 1,651 feet; depth to water, 14.5 feet, April 4, 1946.

Loam, somewhat clayey, brownish gray	0.0 - 1.8
Silt, clayey, light brownish gray	1.8 - 3.3
Sand, silty, light brownish gray	3.3 - 3.8
Sand, medium, light to very light brown, loose	3.8 - 5.5
Sand, medium coarse, with few scattered gravel pebbles, light brown	5.5 - 9.0
Sand, medium coarse, light brown	9.0 - 11.0
Sand, medium coarse to coarse, with few scattered gravel pebbles	11.0 - 13.0
Sand, coarse, with fine gravel	13.0 - 14.0
Same, but slightly coarser-textured	14.0 - 15.0

15-5-16dc. Ground altitude, 1,627 feet; depth to water, 4.2 feet, April 4, 1946.

Loam, clayey, black	0.0 - 1.2
Loam, clayey, dark brownish gray	1.2 - 1.8
Clay, plastic, medium brownish gray	1.8 - 2.8
Sand, fine to medium, medium brownish gray	2.8 - 3.8
Sand, medium, medium brownish gray	3.8 - 4.8
Sand, medium coarse, light brownish gray	4.8 - 7.2

Table 12.--Logs of auger test holes--Continued

Clarks profile--Continued

15-5-22cd. Ground altitude, 1,628 feet; depth to water, 3.9 feet, April 3, 1946.

	Feet
Loam, silty, black.	0.0 - 1.4
Silt, clayey, brownish gray	1.4 - 2.2
Sand, fine, medium brown.	2.2 - 3.5
Sand, medium, light brown	3.5 - 4.5
Sand, fine to medium, light brown	4.5 - 6.5

15-5-27dd. Ground altitude, 1,626 feet; depth to water, 3.7 feet, April 4, 1946.

Loam, sandy, brownish gray.	0.0 - 2.3
Sand, medium coarse, medium brown	2.3 - 5.7
Sand, medium coarse, medium brown, a little lighter than above	5.7 - 6.7

15-5-35dc. Ground altitude, 1,623 feet; depth to water, 4.5 feet, April 3, 1946.

Loam, silty, black.	0.0 - 2.7
Silt, brownish gray	2.7 - 4.0
Sand, fine to medium with a little coarse, brownish gray	4.0 - 5.0
Sand, fine to medium, light brown	5.0 - 6.0
Sand, medium, light brown	6.0 - 6.8
Sand, medium to coarse, light brown	6.8 - 7.8

14-5-1cd. Ground altitude, 1,626 feet; depth to water, 4.7 feet, April 3, 1946.

Loam, sandy, black.	0.0 - 2.6
Sand, fine, brownish gray	2.6 - 3.5
Sand, fine to medium, with scattered small pebbles. . .	3.5 - 4.8
Sand, medium, with a few small pebbles.	4.8 - 5.3
Gravel, fine to medium, with some sand.	5.3 - 6.3

Table 12.--Logs of auger test holes--Continued

Clarks profile--Continued

14-4-18bb. Ground altitude, 1,628 feet; depth to water, 4.3 feet, March 28, 1946.

	Feet		
Loam	0.0	-	1.5
Sand, fine, micaceous, light tan or buff	1.5	-	2.8
Clay, sandy, black	2.8	-	3.9
Clay, silty to sandy, micaceous, buff gray	3.9	-	5.1
Sand, fine to medium	5.1	-	5.5
Sand, slightly coarser than above	5.5	-	6.2
Sand, medium, gray	6.2	-	6.9
Sand, medium, gray with bottom 2 inches rust-colored	6.9	-	7.7

14-4-19ab. Ground altitude, 1,625 feet; depth to water, 3.0 feet, April 3, 1946.

Loam, silty, black	0.0	-	0.75
Silt, brownish gray	0.75	-	1.8
Silt, micaceous, light brownish gray	1.8	-	3.0
Sand, fine to medium, with scattered medium gravel	3.0	-	3.5
Sand, medium to coarse, with scattered medium gravel	3.5	-	4.2
Sand, coarse, and fine gravel	4.2	-	4.5
Sand, medium coarse	4.5	-	5.8

Silver Creek profile

16-3-6cc. Ground altitude, not known; depth to water, 3.9 feet, August 11, 1947.

Silt, fine sandy, light brownish gray	0.0	-	0.9
Silt, sandy, dark brownish gray	0.9	-	1.7
Sand, fine, silty, light brown	1.7	-	3.9
Sand, fine, light brown	3.9	-	7.0

16-3-7dd. Ground altitude, not known; depth to water, 4.4 feet, August 7, 1947.

Silt, sandy, light, brownish gray	0.0	-	2.6
Sand, silty, light brown	2.6	-	4.8
Sand, fine to medium, and some gravel, light pinkish brownish gray	4.8	-	8.6

Table 12.--Logs of auger test holes--Continued

Silver Creek profile--Continued

16-3-20ba. Ground altitude, not known; depth to water, 3.2 feet, August 7, 1947.

	Feet		
Sand, silty, medium brownish gray	0.0	-	2.0
Sand, fine to medium	2.0	-	3.2
Sand, medium, and fine gravel; scattered pebbles	3.2	-	6.2

16-3-28bb. Ground altitude, not known; depth to water, 4.9 feet, August 7, 1947.

Loam, very fine sandy, brownish gray	0.0	-	1.9
Sand, very fine, dark brown	1.9	-	3.3
Sand, silty, dark blue	3.3	-	4.7
Sand, fine, grading downward to medium sand and fine gravel	4.7	-	8.0

15-3-3dc. Ground altitude, not known; depth to water, 4.8 feet, August 11, 1947.

Loam, sandy, with scattered medium pebbles, dark gray	0.0	-	1.7
Sand, fine to medium, with some coarse gravel, light reddish brown	1.7	-	8.5

15-3-10dd. Ground altitude, not known; depth to water, 4.6 feet, August 11, 1947.

Loam, sandy, dark gray	0.0	-	0.7
Silt, sandy, light brownish gray	0.7	-	1.6
Sand, fine to medium, light brown	1.6	-	3.5
Sand, medium, and medium gravel, light pinkish brownish gray	3.5	-	7.3

15-3-23bb. Ground altitude, not known; depth to water, 4.5 feet, August 12, 1947.

Loam, silty, dark gray	0.0	-	1.6
Silt, sandy, light brown	1.6	-	2.1
Clay, sandy, dark brownish gray	2.1	-	4.5
Sand, fine to medium, and gravel, light brown	4.5	-	8.5

Table 12.--Logs of auger test holes--Continued

Silver Creek profile--Continued

15-3-23dc. Ground altitude, not known; depth to water 5.4 feet, August 12, 1947.

	Feet
Loam, silty, dark gray	0.0 - 2.1
Silt, clayey, medium brownish gray	2.1 - 4.8
Clay, very fine sandy, light brown	4.8 - 14.0

Columbus profile

17-1-2cc. Ground altitude, 1,469 feet; depth to water, 9.8 feet, August 6, 1947.

Sand, silty, grading downward to clean sand, medium brownish gray	0.0 - 1.0
Sand, medium, lightly iron-stained	1.0 - 7.5
Sand, medium, and fine-gravel, lightly iron-stained	7.5 - 10.5

17-1-11cc. Ground altitude, not known; depth to water, 4.5 feet, August 6, 1947.

Silt, black	0.0 - 1.9
Clay, silty, light brownish gray, with thin laminae of iron-stained, fine sand	1.9 - 3.1
Sand, silty, brownish gray	3.1 - 6.5
Sand, slightly silty, brownish gray	6.5 - 9.5

17-1-14cb. Ground altitude, 1,464 feet; depth to water, 10.1 feet, August 6, 1947.

Silt, very fine sandy, medium brownish gray	0.0 - 1.6
Clay, sandy, light brownish gray	1.6 - 2.3
Sand, silty, medium brownish gray	2.3 - 4.2
Clay, silty, medium brownish gray	4.2 - 5.5
Clay, very fine sandy, light brownish gray	5.5 - 7.5
Sand, fine, grading downward to medium sand with scattered pebbles	7.5 - 11.2
Sand, coarse, and fine gravel	11.2 - 13.5

Table 12.--Logs of auger test holes--Continued

Columbus profile--Continued

17-1-26bc. Ground altitude, not known; depth to water, 5.0 feet, August 6, 1947.

	Feet
Silt, very fine sandy, medium brownish gray	0.0 - 0.7
Sand, medium, grading downward to coarse sand with thin layers of gravel	0.7 - 5.0
Sand, medium to coarse, with some gravel	5.0 - 8.3

17-1-34dc. Ground altitude, not known; depth to water, 7.5 feet, August 6, 1947.

Silt, very fine sandy, medium brownish gray	0.0 - 0.8
Sand, silty, medium brown	0.8 - 5.0
Sand, fine to coarse	5.0 - 9.0
Gravel, fine to medium, and coarse sand, dark reddish brown	9.0 - 12.0

16-1-11bb. Ground altitude, not known; depth to water 7.0 feet, August 6, 1947.

Silt, very fine sandy, medium brownish gray	0.0 - 2.1
Sand, silty, light brownish gray with thin layer of black silt at 5.1 feet	2.1 - 5.8
Sand, medium to coarse	5.8 - 7.4
Sand, coarse, grading downward to fine gravel	7.4 - 10.4

16-1-14bb. Ground altitude, not known; depth to water, 6.6 feet, August 6, 1947.

Silt, finely sandy, dark grownish gray	0.0 - 2.5
Sand, clayey, medium brown	2.5 - 4.3
Sand, medium, and fine gravel	4.3 - 6.5
Sand, medium to coarse, and fine gravel	6.5 - 9.5

Table 12.--Logs of auger test holes--Continued

Columbus profile--Continued

16-1-23bc. Ground altitude, not known; depth to water; 6.2 feet, August 7, 1947.

	Feet
Silt, fine sandy, medium brownish gray	0.0 - 2.5
Silt, dark brownish gray	2.5 - 3.6
Clay, silty, medium brownish gray with some iron-staining	3.6 - 4.3
Sand, clayey, light brownish gray	4.3 - 4.9
Silt, sandy, black	4.9 - 6.2
Sand, fine to medium	6.2 - 7.7
Sand, coarse, and fine gravel	7.7 - 10.0

16-1-27dd. Ground altitude, not known; depth to water, 4.0 feet, August 7, 1947.

Sand, very fine, silty, medium brownish gray	0.0 - 0.8
Sand, very fine, grading downward to medium sand; scattered pebbles	0.8 - 4.0
Sand, coarse, and fine gravel	4.0 - 7.0

15-1-3aa. Ground altitude, not known; depth to water, 16.0 feet, August 7, 1947.

Silt, slightly clayey, brownish gray	0.0 - 3.4
Silt, sandy and clayey, brownish gray	3.4 - 4.3
Clay, light gray with iron-staining	4.3 - 8.1
Sand, fine, clayey, grading downward to fine gravel	8.1 - 16.5
Gravel, fine to medium	16.5 - 19.5

Schuyler profile

A17-3-4cc. Ground altitude, 1,372 feet; depth to water, 8.4 feet, September 5, 1946.

Loam, silty, brownish gray	0.0 - 2.5
Silt, light brownish gray	2.5 - 3.5
Silt, clayey, light brownish gray	3.5 - 3.7
Loam, clayey and silty, black	3.7 - 6.2
Clay, gray grading downward to bluish gray, with numerous limy concretions	6.2 - 9.3
Clay, silty, with wood fragments, black	9.3 - 9.5
Sand, medium to fine, clayey, interlayered with bluish-gray clay	9.5 - 12.0
Sand, fine to medium, silty, light brownish gray	12.0 - 13.0

Table 12.--Logs of auger test holes--Continued

Schuyler profile--Continued

A17-3-8dd. Ground altitude, 1,364 feet; depth to water, 5.4 feet, September 5, 1946.

