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DEPARTMENT OF MINES
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GEOLOGICAL SURVEY OF CANADA
WATER SUPPLY PAPER No. 218

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF OAKDALE NO. 320 SASKATCHEWAN

By B. R. MacKay, H. N. Hainstock and G. Graham

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DEPARTMENT OF MINES

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GEOLOGICAL SURVEY

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GROUND WATER RESOURCES OF PART OF THE RURAL MUNICIPALITY OF OAKDALE NO. 320 SASKATCHEWAN

INTRODUCTION

Lack of rainfall during the years 1930 to 1934 over a large part of the Prairie Provinces brought about an acute shortage both in the larger supplies of surface water used for irrigation and the smaller supplies of ground water required for domestic purposes and for stock. In an effort to relieve the serious situation the Geological Survey began an extensive study of the problem from the standpoint of domestic uses and stock raising. During the field season of 1935 an area of 80,000 square miles, comprising all that part of Saskatchewan south of the north boundary of township 32, was systematically examined, records of approximately 60,000 wells were obtained, and 720 samples of water were collected for analyses. The facts obtained have been classified and the information pertaining to any well is readily accessible. The examination of so large an area and the interpretation of the data collected were possible because the bedrock geology and the Pleistocene deposits had been studied previously by McLearn, Warren, Rose, Stansfield, Wickenden, Russell, and others of the Geological Survey. The Department of Natural Resources of Saskatchewan and local well drillers assisted considerably in supplying several hundred well records. The base maps used were supplied by the Topographical Surveys Branch of the Department of the Interior.

Publication of Results

The essential information pertaining to the ground water conditions is being published in reports, one being issued for each municipality. Copies of these reports are being sent to the secretary treasurers of the municipalities and to certain Provincial and Federal Departments, where they can be consulted by residents of the municipalities or by other persons, or they may be obtained by writing direct to the Director, Bureau of Economic Geology, Department of Mines, Ottawa. Should anyone require more detailed information than that contained in the reports such additional information as the Geological Survey possesses can be obtained on application to the director. In making such request the applicant should indicate the exact location of the area by giving the quarter section, township, range, and meridian concerning which further information is desired.

The reports are written principally for farm residents, municipal bodies, and well drillers who are either planning to sink new wells or to deepen existing wells. Technical terms used in the reports are defined in the glossary,

How to Use the Report

Anyone desiring information about ground water in any particular locality should read first the part dealing with the municipality as a whole in order to understand more fully the part of the report that deals with the place in which he is interested. At the same time he should study the two figures accompanying the report. Figure 1 shows the surface and bedrock geology as related to the ground water supply, and Figure 2 shows the relief and the location and type of water wells. Relief is shown by lines of equal elevation called "contours". The elevation above sea-level

is given on some or all of the contour lines on the figure.

If one intends to sink a well and wishes to find the approximate depth to a water-bearing horizon, he must learn: (1) the elevation of the site, and (2) the probable elevation of the water-bearing bed. The elevation of the well site is obtained by marking its position on the map, Figure 2, and estimating its elevation with respect to the two contour lines between which it lies and whose elevations are given on the figure. Where contour lines are not shown on the figure, the elevations of adjacent wells as indicated in the Table of Well Records accompanying each report can be used. The approximate elevation of the water-bearing horizon at the well-site can be obtained from the Table of Well Records by noting the elevation of the water-bearing horizon in surrounding wells and by estimating from these known elevations its elevation at the well-site.[1] If the water-bearing horizon is in bedrock the depth to water can be estimated fairly accurately in this way. If the water-bearing horizon is in unconsolidated deposits such as gravel, sand, clay, or glacial debris, however, the estimated elevation is less reliable, because the water-bearing horizon may be inclined, or may be in lenses or in sand beds which may lie at various horizons and may be of small lateral extent. In calculating the depth to water, care should be taken that the water-bearing horizons selected from the Table of Well Records be all in the same geological horizon either in the glacial drift or in the bedrock. From the data in the Table

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[1] If the well-site is near the edge of the municipality, the map and report dealing with the adjoining municipality should be consulted in order to obtain the needed information about nearby wells.

of Well Records it is also possible to form some idea of the quality and quantity of the water likely to be found in the proposed well.

GLOSSARY OF TERMS USED

Alkaline. The term "alkaline" has been applied rather loosely to some ground-waters. In the Prairie Provinces, a water is usually described as "alkaline" when it contains a large amount of salts, chiefly sodium sulphate and magnesium sulphate in solution. Water that tastes strongly of common salt is described as "salty". Many "alkaline" waters may be used for stock. Most of the so-called "alkaline" waters are more correctly termed "sulphate waters".

Alluvium. Deposits of earth, clay, silt, sand, gravel, and other material on the flood-plains of modern streams and in lake beds.

Aquifer or Water-bearing Horizon. A water-bearing bed, lens, or pocket in unconsolidated deposits or in bedrock.

Buried pre-Glacial Stream Channels. A channel carved into the bedrock by a stream before the advance of the continental ice-sheet, and subsequently either partly or wholly filled in by sands, gravels, and boulder clay deposited by the ice-sheet or later agencies.

Bedrock. Bedrock, as here used, refers to partly or wholly consolidated deposits of gravel, sand, silt, clay, and marl that are older than the glacial drift.

Coal Seam. The same as a coal bed. A deposit of carbonaceous material formed from the remains of plants by partial decomposition and burial.

Contour. A line on a map joining points that have the same elevation above sea-level.

Continental Ice-sheet. The great ice-sheet that covered most of the surface of Canada many thousands of years age.

Escarpment. A cliff or a relatively steep slope separating level or gently sloping areas.

Flood-plain. A flat part in a river valley ordinarily above water but covered by water when the river is in flood.

Glacial Drift. The loose, unconsolidated surface deposits of sand, gravel, and clay, or a mixture of these, that were deposited by the continental ice-sheet. Clay containing boulders forms part of the drift and is referred to as glacial till or boulder clay. The glacial drift occurs in several forms:

(1) Ground Moraine. A boulder clay or till plain (includes areas where the glacial drift is very thin and the surface uneven).

(2) Terminal Moraine or Moraine. A hilly tract of country formed by glacial drift that was laid down at the margin of the continental ice-sheet during its retreat. The surface is characterized by irregular hills and undrained basins.

(3) Glacial Outwash. Sand and gravel plains or deltas formed by streams that issued from the continental ice-sheet.

(4) Glacial Lake Deposits. Sand and clay plains formed in glacial lakes during the retreat of the ice-sheet.

Ground Water. Sub-surface water, or water that occurs below the surface of the land.

Hydrostatic Pressure. The pressure that causes water in a well to rise above the point at which it is struck.

Impervious or Impermeable. Beds, such as fine clays or shale, are considered to be impervious or impermeable when they do not permit of the perceptible passage or movement of the ground water.

Pervious or Permeable. Beds are pervious when they permit of the perceptible passage or movement of ground water, as for example porous sands, gravel, and sandstone.

Pre-Glacial Land Surface. The surface of the land before it was covered by the continental ice-sheet.

Recent Deposits. Deposits that have been laid down by the agencies of water and wind since the disappearance of the continental ice-sheet.

Unconsolidated Deposits. The mantle or covering of alluvium and glacial drift consisting of loose sand, gravel, clay, and boulders that overlie the bedrock.

Water Table. The upper limit of the part of the ground wholly saturated with water. This may be very near the surface or many feet below it.

Wells. Holes sunk into the earth so as to reach a supply of water. When no water is obtained they are referred to as dry holes. Wells in which water is encountered are of three classes.

(1) Wells in which the water is under sufficient pressure to flow above the surface of the ground. These are called Flowing Artesian Wells.

(2) Wells in which the water is under pressure but does not rise to the surface. These wells are called Non-Flowing Artesian Wells.

(3) Wells in which the water does not rise above the water table. These wells are called Non-Artesian Wells.

NAMES AND DESCRIPTIONS OF GEOLOGICAL FORMATIONS, REFERRED TO IN THESE REPORTS

Wood Mountain Formation. The name given to a series of gravel and sand beds which have a maximum thickness of 50 feet, and which occur as isolated patches on the higher parts of Wood Mountain. This is the youngest bedrock formation and, where present, overlies the Ravenscrag formation.

Cypress Hills Formation. The name given to a series of conglomerates and sand beds which occur in the southwest corner of Saskatchewan, and rests upon the Ravenscrag or older formations. The formation is 30 to 125 feet thick.

Ravenscrag Formation. The name given to a thick series of light-coloured sandstones and shales containing one or more thick lignite coal seams. This formation is 500 to 1,000 feet thick, and covers a large part of southern Saskatchewan. The principal coal deposits of the province occur in this formation.

Whitemud Formation. The name given to a series of white, grey, and buff coloured clays and sands. The formation is 10 to 75 feet thick. At its base this formation grades in places into coarse, limy sand beds having a maximum thickness of 40 feet.

Eastend Formation. The name given to a series of fine-grained sands and silts. It has been recognized at various localities over the southern part of the province, from the Alberta boundary east to the escarpment of Missouri coteau. The thickness of the formation seldom exceeds 40 feet.

Bearpaw Formation. The Bearpaw consists mostly of incoherent dark grey to dark brownish grey, partly bentonitic shales, weathering light grey, or, in places where much iron

is present, buff. Beds of sand occur in places in the lower part of the formation. It forms the uppermost bedrock formation over much of western and southwestern Saskatchewan and has a maximum thickness of 700 feet or somewhat more.

