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CANADA

DEPARTMENT OF MINES

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BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF WEYBURN No. 67 SASKATCHEWAN

BY

B. R. MacKay, H. N. Hainstock & G. L. Scott

Water Supply Paper No. 33

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF WEYBURN, NO. 67, 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 purposes and the smaller supplies of ground water required for domestic and stock-raising purposes by settlers, villages, and Indian reserves. The drought conditions resulted in repeated crop failures, and in a large number of farms in the acute drought areas of Saskatchewan and Alberta being abandoned. In an effort to relieve the serious situation a number of special studies of the water problem were begun by both Federal and Provincial Governments and allied organizations. The Federal Department of Agriculture undertook among other phases of the drought problem an investigation into the existing supplies of surface water, their conservation by means of dams and dug-outs, and how they could be made more generally available for irrigation. The Geological Survey of the Federal Department of Mines began an extensive study of the underground water conditions of southern Saskatchewan, this water being used principally for domestic and stock-raising purposes. For many years past the water problem in this and other provinces of Canada have engaged the attention of the Geological Survey, and considerable information had already been collected. A number of short reports dealing with the ground water conditions of special areas in Manitoba, Saskatchewan and Alberta have been published by both the Federal and Provincial Geological Surveys, but no systematic study of the ground water resources has been made up to the present.

Field Work

The senior author was in charge of this investigation and was instructed to cover as much of the territory as possible in the season. To effect this it was decided to maintain an office at Regina and to have a large party consisting of twenty-six units, each to consist of three men who would cover their respective areas and visit every farm. In order that the information gathered by these different party units would be as complete and uniform as possible a questionnaire was prepared on which could be tabulated answers to all the essential questions required for a detailed study of the ground water conditions. An effort was made in the field by each party unit to fill in the questionnaire as completely as possible. In many instances, however, it was found that wells had either been abandoned, or the resident had little or no knowledge of the character of the water-bearing horizon and associated beds. When a party unit had completed the survey of a township the set of questionnaires and a report describing the characteristic features pertaining to the underground water conditions were mailed to the field office. Messrs. D.C. Maddox, F.H. Edmunds, H.H. Beach, H.N. Hainstock, R.D. MacDonald, and D.P. Goodall acted as supervisors in inspecting the work of the field units.

During the field season an area of 80,000 square miles, comprising 2,200 townships, was systematically examined, and records of approximately 60,000 wells were obtained, together with water samples for analyses obtained from 720 representative wells. These are systematically classified so that information pertaining to any well may be readily consulted. These records are supplemented by a set of 24 sectional sheets which cover all of southern Saskatchewan north to include township 32. Each sectional sheet comprises 120 townships. On these are indicated by symbol the location, type, and source of water of each of the 60,000 wells.

Publication of Results

The publication of such a great mass of detailed information is out of the question. This forms the permanent record of the Geological Survey. It is highly desirable, however, that a digest of the essential information pertaining to the ground water conditions of each municipality be furnished in convenient form to the municipality offices, to certain Provincial and Federal departments, and to allied organizations, at which centres it will be possible for any resident of the municipality or other party interested in any particular area to consult these reports. Should anyone find that he requires more detailed data than that contained in the report such additional information as the Geological Survey possesses can be procured on application to the Director, Bureau of Economic Geology, Department of Mines, Ottawa. In making such request the applicant should indicate the exact location of the area by giving the quarter section, township, range and meridian.

The reports have been prepared principally for farm residents, municipal bodies, and well drillers who are either contemplating sinking a well for the first time or considering deepening their well to a lower horizon in order to obtain a more abundant supply of water. In describing the water and geological conditions a certain number of technical terms must of necessity be used, and in case the reader should not be familiar with them their meanings have been defined in the glossary.