	Feet
Loam, silty and fine sandy, dark gray	0.0 - 1.3
Silt, clayey and sandy, brownish gray	1.3 - 2.3
Clay, fine sandy, light brownish gray	2.3 - 3.0
Clay, fine sandy, grayish white	3.0 - 3.5
Sand, medium coarse, with scattered pebbles, light brown	3.5 - 5.9
Sand, medium, light brownish gray	5.9 - 6.4
Sand, fine to medium, light brown	6.4 - 7.8
Sand, medium coarse, light brown	7.8 - 8.4

A17-3-21bb. Ground altitude, 1,381 feet; depth to water, 6.2 feet, September 5, 1946.

Loam, fine sandy, dark brownish gray	0.0 - 2.0
Loam, fine sandy and clayey, dark brownish gray	2.0 - 2.5
Clay, silty and sandy, medium brown	2.5 - 3.1
Sand, fine, light brown	3.1 - 4.0
Sand, medium, very light brown	4.0 - 4.5
Sand, coarse, with scattered pebbles, light brown	4.5 - 5.6
Sand, coarse, with scattered pebbles, light brown with black streaks	5.6 - 5.8
Sand, coarse, with scattered pebbles, orange brown to light brown	5.8 - 7.1
Sand, medium coarse, light brown	7.1 - 7.8
Gravel, fine, and coarse sand, light brown	7.8 - 9.2

A17-3-29aa. Ground altitude, 1,362 feet; depth to water, 8.7 feet, September 5, 1946.

Loam, silty, brownish gray	0.0 - 0.8
Silt, light brown	0.8 - 3.2
Sand, very fine, silty, light brown	3.2 - 6.3
Sand, fine, grading downward to medium fine, very light brown	6.3 - 7.4
Sand, medium and coarse interlayered, in part clayey	7.4 - 8.4
Sand, coarse, and fine gravel	8.4 - 11.7

Table 12.--Logs of auger test holes--Continued

Schuyler profile--Continued

A17-3-29dd. Ground altitude, 1,355 feet; depth to water, 5.2 feet, September 5, 1946.

	Feet
Loam, fine sandy, medium brownish gray	0.0 - 1.4
Sand, fine, light brownish gray, with thin layer of sandy clay near bottom	1.4 - 2.8
Sand, fine to medium, light brown	2.8 - 4.0
Sand, medium to coarse, with scattered pebbles, light brownish gray	4.0 - 5.7
Sand, coarse, and fine gravel, medium brown	5.7 - 5.9
Gravel, fine, with scattered pebbles, light brown	5.9 - 6.7
Sand, fine, light gray	6.7 - 7.3
Gravel, fine, light brown	7.3 - 8.2

A16-3-5dd. Ground altitude, 1,385 feet; depth to water, 5.8 feet, September 16, 1946.

Loam, silty, brownish gray	0.0 - 2.4
Loam, clayey and sandy, brownish gray	2.4 - 3.8
Sand, clayey and silty, light yellowish brownish gray mottled by iron-staining	3.8 - 5.0
Sand, medium to coarse, iron-stained at top and grading downward to pinkish-brownish gray	5.0 - 6.6
Sand, very coarse, medium brownish gray	6.6 - 7.8
Sand, fine to medium, light brownish gray	7.8 - 8.8

A16-3-8dd. Ground altitude, 1,393 feet; depth to water, 6.0 feet, September 6, 1946.

Loam, dark brownish gray	0.0 - 1.9
Silt, clayey, medium gray	1.9 - 6.5
Sand, medium, clayey, medium gray, and light bluish-gray clay with numerous white limy concretions	6.5 - 10.0
Sand, medium, somewhat clayey, light bluish gray	10.0 - 10.5

A16-3-16cc. Ground altitude, 1,410 feet; depth to water, 17.1 feet, September 6, 1946.

Loam, brownish gray	0.0 - 1.6
Silt, with scattered limy concretions, brownish gray grading downward to light yellowish brown	1.6 - 6.8
Silt, coarse, grading downward to very fine sand, light brown	6.8 - 15.6
Sand, fine, medium brown	15.6 - 18.1
Sand, fine to medium, medium brown	18.1 - 20.1

Table 12.--Logs of auger test holes--Continued

Schuyler profile--Continued

A16-3-29aa. Ground altitude, 1,425 feet; depth to water, not reached, September 6, 1946.

	Feet	
Loam, dark brownish gray	0.0	- 1.4
Clay, silty, medium brownish gray	1.4	- 9.0
Clay, silty, medium brownish gray	9.0	- 15.0
Clay, silty, medium to dark brownish gray	15.0	- 20.0

North Bend profile

A18-5-23bb. Ground altitude, 1,296 feet; depth to water, 8.2 feet, August 30, 1946.

Loam, dark gray	0.0	- 1.0
Clay, black, crumbly	1.0	- 3.3
Clay, dark gray, with scattered limy concretions	3.3	- 4.5
Clay, creamy gray, crumbly, becoming orange-streaked and plastic downward	4.5	- 7.9
Sand, medium, with scattered pebbles, light brownish gray	7.9	- 11.2

A18-5-23cc. Ground altitude, 1,289 feet; depth to water, 5.5 feet, August 30, 1946.

Loam, sandy, dark gray	0.0	- 1.0
Sand, silty and clayey, yellowish brown	1.0	- 3.5
Sand, medium to coarse, with scattered pebbles, light gray	3.5	- 7.2
Sand, medium, light gray	7.2	- 8.5

A18-5-35bb. Ground altitude, 1,289 feet; depth to water, 10.0 feet, August 30, 1946.

Loam, gray	0.0	- 1.2
Silt, fine sandy and slightly clayey downward, yellowish brown	1.2	- 9.0
Clay, silty and sandy, medium gray, grading downward to dark gray clay	9.0	- 11.6
Clay, bluish gray, with numerous small white limy concretions	11.6	- 13.0
Sand, clayey, bluish gray, grading downward to greenish-gray sand	13.0	- 16.0

Table 12.--Logs of auger test holes--Continued

North Bend profile--Continued

A17-5-2bb. Ground altitude, 1,281 feet; depth to water, 4.9 feet, August 30, 1946.

	Feet
Loam, black	0.0 - 1.0
Clay, sandy, with numerous limy concretions, dark gray grading downward to medium gray	1.0 - 3.5
Sand, clayey, medium gray	3.5 - 5.0
Sand, medium, with scattered pebbles, bluish gray	5.0 - 6.8
Sand, light gray	6.8 - 8.8

A17-5-10ad. Ground altitude, 1,286 feet; depth to water, 8.7 feet, August 30, 1946.

Loam, silty, medium brownish gray	0.0 - 1.2
Silt, light brownish gray	1.2 - 3.0
Clay, silty, medium brownish gray	3.0 - 5.0
Clay, crumbly, creamy and gray mottled	5.0 - 6.5
Clay, silty, with one layer of limy concretions 3/4-inch in diameter, grading downward into yellowish-gray sandy clay	6.5 - 8.4
Clay, silty, grading downward to sandy clay, medium gray with yellowish streaks	8.4 - 9.0
Sand, medium, silty, brownish gray	9.0 - 11.7

A17-5-23bb. Ground altitude, 1,284 feet; depth to water, 2.9 feet, September 5, 1946.

Loam, silty and fine sandy, dark gray	0.0 - 1.0
Silt and very fine sand, light brownish gray	1.0 - 2.5
Sand, medium and fine, light brownish gray; scattered dark-gray wood fragments	2.5 - 4.0
Sand, medium and fine, light brownish gray	4.0 - 4.7
Sand, medium and coarse, with some fine gravel, light gray	4.7 - 5.9

Table 12.--Logs of auger test holes--Continued

Fremont profile

A18-8-33aa. Ground altitude, 1,199 feet; depth to water, 6.1 feet, August 31, 1946.

	Feet
Loam, clayey and sandy, dark brownish gray	0.0 - 1.9
Clay, sandy, medium orange brown	1.9 - 3.9
Sand, clayey, gray and orange brown mottled	3.9 - 4.8
Clay, sandy, dark brown to bluish gray	4.8 - 6.0
Clay, silty, creamy gray	6.0 - 7.7
Sand, medium coarse, light brownish gray with orange flecks	7.7 - 9.0
Sand, medium, light brownish gray	9.0 - 10.0

A17-8-4aa. Ground altitude, 1,197 feet; depth to water, 6.6 feet, August 29, 1946.

Loam, clayey, very dark gray	0.0 - 2.4
Clay, crumbly, with limy concretions, dark gray	2.4 - 4.0
Clay, dark gray	4.0 - 4.2
Clay, silty, crumbly, yellowish gray	4.2 - 5.1
Clay, brownish gray with some iron-staining	5.1 - 8.7
Clay, sandy, very dark gray	8.7 - 9.2
No sample	9.2 - 10.2
Sand, fine to medium, light gray	10.2 - 12.2

A17-8-4dd. Ground altitude, 1,198 feet; depth to water, 8.6 feet, August 29, 1946.

Loam, clayey, very dark gray	0.0 - 0.8
Silt, medium brownish gray	0.8 - 2.5
Clay, crumbly, medium gray	2.5 - 3.8
Clay, dark gray	3.8 - 5.0
Clay, dark brownish gray	5.0 - 9.0
Sand, fine to medium, clayey, medium gray	9.0 - 11.0
Sand, fine to medium, light brownish gray	11.0 - 12.0

Table 12.--Logs of auger test holes--Continued

Fremont profile--Continued

A17-8-16ad. Ground altitude, 1,202 feet; depth to water, 9.8 feet, August 29, 1946.

	Feet
Loam, fine sandy and silty, dark brownish gray	0.0 - 4.0
Sand, medium, light brown	4.0 - 8.5
Sand, coarse, medium, brown	8.5 - 11.4
Sand, medium to fine, medium brown	11.4 - 12.8

A17-8-22cb. Ground altitude, 1,198 feet; depth to water, 4.4 feet, August 29, 1946.

Loam, clayey, dark gray	0.0 - 0.2
Loam, medium sandy, medium brownish gray	0.2 - 1.2
Loam, clayey and silty, dark brownish gray	1.2 - 1.4
Sand, fine to medium, light brown	1.4 - 3.0
Sand, medium, light brown	3.0 - 4.9
Sand, medium to coarse, light brownish gray	4.9 - 7.4

A17-8-28ad. Ground altitude, 1,198 feet; depth to water, 5.0 feet, August 29, 1946.