Belly River Formation. The Belly River consists mostly of non-marine sand, shale, and coal, and underlies the Bearpaw in the western part of the area. It passes eastward and northeastward into marine shale. The principal area of transition is in the western half of the area where the Belly River is mostly thinner than it is to the west and includes marine zones. In the southwestern corner of the area it has a thickness of several hundred feet.

Marine Shale Series. This series of beds consists of dark grey to dark brownish grey, plastic shales, and underlies the central and northeastern parts of Saskatchewan. It includes beds equivalent to the Bearpaw, Belly River, and older formations that underlie the western part of the area.

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Oakdale, No. 320, comprises an area of 324 square miles and consists of nine townships, described as tps. 31, 32, and 33, ranges 22, 23, and 24, W. 3rd mer. This report covers only the southern six townships, or that area investigated by the field partyduring the summer of 1935. The centre of this area lies approximately 16 miles north of Kindersley and 34 miles east of the Alberta boundary. A branch line of the Canadian National railways crosses the municipality in a general northeast-southwest direction, and on it are located the hamlets of Beaufield, Coleville, and Driver, the chief trading centres of this part of the municipality.

The ground surface of the municipality is undulating, becoming more rolling in the northern part of the area. Buffalo coulée, a long, fairly wide and deep valley that contains a number of lakes, occurs in the northwestern corner of the area. The elevation in the valley floor is less than 2,200 feet above sea-level, but it rises to approximately 2,360 feet above sea-level in township 32, range 24. Except for two small areas shown on Figure 1 of the accompanying map, that are covered by moraine, the municipality is mantled by boulder clay or glacial till. In Buffalo coulée the glacial till is covered by Recent deposits of fine, lake sands and silts. Stones and small bouldors are not uncommon on the surface of the moraine- and till-covered areas. With the exception of the valley in the northwestern part of the area, no well-developed drainage courses are present in the municipality. Most of the drainage is into the numerous small sloughs and depressions that are particularly common throughout the moraine-covered areas. Most of the wells are deriving water from the unconsolidated deposits, but a number are thought to obtain their supplies from the Bearpaw bedrock formation.

Water-bearing Horizons in the Unconsolidated Deposits

The Recent sands and silts that cover the floor of Buffalo coulée in the northwestern part of the area should yield small supplies of ground water. These deposits are not thought to be more than 20 feet thick and the wells that obtain water from this source are usually less than 15 feet deep. Two wells on sec. 6, tp. 32, range 24, are obtaining water from these deposits at a depth of 12 feet, and it is reported that water can be obtained on sec. 30, tp. 31, range 24, within 5 feet of the surface. No other wells have been dug in these deposits. The wells sunk in the Recent deposits do not yield a large supply of water, but there is an adequate supply for domestic needs and usually for a few head of stock. The water should be suitable for drinking unless contaminated by surface water containing sewage. Care should be taken to see that wells dug in the base of the coulée are not contaminated by surface waters. Although no great difficulty should be experienced in obtaining small supplies of water from the Recent deposits, it is always advisable to first prospect the proposed well site with a small hand auger to ascertain the water-bearing possibilities. The small lakes in Buffalo coulée are used for watering stock. In sec. 22, tp. 32, range 24, a number of springs occur along the base of the coulée and the water from them is suitable for domestic purposes as well as for stock.

No great difference can be noted in the supply of ground water obtained in the areas that are covered by moraine and those covered by boulder clay or glacial till. Most of the wells dug in these deposits appear to be deriving their supply from scattered pockets of sand. In some wells, however, the aquifer is formed by gravel, whereas in others the type of material is unknown. The glacial drift throughout the area generally consists of a few feet of top soil, 20 to 30 feet of weathered clay that contains scattered

pockets of sand at or near its base, and 25 to 75 feet of compact, dark-coloured, unweathered clay that also contains scattered pockets of sand or gravel.

Throughout the area under discussion a number of wells are obtaining water from the scattered pockets of sand that occur at or near the base of the weathered zone of the glacial drift. These pockets are not continuous over large areas and they do not form a general water-bearing horizon. In two small areas in township 31, range 23, the deposits appear to be joined together and it is probable that in these areas they form fairly continuous water-bearing horizons. Over the remainder of the municipality, however, the pockets appear to be of small areal extent. The yield from the wells tapping these pockets is usually adequate for local needs. In periods of prolonged drought the supply is visibly affected and the yield from most of the wells decreased during the years 1930-35. In years of normal precipitation, however, the supply from such wells should not have to be supplemented from other sources. The water is usually hard and contains a considerable amount of mineral salts in solution, but it is being used for domestic purposes. It is advised that the upper 30 feet of the drift be prospected by means of a hand auger before the site of a shallow well is finally selected.

The pockets of sand in the unweathered zone of the glacial drift are also sources of supply for a large number of wells in this municipality. In the western part of township 31, range 22, a number of wells have encountered pockets that appear to extend fairly continuously over this area. In most of township 32, range 23, and the eastern part of township 32, range 24, the pockets appear to form a general and fairly continuous water-bearing horizon. Over the remainder of the area investigated the pockets of sand in the weathered part of the drift are sparsely distributed. The wells tapping the pockets vary from 50 to 90 feet deep, and the producing aquifers have

been tapped at elevations ranging from 2,260 to 2,300 feet above sea-level. The yield from a few wells that tap horizons in the unweathered zone of the drift are inadequate for all stock requirements, but the supply from most of the wells is more than sufficient for local needs. The water is usually under some hydrostatic pressure and often rises a considerable distance above the top of the aquifer. It is usually hard, and contains a considerable amount of mineral salts in solution, and some of the waters are recorded as being "alkaline". The water from most of the wells is being used for drinking.

In the area in the northeastern corner bordered on the southwest by the "A" boundary line shown on Figure 1 of the accompanying map a few wells are obtaining water from scattered pockets of sand that occur at depths ranging from 40 to 90 feet, or at elevations of 2,170 to 2,205 feet above sea-level. This area is a continuation of that outlined in the municipality to the east. The pockets appear to become more sparely distributed in the municipality of Oakdale. No great difficulty should be experienced, however, in tapping one of the pockets in the area outlined on the accompanying map.

Water-bearing Horizons in the Bedrock

The eastern halves of townships 31 and 32, range 22, are thought to be underlain by the Belly River formation, whereas the remainder of the area is thought to be underlain by the Bearpaw formation. The Bearpaw formation, however, is very thin. In some parts of the area the Bearpaw formation is believed to lie at a depth of 45 feet below the surface, but in other parts it lies at a depth of more than 125 feet. A number of wells throughout the area obtain water from the Bearpaw formation. The dark-coloured sands that form the aquifers for these wells are very fine, but they do not plug the well casings.

The "B" boundary line on the accompanying map outlines an area in which a number of wells are deriving their supplies of water from aquifers located at depths ranging from 50 to 125 feet below the surface, depending upon the elevation of the ground surface, or at elevations of 2,200 to 2,245 feet above sea-level. The wells appear to have tapped a common aquifer. This aquifer is thought to lie in the lower part of the Bearpaw formation or in the upper part of the underlying Belly River formation, but there is a slight possibility that it may be at or near the contact of the bedrock and the overlying boulder clay. The aquifer appears to dip slightly towards the southeast. The areal extent of the water-bearing horizon appears to be limited along the west and northwest, but it may extend considerably beyond the limits shown in the other directions. The water from the wells tapping this horizon is under pressure and in a small group of wells in the eastern part of township 31, range 24, the pressure is such as to cause the water to rise approximately 40 feet higher in elevation than that of the surrounding wells. The yield is sufficient for local needs. The water from some of the wells is fairly soft, whereas that from others is quite hard. It contains a considerable amount of mineral salts in solution, and in some instances it was recorded as being "alkaline". It is generally used for drinking as well as for stock. No trouble should be experienced in obtaining water from this horizon in the outlined area.

Throughout the remainder of the municipality small groups of wells apparently tap other or similar aquifers in the Bearpaw formation. These aquifers are of small areal extent and are not continuous over large areas. In secs. 5, 6, 8, and 20, tp. 31, range 24, water is obtained at depths of 60 to 115 feet, or at elevations of 2,145 to 2,190 feet above sea-level. In the western part of township 32, range 24, it is possible that the aquifers tapped by a number of wells are the same as that occurring in the outlined area. In township

32, range 22, three wells are deriving water from depths of 82, 84, and 97 feet, or at elevations of 2,158, 2,141 and 2,133 feet above sea-level.

Since all the wells that have been drilled into the bedrock in this area obtain water, it appears that the Bearpaw and Belly River formations contain water-bearing horizons throughout the municipality. The possibilities of obtaining water from these horizons are, therefore, considered to be very good.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 31, Range 22

The chief source of water supply in this township is from wells that have been sunk in the glacial drift. In the spring and early summer the stock are sometimes watered at sloughs that are found in the low-lying areas. Dams and dugouts for retaining run-off water have not been used to any great extent, since most of the wells yield adequate supplies for farm needs.

The glacial drift covering the surface of this township is composed principally of glacial till or boulder clay. A very small area in the northwestern corner of the township is covered by moraine. The difference in topographic relief amounts to less than 100 feet throughout the township, the elevations varying between 2,200 and 2,300 feet above sea-level. The ground surface is rolling and becomes nearly level towards the north. No difference is noticeable between the ground water conditions that exist in the deposits of moraine and boulder clay.