How to Use the Report

It is advisable that anyone desiring water information pertaining to a particular section of the municipality read over first the section dealing with the municipality as a whole, as by so doing he will be in a much better position to understand the section of the report dealing with the ground water conditions of the area in which he is particularly interested. As he reads the text he should keep open before him for constant reference the accompanying map of the municipality on which are two figures, one showing the surface and bedrock geology of the area as they affect the ground water supply, and the other the relief and the location and type of water wells. The land relief is shown by means of lines of equal elevation, termed "contours", which lie generally at vertical intervals of 50 feet. The elevation above sea-level of each fourth line is indicated on the map. The statistical summary that follows the text gives at a glance the main characteristics of the wells in each township of the municipality and of the municipality as a whole as listed under the various sub-headings. This is followed by a section dealing with the analyses and quality of the water derived from the unconsolidated deposits and from bedrock. The table of well records gives the detailed information pertaining to each well. In this are tabulated the altitude of the well, its depth, the height to which the water will rise, and the elevation of the water horizon. The wells are grouped in the table by townships and are numbered from the lower right corner of the township westward and northward, and the location of each well by its quarter section is given. The elevations used were determined by aneroid barometer and were checked frequently by elevations on the published maps or by instrument surveys.

Where the ground surface of an area is comparatively flat an effort has been made to indicate the position of the water-bearing horizon in feet below the surface. In rolling country where there is a considerable difference of elevation within short distances a uniform figure for the depth to the water horizon is not generally possible. It then becomes necessary to indicate the position in terms of the elevation of a water-bearing bed in feet above sea-level.

Should one desire to ascertain at any location at which no well has as yet been sunk, the approximate depth at which a particular water-bearing horizon can be reached it is necessary to know two things--first, the elevation of the land surface, and second, the probable elevation of the water-bearing bed, or aquifer. The elevation of the land surface can be obtained by noting the position of the well site on the map, Figure 2, with respect to the two bounding contour lines of known elevation, and estimating either how far above the lower, or how far below the upper, control elevation line the well site lies. The approximate elevation of the water-bearing horizon at the well site can be obtained by noting on the table of well records the elevation of the horizon in the wells adjacent to the proposed location and from the range of elevations given and the relative positions of the wells shown on the map to select what appears to be its most probable elevation at the new well site. Having determined this elevation the depth that it is necessary to sink in order to tap it is the difference between its elevation and the elevation of the land surface. This method is especially applicable when the water-bearing horizon is in bedrock. In unconsolidated deposits the water horizon either conforms to the rolling land surface or occurs in isolated sand beds at various horizons that do not form a continuous water-bearing bed over a large area. Care should be taken in making any calculations for depth of water-bearing horizons to be sure that the elevations selected for the determinations occur in the same geological horizon, that is they should be either all in glacial drift or in the same bedrock formation.

The table of well records also contains notes on the temperature, quality, and quantity of the water being obtained from the various wells, and from this it is possible to draw reasonable conclusions as to the character and quantity of the water likely to be encountered at the proposed well site.

Glossary of Terms Used

Alluvium. Deposits of earth, silt, sand and gravel, and other transported material laid down by rivers, floods, or other causes upon land that has been submerged beneath the waters of lakes or rivers.

Aquifer. Layers or pockets of water-bearing sand or gravel that occur in unconsolidated deposits or as beds forming part of a bedrock formation.

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 deposits of gravel, sand, silt, and marl that have been laid down by the agency of water and which through a long period of time and the weight of the overlying sediments have become cemented into a solid rock.

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 ago.

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

Flood-plain. A flat section in a river valley that is 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 exerted by the water at any given point. It is due mainly to the weight of the column of water occurring at higher levels in the same aquifer or water-bearing bed.

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

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

Potable. Suitable for drinking.

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.

Water-bearing Horizon. A layer in either unconsolidated deposits or in bedrock formations that is water-bearing; same as aquifer.

Zone of Saturation. An area in which the permeable rocks are saturated with water that will move under ordinary hydrostatic pressure.

Names and Descriptions of Geological Formations, Referred to in These Reports

Wood Mountain Formation. The local name given to a series of gravel and thin sand beds which have a maximum thickness of 50 feet, and which occurs as isolated patches on the higher elevations of Wood mountain. They are the youngest of the consolidated rocks and, where present, rest upon the beds of the Ravenscrag formation.