Loam, fine sandy, brownish gray	0.0 - 1.2
Sand, fine, silty, light brown	1.2 - 2.0
Sand, medium to fine, light brownish gray	2.0 - 4.2
Sand, medium to coarse, with scattered pebbles, light brownish gray	4.2 - 6.8
Sand, coarse, and fine gravel, light brownish gray	6.8 - 8.0

Table 13.--Records of wells in the lower Platte River Valley, Nebraska

Table 13.—Records of wells in the lower Platte River Valley, Nebraska

Well number[1]	Owner or tenant	Year completed	Type of well[2]	Depth of well (feet)[3]	Diameter of well (inches)	Type of casing[4]	Method of lift: Type of pump[5]	Method of lift: Kind of power[6]	Use of water[7]	Measuring point: Description	Measuring point: Distance above or below land surface (feet)	Measuring point: Altitude above mean sea level (feet)	Depth to water level below measuring point (feet)[8]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Adams County													
8-12- 6dd	—	—	—	27.0	24	W,GI	C	T	I	Top of beam under pulley wheel.	+1.5	2,017.28	5.89
8ab	E. Woodman	1945	Dr	85	18	GI	T	T	I,0	Top of casing.	+1.0	2,010.14	9.33
Buffalo County													
8-13- 4cb	—	—	Du,Dr	47.0	18	GI	VC	T	I	Edge of discharge pipe.	-2.0	2,041.58	4.42
8-14- 2ab	—	1931	Dr	—	18	GI	C	T	I	Top of wooden curb.	.0	2,062.29	5.71
7cd	—	—	Du,Dr	35	60-24	GI	VC	T	I	Top of wooden beam .	.0	2,092.72	4.21
8-15- 3cb	—	1932	Du,Dr	—	60-24	C,Bs	T	T	I	Edge of concrete curb.	+ .6	2,119.29	14.26
8ba	—	1934	Dr	48.2	24	—	VC	E	I	Edge of curb.	.0	2,128.67	12.12
8-16- 3cb	A. E. Sheldon	1934	Dr	32	18	—	T	E	I,0	Hole in side of turbine.	+ .5	2,165.49	11.47
5ca	—	—	Dr	54.6	36	GI	T	T	I	Edge of casing.	-1.6	2,188.49	15.00
10cc	U. S. Geol. Survey	1946	Dn	8.2	1¼	GI	N	N	0	Top of pipe.	+1.0	2,155.48	2.80
12cc	M. Garvin	1936	Dr	23.4	18	GI	C	G	I,0	Top of casing.	.0	2,139.27	5.10
8-17- 1da	Univ. of Nebraska	1931	Dn	18.0	1	GI	N	N	0	Top of pipe.	+1.2	2,186.72	7.94
4bc	H. Richards	1934	Dr	30.0	24	W	N	N	A,0	Top of casing.	+1.0	2,215.16	6.68
6ac	—	1934	Du,Dr	42.2	96-36	C,GI	C	E	I	Edge of concrete curb.	+1.6	2,229.75	11.55
10cc	—	1932	Du,Dr	36	108-36	C,S	C	T	I	do.	+1.0	2,198.95	5.11
12dd	Univ. of Nebraska	—	Dn	—	1	GI	N	N	0	Top of pipe.	+ .3	2,175.02	1.82
8-18- 1cc	O. Kinnan	1942	—	25.6	36	W,S	VC	T	I	Edge of wood curb.	+ .6	2,229.19	3.01
3ab	—	—	Dr	33.3	—	—	T	E	I	Hole in turbine base.	+ .1	2,244.87	9.30
4cb	U. S. Geol. Survey	1946	Dn	16.4	1¼	GI	N	N	0	Top of pipe.	+1.0	2,253.45	9.68
5bb	—	—	Dr	24.8	18	—	T	E	I	Hole in turbine base.	+ .6	2,263.83	11.50
9-13- 5cb	F. Scott	1930	Dr	53	24	GI	T	T	I,0	Top of cover.	+ .5	2,050.63	20.12
9cc	B. F. Smith	1930	Dr	61.0	—	GI	T	E	I,0	Opening in side of turbine.	+2.0	2,040.95	15.19
11bb	—	—	Dr	—	18	GI	T	G	I,0	do.	+ .5	2,028.14	16.15
13ab	—	1944	Dr	82	18	GI	T	T	I	Hole in turbine base.	+ .5	2,022.10	18.38
17cc	—	—	Dr	42.4	18	GI	T	G	I	Opening in side of turbine.	+1.0	2,052.75	16.62
22bc	E. Stubblefield	1925	Du,Dr	39.1	24	W	C	T	I,0	Top of wood curb.	.0	2,030.69	7.81
26aa	—	—	Dr	29.4	18	GI	N	N	A	Top of casing.	.0	2,019.78	4.79

Buffalo County--Continued													
9-13-28cb	—	—	Dr	43.6	18	GI	C	T	I	Edge of primer flange.	+1.0	2,037.09	5.36
36cc	—	—	Du,Dr	—	108-36	C,GI	C	T	I	Edge of wooden curb.	.0	2,023.30	6.17
9-14- 1dc	U. S. Geol. Survey	1946	Dr	33.8	8	GI	N	N	O	Top of casing.	+ .8	2,061.23	18.86
4cc	do.	1946	Dn	29.0	1¼	GI	N	N	O	Top of pipe.	+1.0	2,088.47	21.77
11bc	—	—	Dr	—	18	GI	T	E	I	Opening in side of turbine.	+1.0	2,077.53	22.15
13cb	M. Davis	1927	Dr	50	24	GI	T	T	I,O	Hole in platform.	+ .5	2,068.60	19.33
17bb	—	1934	—	—	24	GI	T	T	I	Hole in turbine base.	.0	2,094.99	20.24
19dd	T. Lewis	1924	Dr	54	24	GI	VC	T	I,O	Hole in pump base.	+ .71	2,102.86	25.08
21cc	W. Adair	1927	Dr	55	24	GI	VC	T	I,O	Hole in steel plate.	.0	2,089.22	18.45
22bb	—	—	Dr	—	18	—	T	E	I,O	Hole in turbine base.	.0	2,079.35	16.64
25ba	—	1945	Dr	40	18	GI	T	E	I	do.	+ .3	2,061.14	12.10
31bb	—	1942	Dr	58	24	GI	T	E	I	do.	+ .4	2,098.88	14.52
34bb	C. Nicholson	1928	Dr	50	24	GI	VC	T	I,O	Top of concrete curb.	+ .35	2,077.96	10.68
9-15-11cb	C. Aldeen	1930	Dr	53	24	GI	T	-	I,O	Top of casing.	+ .5	2,117.70	27.28
13bc	—	1945	Dr	63.0	24	GI	T	E	I	Hole in turbine base.	+ .6	2,108.57	25.86
16cc	—	1940	Dr	—	18	GI	T	T	I,O	Hole in side of turbine.	.0	—	32.81
30cc	—	1936	Dr	—	24	GI	T	G	I	Top of casing.	+1.4	2,149.55	33.80
34bb	J. Wolford	1922	Dr	48	24	GI	T	E	I,O	Hole in side of turbine.	+1.25	2,121.03	20.82
9-17-31cd	U. S. Geol. Survey	1946	Dn	19.3	1¼	GI	N	N	O	Top of pipe.	+1.0	2,237.73	11.09
9-18-27dd	do.	1946	Dn	14.4	1¼	GI	N	N	O	do.	+2.0	2,256.66	8.02
30ab	—	1939	Dr	27.8	60	GI	T	E	I	Hole in turbine base.	+1.8	2,277.08	4.76
31cc	Dworak	1942	Dr	32.0	24	GI	T	T	I,O	do.	.0	2,274.59	10.39
33cb	—	—	—	21.8	—	—	N	N	I	Top of casing.	+1.0	2,259.3	5.30
33dc	—	—	Dr	27.6	24	GI	C	E	I	Edge of cover.	.0	2,256.81	9.39
10-13-21cc	—	—	Dr	—	18	GI	T	G	I	Opening in side of turbine.	+ .8	2,047.67	28.33
24bc	B. Bentley	1942	Du,Dr	51.6	96-24	C,GI	T	E	I,O	Edge of steel beam.	.0	2,014.17	24.34
27dd	—	—	Dr	—	24	GI	T	T	I	Hole in turbine base.	+ .6	2,027.95	23.29
Butler County													
A16- 1- 4cc	—	—	Dr	32.8	18	GI	T	T	I	Edge of discharge pipe.	+5.3	—	16.37
6bb	Loup River Public Power District	—	Dn	17.7	1	GI	N	N	O	Top of pipe.	+3.3	1,441.48	11.04
7cb	do.	—	Dn	12.5	1¼	GI	N	N	O	do.	+2.2	1,444.16	7.80
14ad	—	—	Dr	42.6	18	GI	T	T	I	Top of casing.	.0	1,434.34	7.69
17bc	W. Deitzler	1941	Dr	38	24	Bs	T	T	I,O	Edge of discharge pipe.	+4.0	1,443.65	8.52
27cb	—	—	—	68.0	18	GI	T	T	I	do.	+6.0	1,486.91	38.88
A16- 2-12da	—	—	—	18	1¼	I	N	N	A,S	Top of curb.	+ .6	1,402.24	8.90
14cc	U. S. Geol. Survey	1946	Dn	12.8	1¼	GI	N	N	O	Top of pipe.	+1.0	1,420.64	6.35
16dc	—	—	Dr	32.6	18	GI	T	T	I	Hole in turbine base.	+ .6	1,428.01	8.28
26dd	H. J. Kosch	—	Dr	60	12	T	Cy	H	D	Top of casing.	.0	1,464.51	47.08
30bc	John Foel	—	Dr	88	18	GI	T	T	I,O	End of discharge pipe.	+3.8	1,462.21	26.42
A16- 3- 1dc	A. Vigliicky	1939	Dr	37	36	GI	T	T	I,O	Hole in turbine base.	.0	1,376.67	11.45
8dd	U. S. Geol. Survey	1946	Dn	12.6	1¼	GI	N	N	O	Top of pipe.	+1.0	1,393.33	4.46
15cd	A. Fortna	1937	Dr	70	18	GI	T	T	I,O	Hole in turbine base.	.0	1,407.16	14.57
20cd	—	—	Dr	58.0	18	GI	T	T	I	do.	+ .4	1,421.22	18.18

See footnotes at end of table.