In general the glacial drift over this township consists in descending order, of 2 to 6 feet of top soil, 20 to 30 feet of weathered clay, and a heavy blue clay that extends to a depth of at least 100 feet below the surface. Numerous but discontinuous pockets of sand and gravel occur at or near the base of the weathered clay. Deposits of sand were also encountered in the blue clay at depths of 60 to 74 feet below the surface, and at depths of 80 to 100 feet below the surface.

Throughout the township a number of wells are deriving their water supply from the pockets of water-bearing sand or gravel that occur at or near the base of the weathered zone of the glacial drift. These pockets appear to form a fairly general, though non-continuous, water-bearing horizon. The supply obtained from this source is sufficient for local needs and although in many wells the yield

decreased during the drought period of 1930-34 the supply did not have to be supplemented from other sources. Before choosing a site for a shallow well it is advisable to test with a small auger in order to locate water-bearing sands or gravels. Isolated pockets of sand also occur at depths of 75 feet and less below the surface. These pockets do not appear to form either a general or a continuous water-bearing horizon, although no dry holes were recorded. When the drift at these depths has been more fully investigated general horizons may be found to exist. The supply from some of the wells tapping these deposits is inadequate for farm needs, and although some of the water was recorded as being "alkaline", it is being used for drinking.

Four wells, located in sections 2, 3, 8, and 10, were sunk to depths ranging from 80 to 100 feet below the surface and encountered sand aquifers at elevations of 2,155 to 2,178 feet above sea-level. The same aquifer may be common to the four wells and when more information is available a general water-bearing horizon may be found to exist at similar elevations to those mentioned above. It is possible that the aquifers supplying these wells are in the Bearpaw or Belly River formations both of which underlie the drift in this township. If such is the case the aquifer should be of considerable areal extent and should be tapped by other wells. The water from the wells is hard and recorded as being "alkaline", but that from three wells is used for drinking. The water is under some hydrostatic pressure. The supply from one well is insufficient for local needs.

On those farms where the wells yield inadequate supplies, it would be advisable to excavate dugouts or construct dams to retain the run-off water for stock use.

Township 31, Range 23

The chief source of water supply in this township is from wells sunk into the glacial drift or into the underlying Bearpaw formation. A few dugouts that retain run-off water for stock use

supplement the supply from the wells. Sloughs are also used for stock during part of the year.

The ground surface in this township is slightly rolling and a fairly wide, shallow ravine runs from the northeastern corner towards the southwest. Most of the township is mantled by glacial till or boulder clay, but small areas in section 6, and sections 25, 35, and 36, are covered by moraine. The elevation varies from 2,250 to 2,350 feet above sea-level.

The glacial drift mantling this township generally consists in descending order, of a few feet of top soil, 25 to 40 feet of weathered boulder clay containing scattered pockets of sand, a layer of sand or gravel approximately 2 feet thick that is fairly general in the northeastern part of the township and which is apparently continuous over small areas, and unweathered clay that contains scattered pockets of sand and gravel. No particular difference in the sequence of deposition can be noted in the moraine and till deposits, but as yet only one well has been dug in the moraine-covered area.

In the northeastern half of the township most of the wells are drawing their supply from sand pockets located at or near the base of the weathered zone of the glacial drift. In two small areas, one containing sections 13, 14, 23, and 24, and the other sections 28, 29, 31, 32, and 33, the pockets of sand appear to be fairly continuous. The yield from most of the wells is adequate for local needs, although during the drought of 1930-1934 the supply was noticeably decreased. The water from more than half the wells tapping these shallow deposits is reported as "alkaline", but it is being used for drinking with no apparent ill effects.

A few widely scattered wells are drawing water from sand pockets located in the lower or unweathered zone of the drift at depths ranging from 60 to 75 feet. There does not appear to be any continuity in the occurrence of these pockets, and although no dry

holes of this depth have been recorded it is possible that some may be dug before one of these pockets of sand is encountered. The water from this type of well is usually harder than that from the shallower wells and is recorded as being "alkaline", but it is used for drinking as well as for stock.

The "B" boundary line outlines an area in which a small group of wells obtain water from a sand aquifer at depths of 43 to 125 feet below the surface, or at elevations of 2,200 to 2,235 feet above sea-level. The dark-coloured sand that forms this water-bearing horizon is thought to be part of the Bearpaw formation, but it may possibly be part of the glacial drift that overlies the bedrock. The character of the water, however, supports the inference that it is part of the Bearpaw formation. The areal extent of the aquifer other than that shown on the map is unknown, but there appears to be little doubt that wells sunk within short distances outside the line shown will tap the water-bearing sand. It may be possible that the aquifer is of wide areal extent and that it underlies most of the township. The yields from two of the wells tapping this aquifer are insufficient for local needs and they must be supplemented by hauling. In the remainder of the wells the supply is adequate for all farm requirements. Some of the waters are fairly soft, whereas others are very hard, but they all contain a considerable amount of mineral salts in solution and some are recorded as being "alkaline". The water from one well is not being used for drinking. It is possible that other water-bearing horizons exist at greater depths in the Belly River formation which underlies the Bearpaw formation throughout the township.

Township 31, Range 24

In this township water is obtained from wells sunk in the glacial drift and in the underlying bedrock. The use of dugouts is not common. When convenient, sloughs are often used for watering stock, but the sloughs become dry in early summer unless there is abundant precipitation.

The ground surface of this township is slightly rolling and there is a general slope from the west to the east. A narrow valley, known locally as Buffalo coulée, cuts through the northwestern part of the township. Most of the township is covered by glacial till or boulder clay, but a small area in the southeastern corner is mantled by moraine. In the valley in the northwestern corner, the glacial till or boulder clay is overlain by Recent lake sands.

No wells have been sunk in the Recent deposits along Buffalo coulée, but tests show that a deposit of quicksand exists below the top soil and that water can be obtained on the SE. $\frac{1}{4}$, section 30, at an approximate depth of 4 feet below the surface. In other parts of the coulée gravel may underlie the top soil. These porous deposits may lie at greater depths than those on section 30, but they will probably contain water. It is reasonable to assume that water-bearing deposits occur at the contact of the Recent and glacial deposits, although no information was obtained.

The glacial drift varies from 60 to approximately 125 feet in thickness. The upper part of the deposit consists of weathered clay that contains a few scattered pockets of sand or gravel. A compact, unweathered clay usually underlies the weathered zone. In places it is underlain by a deposit of dark-coloured sand that is assumed to belong to the Bearpaw formation.

A few wells tap the scattered pockets of sand and gravel that occur in the weathered boulder clay and in the upper part of the unweathered boulder clay. These pockets are sparsely distributed. The yield from the wells tapping the pockets is usually sufficient for local requirements, and the water can be used for drinking although it contains a considerable amount of mineral salts in solution. The glacial drift does not appear to contain many water-bearing deposits and most of the water supply is assumed to be coming from sand beds in the underlying bedrock. The "B" boundary line on the accompanying

map outlines an area in which a number of wells are obtaining water from an aquifer or aquifers at depths of 50 to 125 feet below the surface, or at elevations of 2,200 to 2,245 feet above sea-level. One well, on section 24, is drawing water from an aquifer at an elevation of 2,260 feet above sea-level, but it is assumed to belong to the above group. It is not definitely known if the sand that forms the aquifers of this group of wells is at the contact of the drift and the bedrock or if it lies within the bedrock. It is assumed, however, to belong to the Bearpaw formation. The character of the water in so far as its mineral salt content is concerned, is more characteristic of water from the bedrock than from the drift. Since the water in a few of the wells in the west-central part of the outlined area is under sufficient hydrostatic pressure to rise approximately 40 feet higher than the water from the other wells inside the boundary line, two aquifers may occur within this area. In any eventno difficulty should be experienced in obtaining water from the aquifer, or aquifers, that exist in this area. The yield from two of the wells tapping these water-bearing deposits is insufficient for local needs, but in the remainder of the wells the supply is adequate. The water varies from moderately soft to very hard and that from a few wells was reported as being "alkaline", but in no well was the water so highly mineralized as to be unfit for drinking.

Four wells, located in the NW. $\frac{1}{4}$, section 5, the NE. $\frac{1}{4}$, section 6; the SW. $\frac{1}{4}$, section 8, and the SW. $\frac{1}{4}$, section 20, tap aquifers at depths of 60, 60, 90, and 115 feet below the surface, respectively. The aquifers are at elevations varying from 2,145 to 2,190 feet above sea-level and are thought to be formed by sand deposits in the Bearpaw formation. The water rises to an elevation of approximately 2,200 feet in each well, and it appears that the four wells have tapped a common aquifer. This aquifer may be of considerable areal extent and may underlie the aquifer that occurs in the area

outlined by the "B" boundary line. The yield in all the wells is sufficient for farm needs. The water is hard, contains mineral salts in solution, and with one exception can be used for drinking. It is probable that other aquifers exist at greater depths in the bedrock.

The use of dugouts and dams to collect run-off water is recommended as a means of supplementing the supply of ground water obtained.

Township 32, Range 22

The water supply in this township is derived from a number of wells sunk in the glacial deposits and from three wells sunk into the underlying bedrock formation. A dam in section 20 has not been dry since 1933, and retains an abundant supply of water for stock use. Sloughs can be used also for stock.