Cypress Hills Formation. The local name given to a series of conglomerates and sand beds occurring in the southwest corner of Saskatchewan, which rests upon the Ravenscrag or older formations. The thickness of this formation varies from 30 to 125 feet.

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

Whitemud Formation. The local name given to a series of white, grey, and buff coloured clays and sands that varies in thickness from 10 to 75 feet. The base of this formation grades in places into a coarse, limy sand having a maximum thickness of 40 feet.

Eastend Formation. The local 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 eastern escarpment of the Missouri coteau. The The thickness of the formation seldom exceeds 40 feet.

Marine Shale Formation. The general name given to the thick deposit of incoherent, dark grey to dark brownish grey, plastic shales, which weather light grey to buff in places. It forms the uppermost bedrock formation over the greater part of eastern and central Saskatchewan. In the western part of the province it consists of a series of dark shales termed the Bearpaw formation. This is underlain by a series of sands, shales, and coal seams, known as the Belly River formation.

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Weyburn is an area of 324 square miles in the southeastern part of Saskatchewan. It consists of nine townships described as townships 7, 8, and 9, ranges 13, 14, and 15, west of the 2nd meridian. The city of Weyburn lies in the centre of the municipality.

Water-bearing Horizons in the Unconsolidated Deposits

Recent deposits of alluvium are found in Souris River valley. These deposits are made up of silts, sands, and clays, and were laid down during the flooding of the valley floor by Souris river. They have a maximum thickness of 15 feet.

With the exception of this narrow area in Souris valley, the entire municipality is covered with a mantle of material deposited during the glacial period. A study of the accompanying map will reveal that this mantle has been deposited in two different ways. Approximately one-half of the municipality was covered by glacial lakes, and in these areas the covering of unconsolidated deposits was laid down by water. This type of deposit is termed glacial lake clay. The large area of glacial lake clay shown on the accompanying map is part of the Regina Lake bed which extends in a northwesterly direction through Rouleau, Regina, and as far west as Moose Jaw. The remainder of the municipality is covered with boulder clay or glacial till that was deposited by the glaciers. The glacial till and glacial lake clays extend from the top soil to depths of 75 to 150 feet.

The deposits consist generally of 5 to 40 feet of yellow, brown, or red clay, underlain by $\frac{1}{2}$ to 10 feet of sand and gravel, 60 to 120 feet of blue clay, and 5 to 10 feet of grey-black quicksand. The quicksand, where it occurs, lies at the base of the glacial deposits and overlies the bedrock. The essential difference between the deposits of till and the deposits of lake clays is that the lake clays are more of a silty nature and do not contain the boulders that are often found in the glacial till. Two main water-bearing horizons are found in the glacial deposits of this municipality.

The first horizon almost always underlies the initial 5 to 40 feet of yellow, brown, or red clay. Approximately 95 per cent of the wells in the municipality draw their water from this aquifer. The horizon is composed of fine sand or quicksand, and, less often, gravel. This sand bed has been deposited in a most irregular manner, and the result is the formation of "pockets" and "domes" which may or may not be connected with one another by a continuous bed of sand. The water contained in this sand owes it origin almost entirely to snow and rainfall seepage, hence the drouth of 1930 to 1934 has had a profound effect on the majority of the wells in the municipality. Since the sand layer has been deposited in an irregular fashion, the quantity of water derived from it by shallow wells varies widely within short distances. Districts in which the sand pockets are numerous, or where the sand bed is in a large continuous layer, have shallow wells which yield a fairly abundant supply of water. An approximate area has been traced out on the map where this condition holds in the municipality. The drift in the northern part of township 9, range 15 also contains numerous pockets of sand which can be attested by a fairly large number of wells that yield a good supply of water. The remainder of the municipality is not so fortunate in having a fairly continuous thick layer of sand or frequent large pockets. In many places the sand seam is non-existent. A second approximate area has been outlined on the map where water is very difficult to obtain. Midway between the extremes noted above, are the areas where the water supply from shallow wells is very uncertain. In some sections water in good quantities may be readily found, in others, it is very difficult to obtain in any quantity. No prediction can be made as to where water can be obtained in this horizon and all that can be stated is that water in substantial quantities does occur in pockets and the only method of locating it is by the use of a testing auger. In the two areas traced out on the map it must be understood that even in these districts the water supply is still of a patchy nature. The fact that water is very difficult to obtain in the western part of the municipality does not preclude the possibility of striking a good supply in a pocket. The average well using the first horizon as an aquifer cannot be depended upon to yield sufficient water for over 15 to 20 head of stock in drought years. The water usually is hard and the amount of salts in solution varies from a small to an excessive amount. The hydrostatic pressure, if any, is very small, and it will seldom raise the water 3 feet above its source. Whether the shallow well water is potable or not depends upon the amount of the salts in solution.