Table 13.--Records of wells in the lower Platte River Valley, Nebraska--Continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Butler County--Continued													
A17- 4-28cd	E. Ward	1941	Dr	66.0	22	GI	T	T	I,O	Hole in turbine base.	.0	1,346.84	21.12
Colfax County													
A17- 2-10dc	—	—	Dr	63.8	—	—	T	T	I	Edge of discharge pipe.	+3.0	1,401.83	20.31
16bc	T. Stibal	1942	Dr	112	24	GI	T	G	I,O	Hole in turbine base.	+ .8	1,420.41	26.66
22dd	U. S. Geol. Survey	1946	Dr	13.0	1¼	GI	N	N	O	Top of pipe.	+1.0	1,386.01	6.55
A17- 3- 4cc	do.	1946	Dn	16.0	1¼	GI	N	N	O	do.	+1.0	1,371.58	6.72
4da	—	—	Dr	71.0	18	GI	T	T	I	Top of casing.	.0	1,379.43	18.05
11dd	T. O. Bailey	1937	Dr	90	16	GI	T	T	I,O	Top of platform.	+ .2	1,349.00	10.34
15bc	—	—	Du,Dr	24.6	96-24	W,GI	C	T	I	do.	- .5	1,357.60	9.61
18dc	K. Foldo	1935	Du,Dr	61	24	—	T	T	I,O	Top of casing.	.0	1,369.12	3.04
23cc	U. S. Geol. Survey	1946	Dn	11.0	1¼	GI	N	N	O	Top of pipe.	+1.0	1,348.03	5.39
29aa	do.	1946	Dr	16.0	1¼	GI	N	N	O	do.	+1.0	1,361.63	9.39
A17- 4- 1cc	—	—	Dr	17.4	8	GI	C	N	A,O	Edge of concrete curb.	- .2	1,312.26	4.40
4bb	E. Maxes	1938	Dr	36.3	24	—	T	T	I,O	Hole in turbine base.	+ .1	1,340.25	15.25
17ab	—	—	Dr	28.4	18	GI	T	T	I	do.	+ .8	1,331.76	8.57
A18- 4-31cb	—	—	Dr	56.4	24	GI	T	G	I	do.	+ .6	1,349.66	10.71
36ab	—	—	Dn	12.0	1¼	I	Cy	W	S	Top of pipe.	+ .6	—	4.33
Dawson County													
9-19-16ab	A. Kapp	—	Dr	34.0	36	W,Bs	N	N	I,O	Top of casing.	+ .5	2,313.07	7.62
22ba	Tom Brennan	1939	Dr	56.8	24	GI	VC	E	I	do.	- .5	2,311.79	17.29
25bb	E. Bliss	1938	Dr	52.0	24	GI	T	T	I,O	Hole in turbine base.	+ .4	2,289.24	6.74
31cc	—	1934	Dr	32	18	GI	T	T	I	do.	.0	—	6.85
33bb	R. Gamble	—	—	35.0	18	W	T	T	I,O	Bottom of steel beam.	+ .2	2,300.17	6.14
35cc	F. Barber	1944	Dr	33.9	—	—	T	E	I	Hole in side of turbine.	+ .8	2,286.93	7.20
9-20- 1bb	—	1946	Dr	41	18	GI	T	T	I	Hole in turbine base.	+ .8	2,345.88	15.47
3dd	U. S. Geol. Survey	1946	Dn	18.4	1¼	GI	N	N	O	Top of pipe.	+1.0	2,344.38	10.34
5bc	M. Rhoadarmer	1943	Dr	52.5	18	GI	T	T	I,O	Hole in side of turbine.	+ .6	2,374.28	20.22
10bb	J. Oswald	1946	Dr	42.0	18	GI	T	T	I	Hole in turbine base.	+1.5	2,347.22	9.80
12ab	—	1939	Dr	36	18	GI	T	T	I	do.	+ .6	2,333.26	10.25
13bc	J. Brick	1927	Dr	43	18-24	GI	C	T	I,O	Top of concrete curb.	+1.0	2,329.22	8.78
17bb	—	1931	Dr	21.6	10	—	C	T	I	Top of pump frame.	-3.8	2,349.22	1.90
22cc	J. Priel	—	—	36.5	18	—	T	T	I,O	Bottom of turbine base.	+ .5	2,338.35	9.34
25bb	Cadwaller	1932	Du,Dr	29.0	72	W	T	G	I	Opening in side of turbine.	+ .8	2,320.98	4.70
29cc	—	1931	Du,Dr	29.0	96	T	VC	T	I	Top of casing.	- .5	2,345.36	5.52
33dd	U. S. Geol. Survey	1946	Dn	12.2	1¼	GI	N	N	O	Top of pipe.	+1.0	2,329.02	3.85
34bb	G. Weitzel	1931	Du,Dr	28.2	72	W	VC	T	I	Top of casing.	+1.0	2,330.82	5.02
9-21- 3ab	McKee	1936	Dr	32.0	18	-	T	E	I	End of discharge pipe.	+4.8	2,387.10	13.20
6ad	Univ. of Nebraska	1940	Dn	19.5	1	I	N	N	O	Top of pipe	+2.5	2,406.12	7.38
6da	do.	1930	Dn	11.5	1¼	I	N	N	O	do.	+1.0	2,401.45	4.75
7aa	do.	1914	Dn	15.7	1½	I	N	N	O	do.	+ .9	2,402.61	7.88

Dawson County--Continued

9-21- 7da	Univ. of Nebraska	1930	Dn	11.5	1¼	I	N	N	O	Top of pipe.	+2.0	2,402.28	8.40
12cb	C. Myers	1921	Dr	35	24	GI	C	T	I,O	Top of plank.	+ .2	2,369.76	10.60
15bc	do.	1939	Dr	41.6	24	GI	VC	T	I	Edge of casing.	.0	2,379.28	9.90
18aa	Univ. of Nebraska	1930	Dn	11.5	1¼	I	N	N	O	Top of pipe.	+ .9	2,400.55	5.53
18da	do.	1930	Dn	11.4	1¼	I	N	N	O	do.	+1.0	2,399.83	5.67
19aa1	U. S. Geol. Survey	1946	Dn	12.0	1¼	GI	N	N	O	do.	+1.0	2,398.24	4.40
19aa2	Univ. of Nebraska	1930	Dn	12.0	1¼	I	N	N	O	do.	+2.6	2,396.84	2.85
19da	do.	1930	Dn	11.2	1¼	I	N	N	O	do.	+1.5	2,397.83	4.38
19dd	do.	1930	Dn	11.3	1¼	I	N	N	O	do.	+2.2	2,399.98	7.52
24aa	do.	1931	Dn	10.9	1	I	N	N	O	do.	+1.18	2,359.98	4.20
26ab	J. Resch	1942	Dr	31.6	18	GI	T	T	I	Hole in side of turbine.	+1.0	2,368.27	5.55
29bc	Univ. of Nebraska	1914	Dn	9.8	1¼	I	N	N	O	Top of pipe.	+ .5	2,394.72	3.30
30da	do.	1930	Dn	11.5	1¼	I	N	N	O	do.	+ .9	2,398.11	7.14
31aa1	do.	1930	Dn	20.8	1¼	I	N	N	O	do.	+ .4	2,405.76	13.46
31da	do.	1930	Dn	24.6	1¼	I	N	N	O	Top of reducer.	+1.5	2,404.37	10.34
31dd	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	22.0	2	I	N	N	O	Top of pipe.	+2.0	2,402.87	8.02
33cb	—	1946	Dr	56.0	24	GI	T	E	I	Hole in turbine base.	+ .8	2,386.37	4.76
9-22- 7bb	—	1942	Dr	32.0	18	GI	T	E	I	Edge of discharge pipe.	+1.0	2,439.43	6.97
8cc	—	1942	Dr	58.6	18	GI	T	E	I	Hole in turbine base.	+1.0	2,441.48	9.52
11bb	—	1942	Dr	24.8	24	GI	T	E	I	Opening in side of turbine.	+1.2	2,412.08	5.35
17dd	Univ. of Nebraska	1931	Dn	20.9	1	I	N	N	O	Top of pipe.	+1.2	2,430.28	3.67
23cd	F. Handley	1937	Dr	52.0	24-18	W,Bs	T	G	I,O	Hole in side of turbine.	+1.0	2,420.62	17.10
25dc	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	20.0	2	I	N	N	O	Top of pipe.	+1.1	2,413.55	4.36
27bc	P. Ryodine	1946	Dr	72.0	24	GI	T	E	I	Hole in turbine base.	+1.0	2,465.06	22.27
9-23- 2dc	Leon Neil	1941	Dr	53.0	24	Bs	T	E	I,O	do.	+1.0	2,465.22	16.00
3cc	R. Rhone	1941	Dr	40	30	GI	T	T	I,O	do.	+1.0	2,474.07	12.42
6ad	—	1942	Dr	27.6	24	GI	T	E	I	Opening in side of turbine.	+ .5	2,488.7	7.56
9-24- 1dc	U. S. Geol. Survey	1946	Dn	35.6	1¼	GI	N	N	O	Top of pipe.	+1.0	2,523.20	18.62
10-20-18ad	—	1938	Dr	60.8	16	GI	T	G	I	Hole in side of turbine.	.0	2,407.34	32.65
21cb	H. Hill	1938	Dr	54.6	24	Bs	T	E	I,O	do.	+1.0	2,386.87	24.14
27aa	—	1938	Dr	81.5	—	—	T	E	I,O	Opening in side of turbine.	+1.2	2,384.24	36.00
30cb	A. Brown	1938	Dr	35.6	24	GI	T	T	I	Hole in turbine base.	.0	2,380.21	14.19
35bb	U. S. Geol. Survey	1946	Dn	25.9	1¼	GI	N	N	O	Top of pipe.	+1.0	2,359.50	17.12
10-21- 3bb	—	1946	Dr	97.6	24	GI	T	G	I	Hole in turbine base.	+1.6	2,454.97	41.98
6da	Univ. of Nebraska	1940	Dn	22.5	1	I	N	N	O	Top of pipe.	+1.4	2,442.70	9.22
7aa	do.	1930	Dn	29.2	1¼	I	N	N	O	do.	+1.1	2,437.33	8.69
7da	do.	1914	Dn	33.9	1¼	I	N	N	O	do.	- .5	2,433.07	7.54
15ca	White	1936	Dr	50.4	18	Bs	VC	-	I	Top of steel beam.	+ .5	2,413.45	15.19
18aa	Univ. of Nebraska	1930	Dn	29.2	1¼	I	N	N	O	Top of pipe.	+1.3	2,431.04	8.67
18dd	do.	1914	Dn	28.3	1¼	I	N	N	O	do.	+ .5	2,432.26	12.65
19aa	do.	1930	Dn	27.4	1¼	I	N	N	O	do.	+1.7	2,432.13	16.04
19da	do.	1930	Dn	24.4	1¼	I	N	N	O	do.	+1.4	2,429.37	15.58

See footnotes at end of table.

Table 13.—Records of wells in the lower Platte River Valley, Nebraska—Continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Dawson County—Continued													
10-21-23ab	L. Delap	1938	Dr	42.0	24	—	N	N	O	Hole in turbine base.	+1.0	2,399.30	11.04
27cb	—	—	Dr	36.2	24	Bs	VC	T	I	Top of steel beam.	+ .6	2,394.42	6.82
30aa	Univ. of Nebraska	1930	Dn	15.6	1¼	I	N	N	O	Top of pipe.	+1.2	2,418.74	7.78
30da	do.	1930	Dn	15.3	1¼	I	N	N	O	do.	+ .6	2,416.12	7.85
31aa	do.	1930	Dn	11.4	1¼	I	N	N	O	do.	+1.3	2,411.47	5.77
31da	do.	1914	Dn	13.6	1¼	I	N	N	O	do.	+ .6	2,407.90	6.64
34bc	—	—	—	43.3	—	-	T	E	I	Hole in turbine base.	+ .1	2,397.81	14.40
10-22- 4ab	—	1938	Dr	46.9	18	GI	T	E	I	Hole in side of turbine.	+ .6	2,468.17	14.84
11ba	H. J. Brunner	1937	Dr	—	24-20	GI	T	E	I,O	Top of casing.	+ .5	—	7.39
16ab	Mrs. Snyder	1934	Dr	46.5	24	GI	VC	E	I	Top of steel beam.	+ .8	2,454.5	15.05
18bc	A. Anderson	1939	Dr	53.6	24	GI	T	E	I	Top of casing.	+ .6	2,471.93	20.20
23ac	R. Page	1938	Dr	44.6	—	—	T	E	I	Hole in side of turbine.	+1.6	2,429.51	7.60
29aa	U. S. Geol. Survey	1931	Dn	12.5	1	I	N	N	O	Top of pipe.	+1.8	2,436.94	4.59
31bb	P. J. Seberger	1940	—	27.3	24	GI	C	T	I	Top of pump housing.	-4.0	2,442.4	5.00
35cb	—	1946	Dr	33.3	18	GI	T	T	I	Hole in turbine base.	+ .6	2,416.7	5.04
10-23- 3bb	—	1946	Dr	49.4	18	GI	T	T	I	do.	+ .8	2,486.3	4.80
5bb	V. Ogorsolka	1932	Dr	42.0	24-18	W,GI	T	T	I	do.	+1.0	2,494.60	6.35
6bc	—	—	Dr	21.7	8	GI	C	E	I	Top of casing.	+1.2	2,494.69	3.39
9aa	E. Fleming	1925	Dr	35.0	24	GI	T	G	I,O	Top of concrete curb.	.0	2,488.30	12.76
11ab	—	1939	Dr	—	18	GI	T	T	I	Opening in side of turbine.	+ .6	2,482.6	14.56
16dc	Edna Fleming	1931	—	28.7	24	GI	C	T	I	Top of casing.	+1.2	2,470.95	4.00
24cb	—	1938	Dr	27.9	30	GI	N	N	I	do.	+1.8	2,458.4	7.08
29bb	U. S. Geol. Survey	1946	Dn	12.9	1¼	GI	N	N	O	Top of pipe.	+1.0	2,481.30	6.87
30bc	G. Heller	1934	Dr	35.0	24-18	W,Bs	T	G	I	Top of casing.	+1.0	2,496.10	9.97
10-24- 2cb	—	—	—	27.2	96-24	C	VC	T	I	do.	+1.2	2,507.1	6.40
7bb	F. McDowell	1943	Dr	38.0	18	—	T	T	I,O	Hole in turbine base.	+ .5	2,542.83	13.20
15cc	A. Kauffman	1938	Dr	52.0	24-18	GI	T	T	I,O	do.	+1.0	2,525.71	5.85
17bb	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	35.0	2	I	N	N	O	Top of pipe.	+1.0	2,540.68	5.90
18dc	—	1940	Dr	28.0	18	—	T	T	I	Hole in side of turbine.	.0	2,554.78	3.90
21cc	—	1942	Dr	56.6	18	GI	T	T	I	do.	+1.6	2,567.44	21.03
26cc	—	—	Dr	69.0	18	GI	T	E	I	do.	+1.0	2,549.30	25.49
36cc	—	—	Dr	36.0	18	GI	T	T	I	Hole in turbine base.	.0	2,513.83	7.40
11-21-31dd	Univ. of Nebraska	1914	Dn	57.0	1	I	N	N	O	Top of pipe.	+ .5	2,466.34	26.28
11-22-25bb	—	1938	Dr	—	36	GI	T	E	I	Hole in side of turbine.	.0	2,493.42	46.15
28aa	B. Velte	1938	Dr	110.0	24	—	T	E	I,O	Hole in turbine base.	+ .5	2,490.09	27.54
31cc	—	1946	—	66.2	18	GI	T	T	I	Hole in side of turbine.	+ .6	2,478.62	11.82
11-23-13ab	—	1934	Dr	—	—	—	T	G	I	Edge of discharge pipe.	+2.0	2,522.83	19.10
21bc	E. Robertson	1939	Dr	63.0	24-20	GI	T	G	I,O	Hole in side of turbine.	+1.0	2,525.40	14.93
23cc	U. S. Geol. Survey	1946	Dn	13.3	1¼	GI	N	N	O	Top of pipe.	+1.0	2,496.60	3.00
24cc	—	1946	Dr	46.3	24	GI	T	E	I	Opening in side of turbine.	+2.0	2,493.90	6.20
30bb	—	—	Dr	—	18	GI	T	T	I	do.	.0	2,525.6	9.85
32aa	—	1946	Dr	42.8	18	GI	T	G	I	Hole in turbine base.	+ .3	2,499.90	6.32