The difference in elevation in the township is less than 100 feet. The ground surface is slightly rolling, and in the north-western part of the township is characterized by undrained depressions. Boulder clay or glacial till mantles the entire area. In general the boulder clay consists, in descending order, of a few feet of top soil, 15 to 25 feet of weathered clay that sometimes contains isolated pockets of sand at or near its base, and 20 to 40 feet of unweathered, compact, dark-coloured clay that also contains scattered pockets of sand at or near its base. The Belly River formation is thought to underlie the unweathered clay in the northeastern part of the township. Throughout the remainder of the area the drift is underlain by the Bearpaw formation that immediately overlies the Belly River formation.

A few wells in this township derive their supply of water from the scattered pockets of sand that occur at or near the base of the weathered zone of the drift. These pockets are usually tapped at depths of 20 to 35 feet below the surface. They do not show any continuity in their occurrence and dry holes may be sunk before a producing well is obtained. Time and expense can be saved if such

pockets are located by a small hand auger prior to digging a well. The supply from these wells is usually sufficient for domestic needs and a few head of stock. It depends directly on annual precipitation and during prolonged drought periods the yield is noticeably decreased. The water, as a rule, can be used for drinking as well as for stock.

In the northeastern part of the township a number of wells are obtaining water from sand aquifers that are located near the base of the drift. These wells vary from 40 to 104 feet deep and the aquifers occur at elevations of 2,170 to 2,205 feet above sea-level. In the area lying to the northeast of the "A" boundary line these pockets are of frequent occurrence, and the aquifer appears to be fairly continuous. Little difficulty should be experienced in obtaining an adequate supply of water from wells sunk below 2,180 feet above sea-level in this area. It appears improbable that the water horizon extends farther to the southwest than shown, since three wells outside the outlined area had to be sunk considerably deeper before an adequate supply of water was obtained. The water from the wells located within the outlined area is under some hydrostatic pressure, and only one well yields a supply that is inadequate for local needs. The supply in this well might be increased by deepening the well. The water, although mineralized, is being used for drinking without any apparent ill effects.

Three wells, located in sections 14, 20, and 30, tap aquifers at depths of 82, 84, and 97 feet, respectively, or at elevations of 2,158, 2,141, and 2,133 feet above sea-level. A layer of hard shale was reported to occur at an elevation of 2,159 feet above sea-level in the well located in section 14, and water was encountered in a very fine sand underlying it. In the well located in section 20 the producing sand immediately underlies approximately 80 feet of boulder clay. On section 30 coal was encountered at the bottom of the well. The aquifers for these wells are probably

different, although they lie at a fairly uniform elevation. The well in section 14 apparently is in the Bearpaw, that in section 20 may be in the drift, and that in section 30 has probably passed through the Bearpaw and encountered the underlying Belly River formation. It is reasonable to assume that each of these aquifers is of considerable areal extent, and one or more of them should be tapped by other wells sunk to the required depths. The water is under hydrostatic pressure and the yield is more than sufficient for local needs. The water from the well on section 14 is recorded as being moderately soft, whereas that from the others is hard. It contains mineral salts in solution, but not in sufficient concentration to render the water unfit for drinking.

Township 32, Range 23

The water supply in this township is derived from wells sunk in the glacial drift. In seasons of average precipitation sloughs are used for watering stock. The use of dugouts is uncommon, since most of the wells yield a sufficient supply for stock needs.

The surface of this township is quite undulating in the northern part, but it becomes fairly level in the southern part. The elevation decreases from approximately 2,350 feet in the west to 2,250 feet above sea-level in the east. A narrow area running from the southeastern corner towards the west-central part is covered by moraine and the remainder of the township is mantled by boulder clay or glacial till. The moraine-covered area is characterized by a number of sloughs or depressions. The character of the deposits in the area covered by moraine and that covered by boulder clay or till are very similar and no wide variation should be found in the ground water conditions in these areas. Where sloughs or depressions occur, and they are more common in the moraine-covered area than elsewhere in township, it should be possible to obtain small, intermittent supplies of water from wells sunk near these depressions.

In general, the glacial deposits of this township consist of a few feet of top soil, 25 feet or more of weathered clay that contains scattered deposits of sand or gravel, and unweathered clay that extends to depths in excess of 80 feet below the surface and which contains scattered pockets of sand or gravel.

A few wells obtain water at depths of 25 to 30 feet below the surface, from scattered pockets of sand and gravel located at or near the base of the weathered zone of the glacial drift. These pockets are discontinuous and sparsely distributed and show no correlation in their occurrence. On section 10 the two wells may be drawing from one fairly large pocket of gravel, but it is more probable that each well is deriving its supply from an individual pocket. The supply from the shallow wells is not large, but is generally sufficient for domestic needs and a few head of stock. It is readily affected by continued periods of drought. The well on section 3 yields a supply that is only sufficient for domestic needs, but another well on the same quarter section is used to supplement the supply. The water from these wells is generally not under hydrostatic pressure. The water from most of these wells can be used for drinking as well as for stock, but one well on section 3 is recorded as being used only for stock.

The remainder of the wells in this township are deriving their supply from scattered pockets of sand in the unweathered zone of the glacial drift at depths ranging from 40 to 80 feet below the surface, or at elevations ranging from 2,200 to 2,300 feet above sea-level. Most of the pockets that have been tapped by wells, however, occur at an elevation of approximately 2,280 feet above sea-level. In parts of the township there appears to be some continuity in the deposits, but there does not appear to be an extensive water-bearing deposit of sand. Since the aquifer in some of the wells is formed by a dark-coloured sand, it is possible that some of the water may be coming from the upper part of the bedrock, although all the wells in

this township are assumed to be drawing their supply from the lower part of the drift. The water from most of the wells is under some hydrostatic pressure and the supply is adequate for local requirements. The water contains a considerable amount of mineral salts in solution, and that from some wells is recorded as being "alkaline". The water from the well on section 14 is not used for drinking as it is laxative. The wells on sections 5 and 6 also are used only for stock purposes.

No wells have been drilled to greater depths than 80 feet in this township, but water-bearing horizons probably occur in the Belly River formation, and possibly in the Bearpaw formation which overlies the Belly River throughout the township.

Township 32, Range 24

The supply of water in this township is obtained mainly from wells that are sunk in the glacial drift and underlying bedrock. The supply from the wells is supplemented to some extent by springs and small lakes that occur along or in Buffalo coulée. During part of the year sloughs supply small amounts of water for stock use.

The ground surface, except where cut by Buffalo coulée, a wide, deep ravine that runs from the southwestern corner towards the centre of the northern boundary, is quite level. The maximum elevation of approximately 2,400 feet above sea-level is attained in the north-western corner and the minimum of less than 2,200 feet above sea-level occurs in Buffalo coulée. Section 13, and part of section 24, are covered by moraine, whereas the remainder of the township is mantled by glacial till or boulder clay. Along the floor of Buffalo coulée the boulder clay is overlain by Recent deposits of sand and sandy silts.

The Recent deposits have not been fully prospected for water, but small supplies of water should be obtained from them at shallow depths. A number of small, intermittent springs on section 22 are reported to yield a fair supply of water. Other springs no doubt occur

along the coulée. The springs should supply a sufficient amount of water for a large number of stock during part of the year. The small lakes located along the valley should also prove a source of supply for stock. Small dams could be economically constructed in some of the small tributary coulées and a supply of run-off water retained.

The top soil of the drift-covered area varies from a light, sandy, to a heavy, clay loam that contains stones. Pockets of sand and gravel occur in the weathered zone of the drift, but it is not known to what depth this zone extends. Scattered pockets of sand also occur in the unweathered part of the drift and in the eastern part of the township they are numerous. The Bearpaw formation immediately underlies the drift throughout this township.

Along the eastern part of the township a number of wells are obtaining water from sand aquifers that occur at depths ranging from 40 to 90 feet below the surface. The variation in depth is due in part to the difference in surface elevation. The wells may be tapping a common aquifer. Little difficulty should be experienced in obtaining an adequate supply of water in this area. An ample supply of water under some pressure is obtained from the wells, and the water is hard and in a few wells it is recorded as "alkaline", but it is being used for drinking with no apparent ill effects. This aquifer is not encountered to the west of Buffalo coulée.

One well located on the NE. $\frac{1}{4}$, section 22, is deriving its supply from a sand aquifer that occurs at a depth of 100 feet, or at an elevation of 2,240 feet above sea-level. The extent of this aquifer is unknown, but it may be tapped by other wells should they be sunk in this immediate vicinity. This well yields an abundant supply of hard, mineralized water that is suitable for both household and stock purposes. The hydrostatic pressure is sufficient to cause the water to rise to a point 40 feet above the aquifer.

Four wells, located on the SW. $\frac{1}{4}$, section 6, SW. $\frac{1}{4}$, section 17, SE. $\frac{1}{4}$, section 18, and NW. $\frac{1}{4}$, section 30, obtain water from depths of 120, 70, 82, and 114 feet, respectively. The aquifers are thought

to occur in the Bearpaw formation, but may be tapping the Belly River formation that immediately underlies the Bearpaw throughout the township. The elevation of the aquifers ranges from 2,198 to 2,231 feet above sea-level. If the same aquifer is common to the four wells it may dip towards the south. The water is under hydrostatic pressure and rises to points 60 to 100 feet below the surface. The areal extent of the aquifer is unknown, but it is probable that it extends over most of the area lying west of Buffalo coulée. The supply is abundant and although the water contains mineral salts in solution it is suitable for domestic use.