The second water-bearing horizon occurs in the quicksand underlying the blue clay and overlying the Marine shale bedrock formation. This quicksand layer is not general throughout the municipality, but it occurs at many places. Unlike the water from the first horizon this water is under a hydrostatic pressure that causes it to rise 40 or 50 feet above the quicksand. The water is highly mineralized, is not suitable for human use, but may be used for stock. The yield of the wells is large; one of them may supply sufficient water for 50 head of stock. One main disadvantage of these wells is that the quicksand is liable to clog the sand screens and thus render the well useless.

Water-bearing Horizons in the Bedrock

With the exception of a small area in the southeastern corner, the Marine shale formation underlies the glacial drift throughout the municipality. The curved, broken line that is seen at the base of the map is the approximate southern limit of the bedrock Marine shale formation and the northern limit of the bedrock

Ravenscrag formation. The Marine shale formation is composed of soft shale and has been estimated to be 1,000 feet thick. Two holes, 1,515 and 1,735 feet deep, were drilled in the vicinity of Ralph, by the Prospecting and Development Company, in search of potash. These holes penetrated the Marine shale formation and extended into the underlying Belly River formation. No potash was found and it is also significant that water was not encountered after the initial 80 feet of glacial drift had been passed through. The Marine shale formation has been locally called "soapstone".

In the southeastern corner of the municipality the Whitemud formation overlies the Marine shale formation. The Whitemud formation is characterized by sandstone and white clays. This formation is very thin, but the fact that sandstone and patches of white clay were reported in the vicinity of Ralph and Halbrite shows that this formation probably exists in the southeastern part of the municipality.

The Ravenscrag formation that overlies the Whitemud formation consists of sandy shale and shale beds and contains one or more lignite coal seams.

The sandstone and sandy shale beds of the Ravenscrag and Whitemud formations form water-bearing horizons and yield a moderate supply of water. The areal extent of these formations in this municipality is so small, however, that the possibilities of obtaining an abundant supply of water from them is limited.

The possibility of striking a water-bearing horizon in the Marine shale formation is very remote, and for one well that has struck water in the shale, fifty wells have been totally dry. One well located in sec. 18, tp. 9, range 15, encountered water at a depth of 370 feet from the surface, but it was so highly mineralized that it could not be used even for stock.

In summarizing the water conditions of this municipality, it is advised that drilling operations be confined to depths of 150 feet or less, and test borings for shallow wells should not exceed 40 or 50 feet.

Small sand seams do occur in the blue clay, but the quantity of water contained in them is small and the quality is poor. In the southern part of the municipality, sandstone may be struck at shallow depths. It is advised that the sandstone bed be penetrated to a sand bed below it, where the water supply is much greater than in the overlying sandstone aquifer.

In the glacial lake clay regions the water obtained from the first horizon is more highly mineralized, as a rule, than the water obtained at the same depths from sand pockets in or below the boulder clay.