Dawson County—Continued													
11-23-34ba	—	1940	Dr	51.2	—	—	T	E	I	Opening in side of turbine.	+1.6	2,507.4	19.20
11-24- 1cb	H. Love	1941	Dr	120	30	GI	T	G	I	do.	+ .6	2,590.97	32.66
11cb	—	—	Dr	—	18	GI	T	G	I	do.	+ .6	2,583.1	28.49
16bb	F. Ballmer	1939	Dr	58.0	24	GI	T	T	I,O	Hole in side of turbine.	+1.0	2,561.15	6.46
20ca	J. Owings	1916	Dr	38.0	36	GI	T	T	I,O	Top of casing.	.0	2,544.91	10.59
22ba	—	1939	Dr	—	18	GI	T	T	I	Edge of discharge pipe.	+1.9	2,545.4	10.33
24cb	W. Powell	1941	Dr	53.5	18	GI	T	T	I,O	Hole in turbine base.	+1.2	2,533.30	9.32
26cb	J. Pollet	1940	Dr	48.0	36	GI	T	T	I	do.	+ .6	2,524.2	7.29
34cb	—	—	Dr	29.0	24	GI	-	-	I	Top of pipe.	+1.5	2,518.10	5.90
36ba	—	—	Dr	58.6	18	GI	T	T	I	Opening in side of turbine.	.0	2,512.8	7.60
11-25- 1bb	—	1938	Dr	87.0	18	GI	T	T	I	Hole in side of turbine.	+2.6	2,615.19	35.13
8ad	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	15.0	2	I	N	N	O	Top of pipe.	+ .8	2,572.67	2.51
13cb	—	1942	Dr	—	24	GI	T	G	I	Hole in turbine base.	+1.0	2,561.66	9.49
16bb	U. S. Geol. Survey	1947	Dn	11.5	1¼	GI	N	N	O	Top of pipe.	+1.0	—	6.49
19bc	—	1939	Dr	27.8	24	GI	T	G	I	Hole in turbine base.	+2.0	2,594.22	10.53
19cc	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	32.0	2	I	N	N	O	Top of pipe	+1.0	2,595.71	7.74
21cc	E. Clark	1914	Du,Dr	28.0	18-16	GI	VC	T	I,O	Top of wood beam.	+1.5	2,572.69	10.70
34bc	W. Clark	1932	Dr	—	18	GI	T	T	I,O	Hole in turbine base.	+1.0	2,573.89	11.18
12-23-30bb	—	1945	Dr	—	18	GI	T	G	I	Hole in side of turbine.	+1.0	—	40.30
12-24-18ba	—	1939	Dr	—	36	—	T	G	I	Hole in turbine base.	+1.2	2,672.97	63.35
22bb	—	1941	Dr	—	30	GI	T	G	I	do.	+1.6	2,641.4	54.70
30ab	H. Geiken	1937	Dr	119	24	Bs	T	G	I,O	Hole in side of turbine.	+1.0	2,635.35	44.47
34cb	—	1937	Dr	96.7	18	GI	T	G	I	Opening in side of turbine.	+ .7	2,606.1	33.13
12-25- 8bb	A. Ortman	1946	Dr	139.0	30	Bs	T	G	I	Hole in turbine base.	.0	2,712.48	72.65
14bb	—	1946	Dr	—	24	GI	T	G	I	Hole in side of turbine.	+1.0	2,686.22	67.27
19bb	F. Pearson	1941	Dr	97.0	24	—	T	G	I	Hole in turbine base.	+1.0	2,765.45	45.41
32ba	E. Edson	1940	Dr	—	24	—	T	T	I	do.	+1.8	2,676.67	81.10
34cc	J. Block	1926	Dr	65.0	24	GI	VC	T	I,O	Top of wood sill.	+ .5	2,612.22	29.52
Dodge County													
A17- 5- 2bb	U. S. Geol. Survey	1946	Dn	12.5	1¼	GI	N	N	O	Top of pipe.	+1.1	1,282.04	3.89
A17- 6- 6aa	Univ. of Nebraska	1936	Dr	13.5	1	I	N	N	O	do.	+2.5	1,267.43	4.03
8bc	—	1933	Dr	15.0	6	Bs	Cy	H	S,O	do.	+2.0	1,270.35	4.52
15aa	—	—	Dn	14.0	1¼	GI	Cy	H	S,O	do.	+1.5	1,252.63	3.40
A17- 7- 6ba	—	—	Dr	30.2	12	GI	C	T	I	Top of pump diaphragm.	+ .4	1,239.27	4.49
10ba	—	—	Dr	45.0	18	GI	T	T	I	Hole in turbine base.	+ .5	1,223.41	6.45
A17- 8- 4aa	City of Fremont	1939	Dr	34.0	2	I	N	N	O	Top of pipe.	+1.0	1,198.05	6.69
4ad	do.	1939	Dr	31.0	2	I	N	N	O	do.	+2.5	1,200.36	—
4dd	do.	1939	Dr	31.0	2	I	N	N	O	do.	+1.0	1,199.64	9.59
9da	do.	1939	Dr	30.0	2	I	N	N	O	do.	+1.0	1,198.83	10.88
16aa	do.	1939	Dr	26.0	2	I	N	N	O	do.	+1.0	2,201.77	—
16ad	do.	1939	Dr	18.0	2	I	N	N	O	do.	+1.0	1,203.60	11.23
22cb	do.	1939	Dr	20.0	2	I	N	N	O	do.	+1.0	1,199.88	4.00
28ad	do.	1939	Dr	19.0	2	I	N	N	O	do.	+1.0	1,199.44	4.18

See footnotes at end of table.

Table 13.—Records of wells in the lower Platte River Valley, Nebraska—Continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Dodge County—Continued													
A17- 8-28dd	City of Fremont	1939	Dr	14.0	2	I	N	N	O	Top of pipe.	+1.0	1,199.02	3.52
A18- 5-21cd	—	1927	Dn	12.6	1¼	I	N	N	O	Center of pitcher pump base.	+2.4	1,300.77	5.39
23bb	U. S. Geol. Survey	1946	Dn	16.0	1¼	GI	N	N	O	Top of pipe.	+1.0	1,296.38	8.22
A18- 6-22bc	—	—	Dn	16.0	1¼	I	Cy	H	S	Top of pitcher pump.	+2.5	1,259.53	7.17
25cc	—	—	Dr	37.4	18	GI	T	T	I,O	Hole in turbine base.	+2.0	1,252.21	10.20
26cc	—	1932	Dr	38	18	Bs	T	T	I	Top of casing.	+ .6	1,256.75	10.30
A18- 7-36cb	—	—	Dn	13.0	1¼	I	N	N	O	Top of pipe.	+2.0	1,216.80	5.00
A18- 8-28da	City of Fremont	1939	Dr	85.0	2	I	N	N	O	do.	+1.0	1,263.76	65.63
28dd	do.	1939	Dr	52.5	2	I	N	N	O	do.	+1.0	1,218.40	26.68
33aa	do.	1939	Dr	38.0	2	I	N	N	O	do.	+1.0	1,200.56	6.45
Gosper County													
8-21- 3dc	Jeffrey Bros.	—	Dr	58.2	24	GI	T	E	I,O	On floor at turbine base.	.0	2,378.00	13.79
9bb	—	—	Dr	76.5	18	GI	T	E	I	Hole in side of turbine.	+ .6	2,403.77	36.40
12bb	Jeffrey Bros.	1940	Dr	48	24	GI	T	E	I	do.	+ .8	2,366.02	11.66
Hall County													
9-10- 2dd	—	—	—	117.2	—	—	T	G	I	Hole in turbine base.	+ .2	1,918.3	30.60
4dc	C. Hilsbeck	1930	Du	25.2	24	GI	N	N	O	Top of casing.	+2.0	1,938.1	6.72
9-11- 8bc	R. Abbot	1945	Dr	80.0	18	GI	T	E	I,O	Hole in turbine base.	+ .3	1,957.50	5.92
13bd	—	—	Dr	83.4	—	—	T	G	I	do.	.0	1,913.0	22.63
14cb	C. Cox	1936	Dr	30	18	GI	T	T	I,O	Edge of discharge pipe.	-2.0	1,941.30	5.10
21ob	U. S. Geol. Survey	1946	Dn	15.1	1¼	I	N	N	O	Top of pipe.	+1.0	1,958.8	8.52
9-12- 1dc	J. Kipp	1930	Dr	46.3	24	GI	T	T	I,O	Top of casing.	.0	1,964.30	4.12
6cc	—	—	Dr	42.6	18	GI	T	D	I	do.	+ .4	2,014.77	18.80
9ba	E. F. Ohlman	1929	Dr	63	24	—	T	T	I,O	Top of cover.	.0	2,002.48	21.11
14cc	—	1945	Dr	—	18	GI	T	G	I	Hole in turbine base.	+ .5	1,982.70	6.22
20bc	—	—	Dr	26.8	18	GI	T	-	I	do.	+ .5	2,001.71	5.04
10- 9- 8ab	—	—	Dr	39.5	18	GI	T	G	I	do.	+1.0	1,870.9	6.90
10bb	P. Herman	1940	Du	52	18	W,C	T	T	I,O	do.	+ .6	1,863.10	8.28
27bb	C. S. Cole	1927	Dr	27.6	24	GI	C	G	I,O	Edge of iron girder.	.0	1,881.70	14.35
28cc	—	1937	Dr	—	22	GI	T	T	I,O	Hole in turbine base.	+1.0	1,887.90	15.19
10-10- 3cc	—	—	Dr	38.7	18	GI	T	T	I	Hole at base of turbine.	.0	1,893.88	9.55
8cc	F. Dahlstrom	1928	Dr	90.0	25-32	GI	T	T	I,O	Hole in turbine base.	+1.0	1,921.41	22.29
13dd	U. S. Geol. Survey	1946	Dn	12.4	1¼	I	N	N	O	Top of pipe	+2.0	1,879.9	5.34
20cd	—	—	Dr	—	18	—	T	G	I	Hole in turbine base.	+ .4	1,912.87	8.18
23bb	—	—	Dr	31.4	18	GI	T	T	I	do.	+ .4	1,894.95	9.73
30bc	Demon	—	Du,Dr	40.0	48-24	C,GI	C	T	I	Top of casing.	.0	1,919.88	5.78
10-11- 8cc	—	—	Dr	—	24	—	T	T	I	Edge of steel beam.	.0	1,956.91	22.60
11bb	—	—	Dr	64.6	—	—	T	E	I	Hole in turbine base.	.0	1,942.00	25.88
15dc	W. A. Bouton	1934	Dr	52.5	24	GI	T	T	I	Top of casing.	.0	1,944.00	18.40
30bc	J. M. Weldon	1927	Dr	65.0	24	C	T	T	I	Hole in turbine base.	+ .6	1,969.70	20.81
10-12- 4cc	E. F. Frazell	—	Dr	58	—	—	T	T	I	do.	+ .3	1,988.9	29.16
18cc	—	—	Dr	—	18	—	T	E	I	do.	+ .2	2,006.46	27.25