A hole located in the NW. $\frac{1}{4}$, section 31, was bored to a depth of 110 feet, at which depth stones were encountered and the digging discontinued. If this well were deepened 30 to 50 feet it is probable that water would be encountered.

A well located on the NW. $\frac{1}{4}$, section 21, encountered an aquifer in the bedrock at a depth of 127 feet, or at an elevation of 2,123 feet above sea-level. The aquifer is composed of sand and underlies 126 feet of yellow or blue clay and 1 foot of very hard shale. The areal extent of this aquifer is unknown. The supply of water is more than adequate for farm needs, and it is under some hydrostatic pressure. The water is recorded as being "alkaline" and although it contains iron and other mineral salts in solution it is used for drinking.

STATISTICAL SUMMARY OF WELL INFORMATION IN PART OF THE RURAL MUNICIPALITY OF OAKDALE NO. 320, SASKATCHEWAN.

West of 3rd mer. Township / Range	31 / 22	31 / 23	31 / 24	32 / 22	32 / 23	32 / 24	Total No. in Municipality
Total No. of Wells in Township	22	36	28	22	22	23	153
No. of wells in bedrock	0	13	21	4	0	5	43
No. of wells in glacial drift	22	23	7	18	22	17	109
No. of wells in alluvium	0	0	0	0	0	1	1
Permanency of Water Supply							
No. with permanent supply	22	36	28	22	22	20	150
No. with intermittent supply	0	0	0	0	0	0	0
No. dry holes	0	0	0	0	0	3	3
Types of Wells							
No. of flowing artesian wells	0	0	0	0	0	0	0
No. of non-flowing artesian wells	14	21	19	16	17	13	100
No. of non-artesian wells	8	15	9	6	5	7	50
Quality of Water							
No. with hard water	20	33	19	19	19	18	128
No. with soft water	2	3	9	3	3	2	22
No. with salty water	0	0	0	0	0	0	0
No. with "alkaline" water	14	15	9	10	7	6	61
Depths of Wells							
No. from 0 to 50 feet deep	15	20	3	12	12	11	73
No. from 51 to 100 feet deep	7	12	17	9	10	7	62
No. from 101 to 150 feet deep	0	4	8	1	0	5	18
No. from 151 to 200 feet deep	0	0	0	0	0	0	0
No. from 201 to 500 feet deep	0	0	0	0	0	0	0
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	0
How the Water is Used							
No. usable for domestic purposes	20	33	27	18	18	18	134
No. not usable for domestic purposes	2	3	1	4	4	2	16
No. usable for stock	22	36	28	21	22	20	149
No. not usable for stock	0	0	0	1	0	0	1
Sufficiency of Water Supply							
No. sufficient for domestic needs	22	36	28	22	22	20	150
No. insufficient for domestic needs	0	0	0	0	0	0	0
No. sufficient for stock needs	19	30	25	17	21	18	130
No. insufficient for stock needs	3	6	3	5	1	2	20

ANALYSES AND QUALITY OF WATER

General Statement

Samples of water from representative wells in surface deposits and bedrock were taken for analyses. Except as otherwise stated in the table of analyses the samples were analysed in the laboratory of the Borings Division of the Geological Survey by the usual standard methods. The quantities of the following constituents were determined; total dissolved mineral solids, calcium oxide, magnesium oxide, sodium oxide by difference, sulphate, chloride, and alkalinity. The alkalinity referred to here is the calcium carbonate equivalent of all acid used in neutralizing the carbonates of sodium, calcium, and magnesium. The results of the analyses are given in parts per million--that is, parts by weight of the constituents in 1,000,000 parts of water; for example, 1 ounce of material dissolved in 10 gallons of water is equal to 625 parts per million. The samples were not examined for bacteria, and thus a water that may be termed suitable for use on the basis of its mineral salt content might be condemned on account of its bacteria content. Waters that are high in bacteria content have usually been polluted by surface waters.

Total Dissolved Mineral Solids

The term "total dissolved mineral solids" as here used refers to the residue remaining when a sample of water is evaporated to dryness. It is generally considered that waters that have less than 1,000 parts per million of dissolved solids are suitable for ordinary uses, but in the Prairie Provinces this figure is often exceeded. Nearly all waters that contain more than 1,000 parts per million of total solids have a taste due to the dissolved mineral matter. Residents

accustomed to the waters may use those that have much more than 1,000 parts per million of dissolved solids without any marked inconvenience, although most persons not used to highly mineralized water would find such waters highly objectionable.

Mineral Substances Present

Calcium and Magnesium

The calcium (Ca) and magnesium (Mg) content of water is dissolved from rocks and soils, but mostly from limestone, dolomite, and gypsum. The calcium and magnesium salts impart hardness to water. The magnesium salts are laxative, especially magnesium sulphate (Epsom salts, $MgSO_4$), and they are more detrimental to health than the lime or calcium salts. The calcium salts have no laxative or other deleterious effects. The scale found on the inside of steam boilders and tea-kettles is formed from these mineral salts.

Sodium

The salts of sodium are next in importance to those of calcium and magnesium. Of these, sodium sulphate (Glauber's salt, Na_2SO_4) is usually in excess of sodium chloride (common salt, NaCl). These sodium salts are dissolved from rocks and soils. When there is a large amount of sodium sulphate present the water is laxative and unfit for domestic use. Sodium carbonate (Na_2CO_3) "black alkali", sodium sulphate "white alkali", and sodium chloride are injurious to vegetation.

Sulphates

Sulphates (SO_4) are one of the common constituents of natural water. The sulphate salts most commonly found are sodium sulphate, magnesium sulphate, and calcium sulphate ($CaSO_4$). When the water contains large quantities of the sulphate of sodium it is injurious to vegetation.

Chlorides

Chlorides are common constituents of all natural water and are dissolved in small quantities from rocks. They usually occur as sodium chloride and if the quantity of salt is much over 400 parts per million the water has a brackish taste.

Iron

Iron (Fe) is dissolved from many rocks and the surface deposits derived from them, and also from well casings, water pipes, and other fixtures. More than 0.1 part per million of iron in solution will settle as a red precipitate upon exposure to the air. A water that contains a considerable amount of iron will stain porcelain, enamelled ware, and clothing that is washed in it, and when used for drinking purposes has a tendency to cause constipation, but the iron can be almost completely removed by aeration and filtration of the water.

Hardness

Calcium and magnesium salts impart hardness to water. Hardness of water is commonly recognized by its soap-destroying powers as shown by the difficulty of obtaining lather with soap. The total hardness of a water is the hardness of the water in its original state. Total hardness is divided into "permanent hardness" and "temporary hardness". Permanent hardness is the hardness of the water remaining after the sample has been boiled and it represents the amount of mineral salts that cannot be removed by boiling. Temporary hardness is the difference between the total hardness and the permanent hardness and represents the amount of mineral salts that can be removed by boiling. Temporary hardness is due mainly to the bicarbonates of calcium and magnesium and iron, and permanent hardness to the sulphates and chlorides of calcium and magnesium. The permanent hardness

can be partly eliminated by adding simple chemical softeners such as ammonia or sodium carbonate, or many prepared softeners. Water that contains a large amount of sodium carbonate and small amounts of calcium and magnesium salts is soft, but if the calcium and magnesium salts are present in large amounts the water is hard. Water that has a total hardness of 300 parts per million or more is usually classed as excessively hard. Many of the Saskatchewan water samples have a total hardness greatly in excess of 300 parts per million; when the total hardness exceeded 3,000 parts per million no exact hardness determination was made. Also no determination for temporary hardness was made on waters having a total hardness less than 50 parts per million. As the determinations of the soap hardness in some cases were made after the samples had been stored for some time, the temporary hardness of some of the waters as they come from the wells probably is higher than that given in the table of analyses.

Analyses of Water Samples from Part of the Municipality of Oakdale, No. 320, Saskatchewan

LOCATION						Depth of Well, Ft.	Total dis'vd solids	HARDNESS				CONSTITUENTS AS ANALYSED					CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS							Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alka-linity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	
1	NW.	10	31	23	3	110	2,360	90	20	70	26	655	10	25	1,185	1,146	2,477	18		52		609	1,755	43	⁎2
2	SW.	14	31	24	3	120	1,700	200	50	150	13	495	10	43	873	802	1,811	18		90		392	1,290	21	⁎2
3	NW.	30	32	24	3	114	920	580	420	160	14	630	140	83	164	225	872	251		173		183	242	23	⁎2

Water samples indicated thus, ⁎2, are from bedrock, Bearpaw formation.
Analyses are reported in parts per million.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

No samples of water from the Recent deposits or from the glacial drift in the municipality of Oakdale, No. 320, were taken for analysis. The following discussion is based on the properties of the water as reported in the field and on the results of analyses of samples taken in adjoining municipalities.

Two wells sunk into the Recent deposits on sec. 6, tp. 32, range 24, yield water that is used only for stock. These waters probably contain a large amount of mineral salts in solution, and Na_2SO_4 (Glauber's salt) and $MgSO_4$ (Epsom salts) probably are among the salts that are most highly concentrated. In other municipalities it has been found that the waters from Recent deposits vary greatly in quality within short distances. With this in mind the water from the two wells mentioned above may not be representative of the type of water to be expected from all wells sunk in these deposits.