In many districts water cannot be obtained at shallow depths in sufficient quantities to water a large herd of stock. Where finances do not permit drilling operations, the construction of dugouts is advised. The site chosen for a dugout is of major importance. It should be placed at the bottom of a draw or long inclined slope where a maximum amount of spring run-off water can be collected. It is also important that the dugout be made at least 12 feet deep. Small deep dugouts have proved more satisfactory than large shallow dugouts. Many farmers, especially in the western part of the municipality, have adopted this scheme of obtaining water. Often shallow wells are excavated beside the dugout and the seepage water from the dugout into the well is used for household purposes. Care should be taken that the water is well filtered and that the water in the well does not become stagnant from long standing. These dugouts are often used as a standby for two or three wells which together do not yield enough water in drought periods for stock use.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 7, Range 13

The southeastern corner of this township, sections 1, 2, 11, 12, 13, 14, 15, 22 and 23, contains the northwestern tip of a glacial lake bed that extends into municipalities 66 and 36. Section 6 is also located in a glacial lake bed that extends southward into municipality 37. The remainder of the township is covered with a mantle of glacial till.

The glacial deposit is very thin, especially in sections 13, 14, 15, 16, and 20. In these sections sandstone is struck at a depth of approximately 10 feet from the surface, and it is overlain by yellow sand to the top soil. A layer of sand underlies the sandstone. Four of the five wells that were drilled into the sandstone derive their water supply from the overlying sand bed. The water is soft, but the quantity is dependent upon rainfall conditions. The fifth well, in NE. $\frac{1}{4}$, section 15, was drilled through 17 feet of sandstone into fine sand underlying it. Excellent soft water in large quantities was obtained, and the hydrostatic pressure caused the water to overflow the top of the well. After a period of four months the pressure decreased, and the water level in 1935 stood 4 feet below the surface. The sandstone stratum is not water-bearing.

The wells in the remainder of the township do not encounter sandstone. In these wells water is obtained from sand pockets in the glacial drift. Sometimes the sand beds are 12 to 16 feet thick and lie immediately beneath the top soil. In other localities, yellow, brown, or blue clay 8 to 30 feet thick must be penetrated before a sand aquifer is found. Nearly all these wells proved unreliable in the drought period of 1930-1934. In the sand beds underlying the boulder clay or blue clay, the water contained is hard and alkaline.

Water at depth is found in this township at a level of 70 to 100 feet from the surface. The aquifer is a fine bluish grey sand bed 5 to 10 feet thick and it underlies a 2-foot hardpan layer. Two existing wells, one in SE. $\frac{1}{4}$, section 1, and the other SW. $\frac{1}{4}$, section 13, have tapped this aquifer. The water is soft, rather salty, and it has an iron and soda content, but it is potable for humans as well as for stock. The hydrostatic pressure raises the water 40 to 50 feet above the source, and the supply is not so easily affected by drought as are the shallow well water supplies.

The Prospecting and Development Company drilled a hole in SE. $\frac{1}{4}$, section 28, and struck this same aquifer at a depth of 80 feet from the surface. It is, therefore, probable that this water-bearing horizon is general throughout the township. The above hole was drilled to a depth of 1,735 feet without striking another water-bearing horizon. Another hole drilled, in Ralph, to a depth of 1,515 feet failed to strike water. In view of this information, there are only two dependable water-bearing horizons in the township. The first is the sand layer underlying the sandstone, and this aquifer is not general; the second is the blue-grey sand bed located at 70 to 100 feet beneath the surface.

Numerous coulées offer dam sites where the spring run-off water can be collected and used for stock. In many sections of the township the abundance of sand at the surface prevents the construction of dugouts as the sand is too pervious to retain the water.

Township 7, Range 14

The western half of the township is located in a glacial lake bed, and the eastern part is covered with glacial till. The boundary between the two can be determined by the topography; the glacial lake bed is very flat whereas the glacial till area is undulating in character and in places hilly.