Hall County--Continued													
10-12-20dd	J. Barrow	1929	Dr	63.0	24	Bs	VC	T	I,O	Top of beam.	+ .3	—	—
27cc	—	—	Dr	—	18	GI	T	E	I	Hole in turbine base.	+1.0	1,988.68	20.92
11-9- 14aa	—	—	Dr	25.7	—	—	C	G	I	Top of casing.	.0	1,832.7	—
24cb	—	—	Dr	9.0	24	—	C	T	I	do.	-4.0	1,833.50	2.10
27cb	U. S. Geol. Survey	1933	Dn	12.1	1	I	N	N	O	Top of pipe.	+2.0	1,852.8	8.96
11-10- 1cc	—	—	Du,Dr	—	12	GI	C	T	I	Edge of plank.	.0	1,872.0	9.59
11dd	H. Thomas	1941	Dr	73.0	24	GI	T	T	I,O	Hole in turbine base.	+1.0	1,877.59	11.82
16bb	U. S. Geol. Survey	1946	Dn	19.0	1¼	I	N	N	O	Top of pipe .	+1.0	1,893.50	—
27dc	do.	1946	Dn	22.6	1¼	I	N	N	O	do.	+1.0	1,896.22	17.91
11-11-16cb	—	—	Dr	52.8	18	-	T	E	I	Hole in turbine base.	+3.0	1,934.8	—
25cc	U. S. Geol. Survey	1946	Dr	37.0	8	GI	N	N	O	Top of casing.	+1.6	1,924.00	18.34
32cb	F. Hughes	1929	Dr	65.0	24	Bs	T	T	I,O	Edge of turbine base.	.0	1,960.00	35.77
34cc	L. Graf	—	Dr	—	18	—	T	E	I	Hole in turbine base.	+1.0	—	27.60
36cb	C. Modesitt	1930	Dr	71.0	8	W	VC	T	I	Top of steel beam.	+ .5	1,929.50	23.95
11-12-12cd	—	—	Dr	—	24	I	T	G	I	Hole in pump base.	+ .4	1,946.83	25.39
24cc	—	—	Dr	56.8	—	-	-	E	I	Hole in base of turbine.	+1.0	1,954.5	25.10
32dd	—	—	Dr	—	—	-	T	E	I	Opening in side of turbine.	+2.0	1,986.6	28.40
34dc	—	—	Dr	58.0	24	GI	T	T	I,O	Hole in turbine base.	+1.0	1,974.00	27.17
12- 9- 2dc	Geo. Meier	—	Dr	58	36	GI	T	T	I	Top of casing.	+2.1	1,831.1	15.03
20da	—	—	Dr	62.7	24	—	T	G	I	do.	.0	1,855.1	8.15
25cd	W. Quandt	—	Dr	—	25	C	T	G	I	Top of steel plate.	+2.0	1,838.6	17.68
25db	do.	1927	Dr	74.6	25	C	T	E	I	Opening in side of turbine.	+1.0	1,834.3	—
32aa2	Hall Co. Farm	1943	Dr	92.0	18	-	T	T	I,O	Hole in turbine base.	.0	1,859.8	12.21
12-10-33cb	—	—	Dr	54.6	—	-	T	E	I	Opening in side of turbine.	+ .5	1,888.4	14.20
35ab	Mrs. Royden	—	Dr	61.5	18	-	T	T	I	Hole in turbine base.	+ .4	1,871.2	8.55
12-11-19dd	--	—	Dr	—	18	-	T	T	I	do.	+ .5	1,949.8	44.25
24cd	U. S. Geol. Survey	1946	Dn	16.6	1¼	I	N	N	O	Top of pipe.	+1.0	1,901.80	12.30
31cc	A. D. Johnson	—	Dr	56.0	18	GI	T	T	I	Hole in turbine base.	.0	1,939.3	27.21
34ab	—	—	Dr	—	—	-	T	T	I	do.	+1.0	1,910.1	15.54
Hamilton County													
11-8- 27cc	A. Spiehs	1945	Dr	171	18	GI	T	G	I	do.	+ .3	1,891.64	81.30
28bc	H. J. Rathje	—	Dr	19	18	GI	T	T	I,O	do.	-1.0	1,845.74	28.95
13-5- 15cc	—	1945	Dr	215	—	—	T	G	I	do.	.0	1,775.62	103.2
19aa	E. Clayton	1940	Dr	70	18	GI	T	G	I,O	do.	.0	1,705.39	25.16
13-6- 27cc	H. Lock	1936	Dr	61	24	GI	VC	G	I,O	Top of casing.	+1.0	1,714.94	9.96
Howard County													
13-9- 26dd	U. S. Geol. Survey	1946	Dn	19.2	1¼	I	N	N	O	Top of pipe.	+1.0	1,819.7	8.85
Kearney County													
8-13-12cb	O. Holl	1939	Du	15.0	24	Bs	C	G	I,O	Hole in pump base.	+ .2	2,024.75	5.90
14cb	—	—	Du,Dr	—	77-24	C,Bs	C	T	I	Top of casing.	-1.3	2,036.23	11.35
16bc	H. H. Howard	1944	Dr	77.0	24	GI	T	E	I,O	Hole in turbine base.	+1.4	2,044.95	6.00
8-14-13db	H. Yensen	1929	Dr	40	24	GI	T	G	I,O	Top of cover.	.0	2,062.07	7.36
19cc	G. Nielson	1932	Du	21.0	18	T	C	G	I,O	Top of casing.	+1.0	2,096.97	4.89

See footnotes at end of table.

Table 13.—Records of wells in the lower Platte River Valley, Nebraska—Continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Kearney County—Continued													
8-14-21cb	—	—	—	—	24	GI	T	E	I	Hole in turbine base.	+0.4	2,083.89	4.16
23ba	U. S. Geol. Survey	1946	Dn	12.5	1¼	I	N	N	O	Top of pipe.	+1.0	2,068.30	4.65
23bc	D. E. McGregor	1938	Dr	56	30-18	GI	T	E	I	Hole in side of turbine.	+1.0	—	9.00
8-15-21dc	Geo. Raffety	1944	Dr	32	18	GI	T	E	I,O	Hole in turbine base.	+ .5	2,119.70	5.18
23bc	—	—	Dn	13.1	1¼	GI	N	N	S,A	Top of pipe	+2.3	2,110.20	4.27
29bb	—	—	Dr	28.0	24	W,I	C	T	I	Edge of wood beam.	.0	2,131.85	4.94
8-16-19cc	—	1945	Dr	62.0	18	GI	C	T	I	Top of casing.	+ .8	2,177.84	4.45
23dd	U. S. Geol. Survey	1946	Dn	13.0	1¼	I	N	N	O	Top of pipe.	+2.0	2,145.38	5.64
28aa	do.	1946	Dn	14.8	1¼	GI	N	N	O	do.	+1.0	2,160.34	6.62
Lincoln County													
11-26- 8cb	—	1945	Dr	64.4	18	GI	T	G	I	Hole in turbine base.	+ .4	2,659.26	25.85
15cc	—	1937	Du,Dr	56.0	120-36	T,Bs	T	T	I	Top of steel beam.	+1.6	2,626.33	11.90
16bb	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	35.0	2	I	N	N	O	Top of pipe.	+ .5	2,629.09	10.63
26aa	J. Green	1938	Dr	100	24	GI	T	T	I	Hole in side of turbine.	+1.5	2,624.30	17.37
11-27- 1dc	—	—	Dr	—	24	GI	T	T	I	Edge of casing.	+ .4	2,664.69	24.52
12-26-19bb	—	—	Dn	15.0	1¼	Bs	N	N	A	Top of pipe.	.0	2,634.56	9.05
27cb	—	—	Dn	—	1½	Bs	P	H	D	do.	+1.5	2,616.03	5.90
35aa	—	1941	Dr	49.0	36	GI	T	D	I	Edge of casing.	+1.5	2,618.91	16.36
35db	R. D. McWha	1945	Dr	—	24	GI	T	G	I,O	Hole in turbine base.	+1.0	2,610.43	11.08
12-27- 3ac	—	—	Dr	15.0	1¼	GI	P	H	D	Edge of pump base.	+2.5	2,665.98	6.88
14aa	Univ. of Nebraska	1934	Dn	18.3	1	I	N	N	O	Top of pipe.	+1.7	2,648.10	7.56
16aa	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	11.5	2	Bs	N	N	O	do.	+ .8	2,653.66	5.23
19cc	—	1941	Dr	95	18	GI	T	T	I	Hole in turbine base.	.0	2,723.20	43.09
20cc	—	1944	Dr	71.0	18	GI	T	T	I	do.	.0	2,691.49	24.59
20dd	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	31.0	2	Bs	N	N	O	Top of pipe.	+ .3	2,670.28	14.46
26dd	—	1933	Dr	25.4	24	GI	VC	T	I	Edge of casing.	.0	2,644.97	7.78
27ad	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	12.8	2	Bs	N	N	O	Top of pipe.	+1.0	2,642.65	5.52
28dd	U. S. Geol. Survey	1947	Dn	27.8	1¼	GI	N	N	O	do.	+1.2	—	13.64
36ad	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	16.5	2	Bs	N	N	O	do.	+1.0	2,631.53	6.00
12-28- 8bc	—	1941	Dr	85	18	GI	T	T	I	Hole in turbine base.	+ .6	—	37.05
9bc	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	14.4	2	Bs	N	N	O	Top of pipe.	+ .4	2,703.08	5.47
12-28- 9bd	—	1934	Dr	39.6	24	GI	VC	T	I	Edge of casing.	.0	—	10.79
14dd	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	46.0	2	Bs	N	N	O	Top of pipe.	+1.0	2,711.34	28.59
15ba	do.	1938	Dn	22.0	2	Bs	N	N	O	do.	+ .9	2,701.10	13.15
13-27-32bd	do.	1938	Dn	11.0	2	Bs	N	N	O	do.	+ .8	2,675.7	3.80
13-28-16dd	U. S. Geol. Survey	1947	Dn	16.7	1¼	GI	N	N	O	do.	.0	—	5.55
21da	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	11.5	2	Bs	N	N	O	do.	+ .8	2,712.16	2.56