The character of the water from the glacial deposits also varies widely within narrow limits, and it does not follow that because the water from one well has been found unfit for use that a second well sunk on the same quarter section will also yield water that is unfit for use. Generally speaking, the wells of shallow depth yield less highly mineralized water than those sunk to greater depths. The mineral salts commonly found in waters from the glacial drift are Na_2SO_4 (Glauber's salt), $CaSO_4$ (calcium sulphate), $CaCO_3$ (calcium carbonate), and $MgSO_4$ (magnesium sulphate or Epsom salts). When the first and fourth mentioned salts are concentrated the waters usually have a laxative effect upon those not accustomed to their continued use, and they may cause scour in stock. The water from wells that are being used only for stock in this municipality probably contain a large amount of Glauber's salt and Epsom salts. Iron salts are commonly found in water from the glacial drift, but if waters containing this salt are allowed to stand for a considerable period before using much of the iron will be precipitated.

Water from the Bedrock

Three samples of water from wells that are assumed to tap aquifers in the Bearpaw formation were analysed and the results are listed in the accompanying table. Samples 1 and 2 should be fairly representative of the water obtained in the area outlined by the "B" boundary line on the accompanying map. The first two samples are relatively soft, and it will be noted that the waters contain a large percentage of sodium salts in solution. The total dissolved solid content is not excessive, and although there is a concentration of Na_2SO_4(Glauber's salt) in both samples 1 and 2 the water should be suitable for domestic use as well as for stock. The presence of Na_2CO_3(sodium carbonate or "black alkali"), however, may prove injurious to vegetation if the water is used for irrigation. Sample 3 may be representative of the waters obtained from wells outside the "B" boundary line. It is hard and the mineral salt content is particularly low. Such a water should prove very suitable for all farm needs. When a water obtained from the bedrock is suitable only for stock it is probable that Na_2SO_4(Glauber's salt) and $MgSO_4$ (Epsom salts) are abundant.

WELL RECORDS—Rural Municipality of OAKDALE NO. 320, SASKATCHEWAN

B 4-4
R. 7526

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE: Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED: Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
1	SE.	2	31	22	3	Bored	80	2,245	- 40	2,205	80	2,165	Glacial sand	Hard, clear, "alkaline" iron	41	D, S	Insufficient for 12 head stock.
2	SW.	2	"	"	"	Bored	24	2,220	- 6	2,214	16	2,204	Glacial sand	Soft, clear	44	D, S	Oversufficient for local needs.
3	NW.	3	"	"	"	Bored	87	2,265	- 17	2,248	87	2,178	Glacial sand	Hard, clear, "alkaline" iron	41	D, S	Sufficient for 12 head stock.
4	NE.	4	"	"	"	Bored	68	2,280	- 38	2,242	68	2,212	Glacial sand	Hard, clear, iron	41	D, S	Sufficient for 20 head stock.
5	SE.	4	"	"	"	Bored	48	2,265	- 22	2,243	48	2,217	Glacial sand	Hard, clear, iron	41	D, S	Sufficient for local needs.
6	SW.	5	"	"	"	Bored	32	2,270	- 13	2,257	32	2,238	Glacial sand	Hard, clear, "alkaline"	42	D, S	Sufficient for 15 head stock.
7	NE.	6	"	"	"	Bored	40	2,268	- 22	2,246	40	2,228	Glacial sand	Hard, clear, "alkaline"	42	D, S	Sufficient only for 16 head stock.
8	SW.	8	"	"	"	Bored	100	2,265	- 20	2,245	100	2,165	Glacial sand	Hard, clear, "alkaline"	41	D, S	Sufficient for local needs.
9	NW.	10	"	"	"	Bored	74	2,265	- 64	2,201	74	2,191	Glacial sand	Hard, clear, "alkaline" iron	42	D, S	Insufficient for 4 head stock.
10	NE.	10	"	"	"	Bored	95	2,250			95	2,155	Glacial sand	Hard, clear, "alkaline" iron	41	S	Sufficient for 25 head stock.
11	NW.	17	"	"	"	Dug	32	2,270	- 27	2,243	27	2,243	Glacial sand	Hard, clear, "alkaline" iron	42	D, S	Sufficient for 12 head stock.
12	NE.	19	"	"	"	Bored	50	2,285	- 20	2,265	50	2,235	Glacial sand	Hard, clear, "alkaline" iron	41	D, S	Sufficient for 30 head stock.
13	NE.	20	"	"	"	Dug	28	2,275	- 26	2,249	28	2,247	Glacial sand	Hard, clear	42	D, S	Sufficient for 35 head stock.
14	SW.	21	"	"	"	Dug	22	2,260	- 20	2,240	22	2,238	Glacial sand	Hard, clear	42	D, S	Sufficient for 35 head stock.
15	NW.	25	"	"	"	Dug	39	2,245	- 29	2,216	39	2,206	Glacial sand	Hard, clear, "alkaline" iron	42	D, S	Sufficient for 25 head stock.
16	NE.	25	"	"	"	Dug	60	2,248			60	2,188	Glacial sand	Hard, clear, "alkaline" iron	41	S	Sufficient for 25 head stock.
17	SW.	28	"	"	"	Dug	26	2,270			24	2,246	Glacial sand	Hard, clear	42	D, S	Sufficient for 25 head stock.
18	SW.	30	"	"	"	Bored	50	2,287	- 25	2,262	50	2,237	Glacial drift	Hard, clear, "alkaline" iron	41	D, S	Sufficient for local needs.
19	NE.	32	"	"	"	Bored	28	2,257	- 20	2,237	28	2,229	Glacial sand	Hard, clear	42	D, S	Sufficient for 30 head stock.
20	SW.	32	"	"	"	Bored	41	2,265	- 12	2,253	41	2,224	Glacial gravel	Soft, clear	42	D, S	Sufficient for local needs.
21	NW.	32	"	"	"	Dug	23	2,280	- 19	2,261	23	2,257	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
22	NE.	34	"	"	"	Bored	27	2,240	- 22	2,218	27	2,213	Glacial sand	Hard, clear, "alkaline"	42	D, S	Sufficient for 30 head stock.
1	SE.	4	31	23	3	Bored	116	2,290	- 90	2,200	90	2,200	Bearpaw? sand	Hard, clear, "alkaline" iron	41	D, S	Sufficient for 8 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of OAKDALE NO.320, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
2	NE.	4	31	23	3	Bored	60	2,270	- 30	2,240	60	2,210	Bearpaw? sand	Soft,clear	42	D, S	Sufficient for 20 head stock.
3	SW.	5	"	"	"	Bored	63	2,295	- 40	2,255	63	2,232	Bearpaw? sand	Hard,clear, iron	40	D, S	Sufficient for 20 head stock.