The entire township, with the exception of parts of sections 4 and 30, is overlain by a glacial deposit at least 40 feet thick. It is composed of beds of yellow, brown, red, and blue clay, and pockets of sand or quicksand. These beds do not follow any sequence or continuity, and the formations found in one well may be entirely different in another well dug a short distance away. The majority of the shallow wells are from 16 to 20 feet in depth and the aquifer is almost always sand. These pockets of sand do not yield an abundance of water and the supply is obtained from surface seepage. Occasionally good amounts of water are obtained at shallow depths, such as in a well in NE. $\frac{1}{4}$, section 22, but this is due to the presence of a large, deep, sand pocket, which is merely a large sand reservoir, and the condition is only local.

Quicksand **aquifers** are found at shallow depths in the western part of the township, and they yield a more substantial supply than the gravelly sand beds. The water usually is alkaline and farmers have difficulty with the quicksand washing in and partly shutting off the supply.

In NW. $\frac{1}{4}$, section 4, and in SE. $\frac{1}{4}$, section 30, a layer of sandstone was struck in a well at a depth of 20 feet from the surface. The well was dug through the sandstone and a good supply of fairly hard water was obtained from a sand aquifer. In the first well the sand above the sandstone was used as the aquifer and an intermittent supply of water was obtained. A better supply is always obtained from beneath the sandstone than above it, because the water supply in the sand beneath is not so easily affected by drought.

Two other horizons were tapped by existing wells. In NW. $\frac{1}{4}$, section 9, water was obtained in great abundance at a depth of 80 feet from the surface in quicksand, but the hydrostatic pressure was so great that the quicksand was forced up with the water and half filled the well. The water was hard and too **highly** alkaline to be used for drinking.

In SE. $\frac{1}{4}$, section 29, a bored well struck an aquifer at a depth of 150 feet from the surface. The pressure raised the water to within 15 feet of the surface and the supply is large. The water was soft, alkaline, and contained soda, iron, and sulphur. It was condemned by the analyst as being unfit for man or stock. A dry hole, 205 feet in depth, was bored in NW. $\frac{1}{4}$, section 33, and sandstone was encountered at 18 feet from the surface.

In most of the sections water-bearing aquifers can be found at shallow depths, but the supply, especially in dry years, is limited. Water of poor quality, but in great abundance, may possibly be found at depths up to 150 feet from the surface. Below this depth possibilities of striking water are not good.

Township 7, Range 15

The extreme eastern part of the township is the western limits of the glacial lake bed, mentioned under township 7, range 14. Glacial till covers the remainder of the township.

The glacial drift covering is at least 40 feet thick and is composed of yellow or red clay, blue clay, and seams of fine sand and quicksand. All the existing wells in the township strike water within 40 feet of the surface, and the aquifer is generally sand or quicksand.

Farmers do not have difficulty in striking these sand aquifers, but the trouble is that the supply is limited in dry years, and a large percentage of them yield alkaline water. Wells containing a seam of quicksand are the most reliable. One well in SW. $\frac{1}{4}$, section 10, which yields a supply sufficient for 50 head of stock struck a gravel aquifer within 4 feet of the surface. The water is soft and many farmers tanked from this well during the drought of 1930-1934.

Farmers usually have two or three wells on their property, since sand seams are readily found at shallow depths, and all of them are required. Dugouts have been excavated by many farmers during the dry years and these together with the wells furnish a sufficient supply of water for stock.

No attempts to drill for water at depth, have been made but it is possible that water-bearing horizons occur within 150 feet of the surface.

The township is broken by numerous coulées which offer excellent opportunities for dam construction.

In summary it may be stated that water, usually alkaline in nature, can be obtained almost anywhere in the township within 30 feet of the ground surface. The quantity is limited especially in dry years. Conditions are favourable for the construction of dams and dugouts, and if this were done the water situation need not be critical even in times of drought.

Township 8, Range 13

The entire township is overlain by glacial drift having a minimum thickness of at least 60 feet. The maximum thickness of the drift is unknown, but it probably does not exceed 150 feet.