Lincoln County—Continued													
13-28-25bc	M. Roberts	—	Dr	18.0	6	Bs	Cy	G	I,O	Top of pipe.	.0	2,695.73	3.50
26db	—	1945	Dr	17.4	24	GI	C	T	I	Edge of casing.	-3.0	2,695.27	2.50
28cc	U. S. Geol. Survey	1947	Dn	13.1	1¼	GI	N	N	O	Top of pipe	+1.0	—	4.28
29cc	Langford	—	Dr	—	—	—	-	-	I,O	Top of concrete curb.	-2.0	2,716.31	3.29
31cc	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	20.0	2	Bs	N	N	O	Top of pipe.	+ .9	2,730.61	5.56
13-29- 4cc	do.	1936	Du	10.5	4	GI	N	N	O	Top of casing.	+ .3	2,764.27	5.89
6ba	do.	1938	Dn	11.5	2	Bs	N	N	O	Top of pipe.	+ .5	2,773.25	3.55
13bc	—	—	Dr	13.4	1¼	GI	P	H	S	Edge of pump base.	+2.0	2,741.99	6.25
20bb	Central Nebraska Public Power and Irrig. Dist.	1936	Dr	16.0	4	GI	N	N	O	Top of casing.	+ .2	2,771.31	6.62
24ba	—	1938	Dr	28.0	24	GI	S	-	I	Top of 1¼-inch pipe.	+4.0	2,740.32	9.39
25bb	Central Nebraska Public Power and Irrig. Dist.	1938	Dn	10.7	2	Bs	N	N	O	Top of pipe.	+ .9	2,733.45	5.75
35bb	—	1944	Dr	49.7	24	GI	T	T	I,O	Hole in turbine base.	.0	—	17.68
13-30- 3ad	Central Nebraska Public Power and Irrig. Dist.	—	Dn	—	2	Bs	N	N	O	Top of pipe.	+ .5	2,789.61	4.95
4cd	U. S. Geol. Survey	1946	Dn	12.5	1¼	I	N	N	O	do.	+1.0	—	8.11
9cb	do.	1946	Dn	12.5	1¼	I	N	N	O	do.	+1.0	2,801.99	3.05
13cc	—	1941	Dr	79.6	24	GI	T	T	I	Hole in turbine base.	+ .6	2,801.58	19.89
13dd	Central Nebraska Public Power and Irrig. Dist.	1936	Dr	22.0	4	GI	N	N	O	Top of casing.	+1.9	2,785.54	11.65
15cc	Vic Halligan	1940	Dr	246.0	24	GI	T	E	T	Hole in turbine base.	+ .5	—	16.18
15dd	—	—	Du,Dr	70.0	36	Bs	T	E	I	Edge of curb.	+1.6	2,817.71	24.33
21bb	Univ. of Nebraska	1914	Dn	21.3	1¼	I	N	N	O	Top of pipe.	+1.0	2,821.80	12.44
14-30- 9ca	U. S. Geol. Survey	1946	Dn	25.8	1¼	I	N	N	O	do.	+1.0	2,833.35	4.74
16db	do.	1946	Dn	12.5	1¼	I	N	N	O	do.	+1.0	2,807.83	1.40
21cd	do.	1946	Dn	12.5	1¼	I	N	N	O	do.	+1.0	2,802.50	4.35
27ad	—	1944	Dr	61.4	18	GI	T	G	I	Hole in turbine base.	.0	2,787.90	5.52
28dc	U. S. Geol. Survey	1946	Dn	12.4	1¼	I	N	N	O	Top of pipe.	+1.0	2,799.85	7.03
33cd	do.	1946	Dn	12.4	1¼	I	N	N	O	do.	+1.0	2,802.66	7.88
36aa	—	—	Dr	24.6	6	GI	N	N	S,A	Edge of casing.	+ .2	2,785.50	1.40
Merrick County													
11- 8- 3dd	U. S. Geol. Survey	1946	Dn	9.4	1¼	I	N	N	O	Top of pipe.	+1.0	1,796.73	2.54
8bb	—	—	Dr	41.6	24	Bs	T	T	I	Top of steel beam.	.0	1,821.18	10.02
16cb	—	1941	Dr	43.7	24	GI	T	T	I	Hole in turbine base.	+1.2	1,819.39	6.60
12- 7- 4dc	—	1946	Dr	46.4	18	GI	T	T	I	do.	+1.5	1,756.09	9.60
7aa	U. S. Geol. Survey	1945	Dn	12.7	1¼	GI	N	N	O	Top of pipe.	+1.0	1,763.16	7.25
17bc	—	1945	Dr	—	18	GI	T	G	I	Hole in turbine base.	+ .6	1,768.40	8.28
12- 8- 7dc	—	—	Dr	—	22	—	T	T	I,O	do.	+1.0	1,818.61	12.15
10cc	—	1934	Dr	39.6	18	GI	T	T	I	Top of steel beam.	.0	1,792.42	7.72
12cc	—	1946	Dr	32.4	18	GI	T	T	I	Hole in turbine base.	+ .8	1,774.70	5.36
20cc	—	—	Dr	79.2	24	—	T	E	I	Top edge of turbine base.	+1.0	1,824.99	19.40
28dc	U. S. Geol. Survey	1945	Dn	12.3	1¼	GI	N	N	O	Top of pipe.	+1.0	1,800.83	12.15
13- 5- 4bd	—	—	Dr	32.6	24	GI	T	T	I	Hole in turbine base.	+1.0	1,668.51	9.30

See footnotes at end of table.

Table 13.—Records of wells in the lower Platte River Valley, Nebraska—Continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Merrick County—Continued													
13- 6- 2bc	U. S. Geol. Survey	1945	Dn	12.8	1¼	GI	N	N	O	Top of pipe.	+1.0	1,688.85	6.10
4bb	—	—	Dr	38.9	18	GI	T	T	I	Hole in turbine base.	+ .9	1,704.08	10.20
7ob	U. S. Geol. Survey	1945	Dn	12.6	1¼	GI	N	N	O	Top of pipe.	+1.0	1,714.73	6.26
15cb	—	—	—	46.0	18	GI	T	T	I	Hole in turbine base.	.0	1,702.74	6.54
19cb	U. S. Geol. Survey	1945	Dn	12.5	1¼	GI	N	N	O	Top of pipe.	+1.0	1,719.88	5.39
28bb	do.	1946	Dn	12.0	1¼	I	N	N	O	do.	+1.0	1,712.92	6.16
13- 7- 4bc	do.	1945	Dn	12.8	1¼	GI	N	N	O	do.	+1.0	1,748.18	7.88
7cd	—	—	--	46.7	18	GI	T	T	I	Hole in turbine base.	+1.0	1,765.86	9.45
10cc	—	1943	Dr	68.8	24	GI	T	T	I	do.	+1.6	1,745.02	11.15
22dc	—	—	Dr	42.6	18	GI	T	T	I	Top of casing.	+1.0	1,738.45	5.94
29cb	U. S. Geol. Survey	1946	Dn	11.0	1¼	I	N	N	O	Top of pipe.	+1.8	1,751.29	4.00
30cc	—	1946	Dr	—	18	GI	T	T	I	Top of casing.	+1.8	1,776.62	18.40
36cb	—	—	Dr	58.6	24	GI	T	T	I	Hole in turbine base.	+1.0	1,738.34	9.93
13- 8-10cd	—	—	Dr	—	18	GI	T	T	I	do.	+1.0	1,779.63	7.30
20cb	—	1945	Dr	46	18	GI	T	T	I	do.	+1.0	1,807.65	16.20
27dc	—	—	Dr	58.2	18	GI	T	T	I	do.	+ .2	1,794.31	14.78
32dd	—	1944	Du,Dr	--	72-24	C,GI	VC	T	I	Top of concrete casing..	.0	1,803.84	11.42
14- 4-18bb	U. S. Geol. Survey	1946	Dn	12.2	1¼	I	N	N	O	Top of pipe.	+2.3	1,628.15	5.98
14- 5- 6aa	—	1944	Dr	32	24	GI	T	T	I	Hole in turbine base.	+1.4	1,651.29	8.82
7cc	—	1941	Dr	—	24	GI	T	T	I	do.	+1.0	1,660.37	6.35
9cc	—	1943	Dr	30.0	18	GI	T	T	I,O	Top of casing.	+ .6	1,650.30	6.10
15da	—	1939	Dr	—	18	GI	T	T	I	Hole in turbine base.	+ .4	1,643.96	6.44
27cd	—	—	Dr	19.8	18	GI	T	T	I	do.	.0	1,651.86	4.28
28cb	—	—	Dr	39.6	24	GI	T	T	I	Top of steel beam.	+ .6	1,660.33	7.21
31bc	—	—	Dr	32.4	24	GI	T	T	I	Top of casing.	+ .3	1,672.55	3.31
14- 6-15bb	U. S. Geol. Survey	1945	Dn	13.1	1¼	GI	N	N	O	Top of pipe.	+1.0	1,680.76	4.00
17bc	—	1938	Dr	52	24	GI	T	T	I	Hole in turbine base.	+1.0	1,699.01	15.35
24bc	—	—	Dr	—	24	GI	C	E	I	Top of casing.	-3.0	1,667.54	1.45
28cc	Charron	1944	Dr	40	48	C	VC	T	I	do.	+ .6	1,693.47	5.40
14- 7-11bb	—	--	Dr	--	18	GI	T	E	I	Hole in turbine base.	+1.0	1,721.31	10.92
21cb	H. Tsudy	1933	Dr	32.5	8	GI	C	G	I,O	Top of casing.	+1.0	1,738.77	7.33
26cc	U. S. Geol. Survey	1946	Dn	21.5	1¼	I	N	N	O	Top of pipe.	+1.0	—	13.46
14- 8-25dd	—	—	Dr	—	18	GI	T	T	I	Hole in turbine base.	.0	1,752.55	7.27
15- 4-10bb	—	1941	Dr	52	18	GI	T	G	I	do.	+1.0	1,610.62	28.48
12bc	—	—	Dr	58	18	GI	T	T	I	do.	.0	1,570.96	5.43
15dd	U. S. Geol. Survey	1945	Dn	15.0	1¼	GI	N	N	O	Top of pipe.	+1.0	1,586.98	8.06
19ab	—	1945	Dr	—	24	GI	T	T	I	Hole in turbine base.	+ .2	1,607.41	6.27
21ab	—	—	Dr	24.3	36	C	VC	E	I	Edge of steel rim.	+ .8	1,594.40	5.32
31cc	U. S. Geol. Survey	1945	Dn	12.0	1¼	GI	N	N	O	Top of pipe.	+1.0	1,616.79	4.38
33cc	—	—	Dr	19.8	12	GI	C	T	I	Top of casing.	+1.8	1,606.39	6.80
15- 5- 8dd	U. S. Geol. Survey	1946	Dn	19.4	1¼	I	N	N	O	Top of pipe.	+1.0	1,651.32	14.37
20bb	—	—	Dr	—	18	GI	T	T	I	Top of casing.	.0	1,659.65	10.13
27dd	U. S. Geol. Survey	1946	Dn	12.0	1¼	I	N	N	O	Top of pipe.	+1.0	1,626.39	4.46
34cc	—	1946	Dr	—	18	GI	T	G	I	Hole in turbine base.	+ .8	1,636.15	5.72