4	SE.	6	"	"	"	Bored	60	2,270	- 40	2,230	60	2,210	Bearpaw? sand	Hard,clear	41	D, S	Sufficient for 18 head stock.
5	NE.	6	"	"	"	Bored	60	2,280	- 35	2,245	60	2,220	Bearpaw? sand	Hard,clear	41	D, S	Sufficient for 20 head stock.
6	SE.	7	"	"	"	Bored	55	2,280	- 35	2,245	55	2,225	Bearpaw? sand	Soft,clear, iron	41	D, S	Sufficient for 20 head stock.
7	SW.	8	"	"	"	Bored	60	2,295	- 48	2,247	60	2,235	Bearpaw? sand	Hard,clear, iron	41	D, S	Sufficient for 70 head stock.
8	NW.	10	"	"	"	Bored	110	2,290	- 50	2,240	110	2,180	Bearpaw? blue sand	Soft,cloudy	42	D, S	Sufficient for 35 head stock. #
9	SW.	13	"	"	"	Dug	30	2,315	- 21	2,294	21	2,294	Glacial sand	Hard,clear, "alkaline", iron	42	D, S	Sufficient for 40 head stock.
10	NW.	14	"	"	"	Bored	40	2,315	- 20	2,295	40	2,275	Glacial drift	Hard,clear, iron	41	D, S	Sufficient for 12 head stock; was a 25-foot well, now filled in.
11	NW.	15	"	"	"	Bored	42	2,280	- 30	2,250	42	2,238	Glacial sand	Hard,clear, "alkaline", iron	42	D, S	Sufficient for 20 head stock.
12	NE.	16	"	"	"	Dug	25	2,280	- 20	2,260	20	2,260	Glacial sand	Hard,clear,	43	D, S	Sufficient for local needs.
13	SW.	16	"	"	"	Bored	43	2,255	- 26	2,229	43	2,212	Bearpaw? sand	Hard,cloudy, "alkaline", iron	41	D, S	Sufficient for 8 head stock.
14	NE.	17	"	"	"	Bored	100	2,290	- 38	2,252	90	2,200	Bearpaw? sand	Hard,cloudy, iron	42	D, S	Sufficient for 8 head stock.
15	NE.	18	"	"	"	Bored	114	2,320	- 74	2,246	114	2,206	Bearpaw? sand	Hard,clear, "alkaline", iron	41	S	Sufficient for 40 head stock.
16	SW.	18	"	"	"	Bored	65	2,340	- 50	2,290	65	2,275	Glacial drift	Hard,clear, "alkaline", iron	41	D, S	Sufficient only for 15 head stock.
17	SW.	20	"	"	"	Dug & Drilled	125	2,325	- 70	2,255	125	2,200	Bearpaw? formation	Hard,clear, iron	41	D, S	Sufficient only for 6 head stock.
18	NW.	20	"	"	"	Bored	100	2,305			100	2,205	Bearpaw? sand	Hard,clear, iron	41	D, S	Sufficient for 35 head stock.
19	NE.	20	"	"	"	Bored	30	2,285	- 26	2,259	26	2,259	Glacial sand	Hard,clear, "alkaline", iron	42	D, S	Yields ½ barrel every 15 minutes.
20	NW.	21	"	"	"	Bored	75	2,315	- 25	2,290	75	2,240	Glacial sand	Hard,clear, "alkaline", iron	40	S	Sufficient for 20 head stock.
21	NW.	23	"	"	"	Bored	30	2,300	- 25	2,275	25	2,275	Glacial sand	Hard,clear, "alkaline", iron	41	D, S	Sufficient for 20 head stock.
22	NW.	24	"	"	"	Dug	30	2,310	- 25	2,285	25	2,285	Glacial sand	Hard,clear, "alkaline", iron	42	D, S	Sufficient for 20 head stock.
23	NE.	24	"	"	"	Dug	24	2,330	- 20	2,310	20	2,310	Glacial sand	Hard,clear	42	D, S	Sufficient for local needs.
24	SE.	28	"	"	"	Dug	23	2,290	- 11	2,279	23	2,267	Glacial sand	Hard,clear	42	D, S	Sufficient for 8 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of OAKDALE NO.320, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
25	NW.	28	31	23	3	Dug	20	2,310	- 16	2,294	16	2,294	Glacial sand	Hard, clear, "alkaline", iron	42	D, S	Second well 18 feet deep, total yield sufficient for 20 head stock.
26	SE.	29	"	"	"	Bored	30	2,280	- 17	2,263	30	2,250	Glacial sand	Hard, clear, "alkaline", iron	41	D, S	Sufficient for local needs.
27	NE.	30	"	"	"	Bored	35	2,315	- 30	2,285	30	2,285	Glacial sand	Hard, clear, iron	42	D, S	Sufficient only for domestic needs.
28	SW.	30	"	"	"	Bored	65	2,350			65	2,285	Glacial drift	Hard, clear, iron	42	D, S	Sufficient for 15 head stock.
29	NE.	31	"	"	"	Bored	40	2,320	- 36	2,284	36	2,284	Glacial sand	Hard, clear	42	D, S	Sufficient for 16 head stock.
30	SW.	32	"	"	"	Bored	30	2,312	- 27	2,285	27	2,285	Glacial sand	Hard, clear	42	S	Sufficient for 16 head stock; also a 24-foot well for house use.
31	SW.	33	"	"	"	Dug	25	2,307	- 21	2,286	21	2,286	Glacial sand	Hard, clear, "alkaline", iron	42	D, S	Sufficient for 20 head stock.
32	SW.	35	"	"	"	Dug	40	2,305	- 20	2,285	40	2,265	Glacial sand	Hard, clear, iron	42	D, S	Sufficient for 12 head stock.
33	NE.	35	"	"	"	Bored	60	2,315			60	2,255	Glacial sand	Hard, clear, "alkaline"	41	D, S	Sufficient for 60 head stock.
1	SW.	1	31	24	3	Bored	100	2,320	- 65	2,255	100	2,220	Bearpaw?	Hard, clear, "alkaline", iron	41	D, S	Sufficient for 12 head stock.
2	SW.	2	"	"	"	Bored	120	2,355	- 85	2,270	120	2,235	Bearpaw?	Soft, clear	41	D, S	Sufficient for local needs.
3	NW.	2	"	"	"	Bored	105	2,310	- 80	2,230	80	2,230	Bearpaw?	Soft, clear	41	D, S	Sufficient for 10 head stock.
4	NW.	3	"	"	"	Bored	69	2,295	- 50	2,245	69	2,226	Bearpaw?	Hard, clear iron	40	D, S	Sufficient for local needs.
5	SW.	3	"	"	"	Bored	90	2,290	- 45	2,245	90	2,200	Bearpaw?	Soft, clear		D, S	Sufficient for local needs.
6	NW.	5	"	"	"	Bored	60	2,248	- 50	2,198	60	2,188	Bearpaw?	Hard, clear, "alkalin", iron	40	D, S	Sufficient for local needs.
7	NE.	6	"	"	"	Bored	60	2,250	- 50	2,200	60	2,190	Bearpaw?	Hard, clear, "alkaline"	41	D, S	Sufficient for 30 head stock.
8	SW.	8	"	"	"	Bored	90	2,235	- 30	2,205	90	2,145	Bearpaw?	Hard, clear, iron	40	S	Oversufficient for 10 head stock.
9	NE.	9	"	"	"	Bored	36	2,260	- 33	2,227	33	2,227	Glacial sand	Hard, clear, "alkaline", iron	41	D, S	Insufficient for 12 head stock.
10	SW.	10	"	"	"	Bored		2,288					Glacial drift	Hard, clear, "alkaline", iron	40	D, S	Sufficient for local needs.
11	SE.	12	"	"	"	Bored	105	2,355			100	2,255	Glacial drift	Hard, clear	41	D, S	Second well 48 feet deep; total supply sufficient for 15 head stock.
12	NW.	12	"	"	"	Bored	110	2,350					Bearpaw?	Hard, clear, "alkaline", iron	41	D, S	Sufficient for 10 head stock.
13	SW.	13	"	"	"	Bored	125	2,360	- 60	2,300	125	2,235	Bearpaw?	Hard, clear, "alkaline"	40	D, S	Sufficient for local needs.
14	NE.	13	"	"	"	Dug	120	2,360	- 66	2,294	66	2,294	Bearpaw?	Hard, clear	40	D, S	Sufficient only for 12 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of OAKDALE NO. 320, SASKATCHEWAN