A well-section almost anywhere in this township would be as follows: 2 to 5 feet of top soil, 8 to 25 feet of yellow or grey boulder clay, 1 to 8 feet of sand or quicksand, and at least 60 feet of blue clay. Occasionally sand occurs at the surface without any overlying yellow or grey clay, and blue clay may underlie the yellow clay without the intervening sand horizon. However, the sand aquifer is quite general throughout the township. A layer of boulders is often encountered at a depth of 20 to 25 feet below the ground surface.

Every well in the township is dug to a depth of less than 35 feet. The bed of sand or quicksand underlying the yellow boulder clay is the aquifer and it exists probably in a continuous layer throughout the township. Wells tapping this sand bed yield a very good supply of water, and, in general, they will water 20 to 40 head of stock, even in drought years.

Within the continuous layer, pockets or lenses occur in places. Wells that have tapped one of these lenses produce water that is under a slight pressure, and the supply is greater than in wells that have not struck a lens. These wells will water 100 head of stock without difficulty. The water as a rule is medium hard to soft. A well in SE. $\frac{1}{4}$, section 34, produces salty water.

Some wells have had their supply depleted by the drought years of 1930-1934, others have not. This condition is due to the character of the aquifer. A concave upward formation of sand will be affected by drought conditions sooner than a concave downward formation. The water table in average years of rainfall will follow the surface topography, but in drought years the water table becomes lower and flattens out, hence the supply of water from a dome-shaped formation is depleted, whereas the supply in the concave downward formation may be affected only slightly.

There are no existing wells deeper than 35 feet. Dry holes have been dug into the blue clay to a depth of 60 feet. Two holes, one in NE. $\frac{1}{4}$, section 6, and the other in NW. $\frac{1}{4}$, section 28, were drilled to depths of 450 feet and 375 feet, respectively, without obtaining water. From this information it is apparent that the only water-bearing horizon in the township occurs beneath the yellow clay. The blue clay extends to a depth of 150 to 200 feet, probably with no water-bearing sand seams contained in it. The bedrock Marine shale formation, underlying the blue clay, contains no water-bearing horizons.

Drilling operations should be confined to depths less than 150 feet since sand seams may occur in the blue clay, but the limited information obtained does not favour this possibility.

Township 8, Range 14

The glacial drift in this township is composed almost entirely of yellow clay and blue clay. Small pockets of sand may lie between the yellow and blue clay and small sand seams are also found in the blue clay. Gravel and sand knolls and ridges occur throughout the township.

Unlike the township immediately to the east this township does not contain a continuous water-bearing horizon. In the southern half of the township especially, farmers have found difficulty in striking water-bearing sand or gravel in their wells. Where sand is struck the water supply is very limited. This shows that the extent of the aquifer is not great. At infrequent and widely separated points in the township large pockets of sand have been struck and a good volume of water obtained. Examples are wells in SW. ¼, section 5, SW. ¼, section 9, and NE. ¼, section 26. They also occur at other places.

Generally speaking, good wells are very difficult to obtain in this township, due to the small amounts or complete absence of water-bearing sands. With the exception of the gravel knolls, yellow clay occurs at the surface and extends to a depth of 7 to 20 feet. A layer of boulders, a small sand seam, or blue clay underlies the yellow clay. The blue clay extends to a depth of at least 190 feet and small sand seams are encountered, yielding very small supplies of highly alkaline water. Water obtained from the sand separating the yellow clay and blue clay is usually too highly mineralized to be potable. Sand pockets do occur in places and water of good quality is obtained, but this condition is not general.

In attempting to obtain a suitable water supply in this township the best method is to test with a 2-inch auger to a maximum depth of 40 feet. In this manner a pocket of sand may be tapped. The size and shape of this pocket, together with rainfall conditions, will determine the amount of water yielded. Wells that will yield large supplies of water in times of drought are not to be expected. Drilling operations are not advisable. The blue clay overlies the Marine shale bedrock formations and neither the blue clay nor the Marine shale contain water-bearing horizons. Test borings to a maximum depth of 40 to 50 feet should be made before a well is dug.