Merrick County—Continued													
15- 6-26bc	—	—	Dr	—	18	GI	T	T	I	Hole in turbine base.	+ .4	1,679.96	8.80
32bc	—	—	Dr	47.7	18	GI	T	T	I	do.	+ .8	1,709.13	6.02
16- 3- 7dd	U. S. Geol. Survey	1947	Dn	10.6	1¼	GI	N	N	O	Top of pipe.	+1.0	—	5.45
23dd	Tomlah	1945	Dr	56.0	18	GI	T	G	I	Hole in turbine base.	+1.4	1,531.02	8.24
27cc	P. Pearson	1934	Du	28.0	22	Bs	VC	G	I	Top of casing.	+1.5	1,545.59	7.90
32cb	—	1944	Dr	43.2	24	GI	T	G	I	Hole in turbine base.	+1.2	1,558.85	7.27
Nance County													
15- 5- 4bd	C. Jensen	1941	Dr	80	24	GI	T	T	I	do.	.0	1,636.25	7.72
5da	do.	1946	Dr	42.6	24	GI	T	T	I	do.	+1.0	1,649.30	17.38
16- 4-15bb	—	—	Dr	27.8	18	GI	T	G	I	do.	.0	1,597.23	9.79
27dc	—	—	Dr	—	36	GI	T	T	I	do.	+ .5	1,581.00	9.89
36bb	—	1946	Dr	—	18	GI	T	G	I	do.	.0	1,573.85	11.64
16- 6-25bb	—	—	Dr	18.6	6	GI	Cy	W	S	Edge of casing.	+1.0	1,635.04	9.20
Phelps County													
8-17-19bb	—	—	Dr	32.0	24	W,GI	C	T	I	Top of plank.	.0	2,224.98	8.80
19db	W. Bamford	1927	Dr	46.0	24	W	C	T	I,O	Top of concrete curb.	+1.0	2,223.22	12.79
24bc	F. Skiles	1927	Dr	43.0	24	W	T	T	I,O	On steel beam.	+1.0	2,188.39	9.23
8-18- 9db	Univ. of Nebraska	1936	Dn	12.3	1	I	N	N	O	Top of pipe.	- .35	2,242.59	3.44
14cc	R. Stevens	1942	Dr	32.0	36	BS	VC	T	I	Top of casing.	+1.2	2,237.54	7.34
16cc	G. Nelson	1934	Dr	38	24	—	T	E	I,O	Hole in side of turbine.	+1.0	2,252.82	8.30
18dc	V. Carlson	1945	Dr	52.7	24	GI	T	T	I	Hole in turbine base.	+1.6	2,266.12	11.34
24bb	W. Skiles	1937	Dr	35.4	24	GI	T	T	I,O	Hole in casing.	.0	2,232.83	8.82
8-19- 7dc	M. Labarf	1937	Dr	41.2	24	GI	T	T	I,O	Edge of steel plate.	- .5	2,300.78	3.97
14dc	H. Crawford	1936	Du,Dr	48.0	24	—	T	E	I,O	Hole in turbine base.	.0	2,280.81	11.23
15cd	—	—	Dr	28.0	18	GI	T	T	I	do.	.0	—	7.04
16cc	—	1931	Dr	42.6	24	GI	T	T	I	Edge of turbine base.	+2.4	2,299.45	12.00
8-20- 8cd	A. Matson	—	Dr	51	24	Bs	T	E	I,O	Bottom edge of discharge.	+4.6	2,339.45	11.87
9cd	L. Jones	1938	Dn	13.0	1¼	I	N	N	O	Top of pipe.	+1.0	2,326.00	4.47
14bc	—	1934	Dr	57.2	24	GI	T	T	I	Edge of casing.	.0	2,327.06	13.72
14db	Central Nebraska Public and Irrig. Dist.	1938	Dn	16.0	1¼	Bs	N	N	O	Top of pipe.	+1.2	2,315.07	5.05
Platte County													
A17- 1-14cc	Loup River Public Power District	1935	Dn	16.5	1¼	Bs	N	N	O	do.	+1.7	1,426.7	11.15
14dd	do.	1935	Dn	11.4	1¼	Bs	N	N	O	do.	.0	1,417.6	5.07
17dd	do.	1938	Dn	26.4	1¼	Bs	N	N	O	do.	+2.8	1,239.2	11.03
25aa	do.	1935	Dn	21.6	1¼	Bs	N	N	O	do.	+4.2	1,416.6	12.40
29da	do.	1935	Dn	21.3	1¼	Bs	N	N	O	do.	+2.6	1,434.9	12.89
30cc	do.	1944	Dn	3.5	1	Bs	N	N	O	do.	+3.5	1,440.93	6.22
31bb	do.	1944	Dn	13.6	1	Bs	N	N	O	do.	+2.6	1,440.48	5.28
36bc	do.	1935	Dn	16.6	1¼	Bs	N	N	O	do.	+2.8	1,415.6	8.22

See footnotes at end of table.

Table 13.—Records of wells in the lower Platte River Valley, Nebraska—Continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Platte County—Continued													
16- 1- 5cc	—	—	Dr	32.6	24	GI	T	T	I,O	Edge of casing.	+0.5	1,475.34	6.09
2- 1cb	Loup River Public Power District	—	Dr	16.0	1¼	GI	N	N	O	Top of pipe.	+2.5	—	7.69
9cc	J. Nyffeler	1941	Dr	38.0	24	GI	T	T	I,O	Hole in turbine base.	+1.2	1,509.37	3.59
12ab	H. Ernst	1905	Dr	17.5	1¼	GI	N	N	O	Top of pipe.	+1.0	1,489.63	9.64
17- 1- 2cc	Loup River Public Power District	1935	Dr	21.6	1¼	Bs	N	N	O	do.	.0	1,469.4	10.29
5ad	do.	1935	Dr	15.9	1¼	Bs	N	N	O	do.	+3.7	1,475.23	5.70
7ac	do.	1935	Dr	16.5	1¼	Bs	N	N	O	do.	+2.0	1,480.4	8.28
13bb	do.	1935	Dn	15.3	1¼	Bs	N	N	O	do.	+2.0	1,457.1	6.53
14cc	do.	1935	Dr	20.2	1¼	Bs	N	N	O	do.	+2.3	1,466.5	12.02
27ba	do.	—	Dn	6.0	1¼	GI	N	N	O	do.	+3.2	1,458.78	6.32
30aa	—	—	Dr	38.0	18	GI	T	G	I	do.	+ .5	1,476.61	12.10
32bb	—	—	Dr	46.0	18	GI	T	G	I	Hole in turbine base.	.0	1,486.09	20.04
34dc	J. C. Ernst	—	Dr	65.2	—	—	T	E	I,O	Hole in pumphead.	+ .3	1,459.54	8.44
17- 2- 2cd	E. Schacher	—	Dr	43.9	3	I	N	N	O	Top edge check valve.	-4.0	1,484.34	2.11
4bc	Loup River Public Power District	1935	Dn	20.8	1¼	Bs	N	N	O	Top of pipe.	+3.1	1,510.42	12.62
24cb	do.	—	Dn	19.0	1¼	GI	N	N	O	do.	+3.0	1,489.51	13.70
25bc	do.	—	Dn	40.0	1¼	GI	N	N	O	do.	+1.6	1,511.65	33.92
17- 3-23ad	—	—	Dr	48.2	24	GI	VC	T	I,O	Edge of casing.	+ .6	—	15.49
Polk County													
14- 4-19ab	U. S. Geol. Survey	1946	Dn	13.0	1¼	GI	N	N	O	Top of pipe.	+1.0	1,627.55	5.38
15- 2- 4dc	—	1943	Dr	50.8	18	GI	T	T	I,O	Hole in turbine base.	+1.0	1,522.13	7.72
7bb	U. S. Geol. Survey	1946	Dr	13.0	1¼	I	N	N	O	Top of pipe.	+1.0	1,530.23	7.66
15- 3- 2aa	—	—	Dn	—	1¼	GI	-	W	S,A	Edge of cylinder.	+ .6	1,531.84	6.14
3dc	U. S. Geol. Survey	1947	Dn	9.5	1¼	GI	N	N	O	Top of pipe.	+1.0	—	5.82
9bc	--	1943	Dr	43.2	18	GI	T	T	I	Hole in turbine base.	.0	1,556.40	6.02
20cc	R. Norris	1936	Du	21.0	12	GI	VC	T	I,O	Top of steel beam.	+ .2	1,583.03	5.69
23dc	U. S. Geol. Survey	1947	Dn	13.6	1¼	GI	N	N	O	Top of pipe.	.0	—	5.38
29dc	—	—	Dr	39.2	18	GI	T	T	I	Hole in turbine base.	+ .4	1,595.12	12.08
15- 4-35dc	C. O. Carlson	—	—	80	24	—	VC	N	I,O	Base of 1-inch pipe.	+ .6	1,613.01	20.37
16- 1-14bb	J. Czafla	1936	Dn	13.0	1¼	I	N	N	O	Top of pipe.	+1.4	1,459.13	6.50
18cc	—	—	Dr	42	18	GI	T	T	I	Edge of discharge pipe.	+3.0	1,486.24	10.24
21dc	L. Hegl	1941	Dr	48.0	18	GI	T	G	I	Hole in turbine base.	.0	1,474.29	6.30
23bc	—	—	Dr	46.4	18	GI	T	G	I	do.	-0.6	1,474.44	6.17
34cc	—	1947	Dr	105.4	18	GI	N	N	I	Edge of casing.	+1.0	1,504.64	25.55
36cd	H. Bugham	1940	Dr	108	18	GI	T	G	I,O	End of discharge pipe.	+3.2	1,496.86	24.35
16- 2-23dc	R. Nitsch	1937	Dr	40	24	GI	VC	T	I,O	Top of steel beam.	+ .5	1,498.78	7.64
Saunders County													
A17- 5-23bb	U. S. Geol. Survey	1946	Dn	8.5	1¼	I	N	N	O	Top of pipe.	+1.0	1,285.06	2.23

See footnotes on following page.

1/ Wells in this table are arranged alphabetically by counties and numerically within each county. The well numbers are based on location with respect to General Land Office surveys of the area. The first numeral indicates the township, the second the range, and the third the section. The lower case letters that follow the section number indicate the position of the well within the section, the first letter indicating the quarter section and the second letter the quarter-quarter section. The letters a, b, c, and d are applied in counterclockwise direction, beginning with a in the northeast quadrant. The last numeral indicates the number of the well within the tract of land indicated by the last letter; but if only one well is inventoried within that tract, no number is shown. The numbers of wells located east of the 6th principal meridian, which passes through Columbus, are preceded by the capital letter A.

2/ Dr, drilled; Dn, driven; Du, dug.

3/ Reported depths below land surface are given in feet; measured depths are given in feet and tenths below measuring points.

4/ Bs, boiler steel; C, concrete; GI, galvanized iron; I, iron, T, tile; W, wood.

5/ C, horizontal centrifugal; Cy, cylinder; N, none; P, plunger; T, turbine; VC, vertical centrifugal.

6/ E, electric, G, direct connected or belted power unit; H, hand operated; N, none; T, tractor; W, windmill.

7/ A, abandoned; D, domestic; I, irrigation; O, observation; S, stock.

8/ All measurements made in March 1947.