B 4-4
R. 7526

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE: Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED: Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
15	NE.	14	31	24	3	Bored	90	2,335	- 50	2,285	90	2,245	Bearpaw? sand	Soft, clear	41	D, S	Sufficient only for 10 head stock.
16	SW.	14	"	"	"	Bored	120	2,355	- 70	2,285	120	2,235	Bearpaw? sand	Soft, clear	41	D, S	Sufficient for local needs.
17	NW.	16	"	"	"	Bored	63	2,280	- 33	2,247	63	2,217	Bearpaw? sand	Hard, clear	41	D, S	Sufficient for 18 head stock.
18	SW.	20	"	"	"	Bored	115	2,275	- 80	2,195	115	2,160	Bearpaw?	Hard, clear, iron	41	D, S	Sufficient for 70 head stock.
19	NE.	20	"	"	"	Dug	72	2,305	- 66	2,239	66	2,239	Glacial clay	Soft, clear	42	D, S	Insufficient for 18 head stock.
20	NW.	24	"	"	"	Bored	95	2,355	- 70	2,285	95	2,260	Bearpaw? sand	Hard, clear, "alkaline"	41	D, S	Sufficient for 16 head stock.
21	SE.	25	"	"	"	Bored	100	2,355			100	2,255	Glacial sand	Hard, clear, iron	42	D, S	Sufficient for local needs; also a similar well.
22	SW.	28	"	"	"	Dug	60	2,300	- 43	2,257	60	2,240	Bearpaw? sand	Soft, clear	42	D, S	Oversufficient for 35 head stock; also a similar well.
23	NE.	33	"	"	"	Bored	90	2,325	- 78	2,247	90	2,235	Bearpaw?	Hard, clear	40	D, S	Sufficient for 11 head stock.
24	NW.	34	"	"	"	Bored	100	2,320	- 40	2,280	100	2,220	Bearpaw? sand	Hard, clear, "alkaline"	40	D, S	Sufficient for 16 head stock.
25	SW.	36	"	"	"	Bored	63	2,308	- 22	2,286	63	2,245	Bearpaw? sand	Soft, clear	42	D, S	Oversufficient for local needs.
1	SW.	4	32	22	3	Dug	17	2,242	- 14	2,228	14	2,228	Glacial sand	Hard, clear, "alkaline", iron	43	S	Sufficient for 30 head stock.
2	SW.	6	"	"	"	Bored	35	2,265	- 15	2,250	35	2,230	Glacial sand	Hard, clear, "alkaline"	42	D, S	Oversufficient for 20 head stock.
3	NW.	6	"	"	"	Dug	20	2,252	- 10	2,242	20	2,232	Glacial sand	Hard, clear	43	D, S	Second similar well; total supply sufficient for local needs.
4	NW.	12	"	"	"	Dug	35	2,240	- 5	2,235	35	2,205	Glacial sand	Soft, clear	42	D, S	Sufficient only for 6 head stock; also a 20-foot well not used.
5	NE.	13	"	"	"	Bored	90	2,293	- 50	2,243	90	2,203	Glacial sand	Hard, clear, "alkaline", iron	41	S	Sufficient for 25 head stock; has a 20-foot seepage well.
6	SE.	14	"	"	"	Bored	82	2,240	- 30	2,210	82	2,158	Bearpaw? sand	Soft, clear, "alkaline"	42	D, S	Sufficient for local needs.
7	SE.	20	"	"	"	Bored	84	2,225	- 20	2,205	84	2,141	Bearpaw? sand	Hard, clear, "alkaline", iron	42	D, S	Oversufficient for local needs; also a 100-foot well, poor supply.
8	NE.	22	"	"	"	Dug & Bored	40	2,235	- 23	2,212	40	2,195	Glacial sand	Hard, clear, "alkaline"	42	D, S	Sufficient for 40 head stock.
9	NW.	24	"	"	"	Bored	104	2,285			104	2,181	Glacial sand	Hard, clear, "alkaline", iron	42	D, S	Oversufficient for local needs.
10	SE.	25	"	"	"	Dug	38	2,285	- 18	2,267	38	2,247	Glacial sand	Hard, clear, "alkaline"	42	D, S	Sufficient for 20 head stock.
11	SE.	27	"	"	"	Bored	60	2,245	- 28	2,217	60	2,185	Glacial sand	Hard, clear, "alkaline", iron	42	D, S	Oversufficient for 17 head stock.
12	NW.	30	"	"	"	Bored	97	2,230	- 20	2,210	97	2,133	Belly River ? coal	Hard, clear, iron	42	D, S	Sufficient for 20 head stock.
13	NE.	32	"	"	"	Bored	62	2,232	- 30	2,202	62	2,170	Glacial sand	Soft, clear	41	D, S	Oversufficient for 35 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of OAKDALE NO. 320, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
14	NW.	34	32	22	3	Bored	30	2,232	- 16	2,216	30	2,202	Glacial drift	Hard,clear	42	D, S	Sufficient for 20 head stock; also a 30-foot well waters 15 head stock.
15	NE.	35	"	"	"	Bored	57	2,255	- 25	2,230	57	2,198	Glacial sand	Hard,clear, "alkaline", iron	42	D, S	Sufficient for 30 head stock.
16	SW.	36	"	"	"	Dug	60	2,265	- 22	2,243	60	2,205	Glacial sand	Hard,clear	42	D, S	Insufficient for 25 head stock.
17	SE.	36	"	"	"	Bored	26	2,275	- 20	2,255	26	2,249	Glacial sand	Hard,clear, "alkaline"	42	S	Oversufficient for local needs.
1	SE.	2	32	23	3	Bored	65	2,305	- 15	2,290	65	2,240	Glacial sand	Soft,clear	42	D, S	Sufficient for local needs.
2	NW.	3	"	"	"	Bored		2,323					Glacial sand	Hard,clear, "alkaline"	41	S	Oversufficient for local needs; also a 20-foot well for house use.
3	SW.	5	"	"	"	Bored	80	2,330					Glacial sand	Hard,clear, "alkaline" iron	40	S	Oversufficient for local needs.
4	SE.	6	"	"	"	Bored	46	2,328	- 26	2,302	46	2,282	Glacial sand	Hard,clear, iron	41	S	Sufficient for local needs.
5	NW.	10	"	"	"	Dug	25	2,335	- 20	2,315	20	2,315	Glacial gravel	Hard,clear	41	D, S	Sufficient for 35 head stock.
6	NE.	10	"	"	"	Bored	30	2,340	- 25	2,315	25	2,315	Glacial gravel	Hard,clear	41	D, S	Sufficient for 25 head stock.
7	NW.	12	"	"	"	Bored	60	2,265	- 20	2,245	60	2,205	Glacial sand	Hard,clear, iron	42	D, S	Sufficient for local needs.
8	SE.	14	"	"	"	Bored		2,265	- 30	2,235	30	2,235	Glacial sand	Hard,clear, "alkaline"	41	S	Sufficient for 20 head stock.
9	SE.	16	"	"	"	Dug & Bored	40	2,340	- 20	2,320	40	2,300	Glacial sand	Soft,clear	41	D, S	
10	NW.	16	"	"	"	Dug	48	2,320	- 18	2,302	48	2,272	Glacial sand	Hard,clear, iron	41	D, S	Sufficient for 25 head stock.
11	NE.	17	"	"	"	Bored	50	2,340	- 30	2,310	50	2,290	Glacial sand	Hard,clear, "alkaline", iron	42	D, S	Sufficient for 14 head stock.
12	NE.	18	"	"	"	Dug & Bored	75	2,340	- 47	2,293	75	2,265	Glacial sand	Hard,clear, iron	40	D, S	Sufficient for 30 head stock.
13	SE.	19	"	"	"	Bored	80	2,355					Glacial sand	Hard,clear	41	D, S	Sufficient for local needs.
14	NW.	21	"	"	"	Bored	59	2,345			59	2,286	Glacial sand	Hard,clear, iron	41	D, S	Sufficient for 30 head stock.
15	SW.	24	"	"	"	Bored	30	2,270	- 15	2,255	30	2,240	Glacial sand	Hard,clear, iron	40	D, S	Sufficient for 12 head stock.
16	NE.	27	"	"	"	Dug	58	2,335	- 38	2,297	58	2,277	Glacial sand	Hard,clear, "alkaline"	41	D, S	Sufficient for 70 head stock.
17	NE.	28	"	"	"	Dug	40	2,335	- 30	2,305	40	2,295	Glacial drift	Hard,clear	41	D, S	Sufficient for 25 head stock; also a 60-foot well, caved in.
18	SW.	28	"	"	"	Bored	49	2,335	- 29	2,306	49	2,286	Glacial sand	Hard,clear, iron	41	D, S	Sufficient for 20 head stock.
19	SE.	30	"	"	"	Bored	70	2,355	- 62	2,293	70	2,285	Glacial sand	Hard,clear, "alkaline", iron	41	D, S	Oversufficient for 21 head stock.
20	SW.	36	"	"	"	Bored	70	2,270	- 30	2,240	30	2,240	Glacial drift	Hard,clear, "alkaline"	41	D, S	Sufficient for 25 head stock.
1	SW.	1	32	24	3	Bored	40	2,340	- 30	2,310	40	2,300	Glacial sand	Hard,clear, "alkaline"	42	D, S	Sufficient for 25 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used
(#) Sample taken for analysis.

B 4-4
R. 7526

WELL RECORDS—Rural Municipality of OAKDALE NO.320, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
2	SE.	6	32	24	3	Dug	12	2,205	- 8	2,197	8	2,197	Recent alluvial sand	Hard, clear, "alkaline", iron	43	S	Sufficient for 20 head stock; also a 10-foot well used for stock.
3	SW.	6	"	"	"	Bored	120	2,318	- 80	2,238	-120	2,198	Bearpaw ?	Hard, clear, iron	40	D, S	Sufficient for local needs; also a 120-foot well went dry in 1931.
4	SE.	10	"	"	"	Bored	48	2,338	- 34	2,304	34	2,304	Glacial sand	Hard, clear	41	D, S	Sufficient for 100 head stock.
5	SE.	14	"	"	"	Bored	50	2,345	- 42	2,303	50	2,295	Glacial sand	Hard, clear, "alkaline"	42	D, S	Sufficient for 18 headstock.
6	NW.	15	"	"	"	Spring		2,325					Glacial drift			S	
7	SW.	17	"	"	"	Bored	70	2,290	- 60	2,230	70	2,220	Bearpaw?	Hard, clear, iron	42	D, S	Sufficient for 30 head stock; had a 10-foot well, now filled in.
8	SE.	18	"	"	"	Bored	82	2,320	- 60	2,260	82	2,238	Glacial sand	Hard, clear, iron	42	D, S	Sufficient for 50 head stock.
9	NW.	21	"	"	"	Bored	127	2,250	-100	2,150	127	2,123	Bearpaw ?	Hard, clear, "alkaline", iron	40	D, S	Oversufficient for local needs.
10	NE.	22	"	"	"	Bored	100	2,340	- 60	2,280	100	2,240	Glacial sand	Hard, clear, "alkaline"	42	D, S	
11	NW.	22	"	"	"	Spring		2,340					Glacial drift				Dry in dry years.
12	SE.	22	"	"	"	Bored	43	2,330	- 34	2,296	43	2,287	Glacial sand	Hard, clear	42	D, S	Sufficient for 25 head stock.
13	SW.	22	"	"	"	Spring		2,325					Glacial drift			S	Other springs.
14	NW.	24	"	"	"	Bored	50	2,340	- 38	2,302	50	2,290	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
15	SE.	25	"	"	"	Bored	90	2,350	- 70	2,280	90	2,260	Glacial sand	Soft, clear	40	D, S	Sufficient for 15 head stock.
16	NE.	26	"	"	"	Bored	50	2,350	- 41	2,309	50	2,300	Glacial sand	Hard, clear, "alkaline", iron	40	D, S	Sufficient for 100 head stock.
17	NW.	30	"	"	"	Bored	114	2,345	-100	2,245	114	2,231	Bearpaw? blue sand	Soft, clear	40	D, S	Sufficient for 13 head stock. #
18	NW.	31	"	"	"	Bored	110	2,380									Dry hole in glacial drift, several other dry holes.
19	NE.	36	"	"	"	Dug	60	2,360	- 51	2,309	54	2,306	Glacial gravel	Hard, clear, iron	42	D, S	Sufficient for 22 head stock.
20	SE.	36	"	"	"		60	2,360	- 50	2,310			Glacial gravel				Yielded a good supply but is now filled in as it was not needed.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used
(#) Sample taken for analysis.