The city of Weyburn derives its water supply from two wells located on a small sand ridge. This ridge is situated to the west of Souris river and the sand beds apparently depend to some extent on seepage from the river for their supply. The depths of the wells are 66 feet and 71 feet and water was first struck at the 35-foot level. After the yellow clay had been pierced, sand, silt, and gravel were found to the bottoms of the wells. The water is hard, contains iron, and is not under pressure. One well supplies 200,000 gallons a day, but the water level dropped 14 feet in both wells during the drought of 1930-1934. The wells, therefore, depend largely on seepage for their supply and it is unlikely that the underground supply is very large. Neighbouring wells have been drained since these two wells were constructed.

The Weyburn wells have been a source of supply for many farmers in this neighbourhood during the drought years.

Township 8, Range 15

The glacial drift in this township varies from 60 feet to 90 feet in thickness and overlies the bedrock Marine shale formation. The contact between the glacial deposits and the bedrock is beneath a bed of quicksand. Yellow, red, or brown boulder clay extends from the surface to a maximum depth of 30 feet. Small sand pockets may or may not occur beneath these clays. Blue clay extends to the quicksand, followed by the Marine shale.

No good water-bearing horizon occurs in the glacial drift and the Marine shale formation does not yield water. Very small supplies of water are obtained from the sand beneath the yellow clay. A few wells such as those found in NW. $\frac{1}{4}$, section 24, and SE. $\frac{1}{4}$, section 25, strike a sand pocket that yields an abundant supply in years of average rainfall, but even these wells depend to a great extent on seepage. Most of the wells in this township produce water that is too highly alkaline to be potable.

Bored wells have tapped the quicksand layer at depths of 50 to 90 feet from the surface, but the supply is not uniform. The quicksand aquifer in a well located in SE. $\frac{1}{4}$, section 20, produces a limited quantity, and a similar well in SE. $\frac{1}{4}$, section 27, produces sufficient to water 50 head of stock. The water is hard, too highly alkaline to be potable, and the hydrostatic pressure is not great.

Wells have been drilled to a depth of 200 feet without finding water. Fossils were found in a well in SW. ¼, section 32, at a depth of 75 feet from the surface, which define the bedrock Marine shale formation. Potable water probably cannot be found at depths in excess of 100 to 125 feet in this township. Limited quantities of highly alkaline water that would be usable for stock may be found in quicksand overlying the bedrock. Due to the absence of a definite sand seam and the limited number of sand beds or lenses, the possibility of striking a reliable source of water at shallow depths is remote.

The farmers of this township have adopted the only feasible means of securing and conserving water at places where shallow wells went dry in the drought of 1930-1934, and that is by constructing dugouts. Frequently wells are dug beside them and the seepage from the dugout is used as household water.

In these wells care should be taken that the water is properly filtered, either by a natural sand seam or by hand-made stone filters. The water should be pumped regularly to prevent it from becoming stagnant. The existence of small creeks and gullies furnish opportunities for dam construction.

Township 9, Range 13

Water is obtained from the glacial drift at depths of 12 to 25 feet. Dry holes have been bored to depths of 60, 80, and 100 feet without striking an aquifer in the blue clay. The only aquifer in this township within the upper 100 feet of glacial drift occurs very close to the surface.

The yellow boulder clay is thinner in this township than is usually found in this part of the province. It underlies the top soil to depths of 3 to 15 feet at the most. The aquifer for all the wells in the township underlies this yellow boulder clay. It is composed of fine yellow or brownish sand or quicksand and the bed is from 2 to 12 feet thick. In a few wells sandy gravel occurs, but in the great majority of wells fine sand forms the aquifer. Blue clay underlies the sand and extends to a depth of at least 100 feet from the ground surface. No borings deeper than 100 feet were reported.

The sand does not lie in an uninterrupted layer, but occurs at many places in beds of fairly large extent. Farmers in the majority of the sections have little difficulty in striking it. The quality and quantity of the water yielded however, varies considerably. Most of the existing wells deliver a clear, hard, slightly alkaline water, but farmers report that several wells that yielded highly alkaline water were dug before a well was found that gave potable water. The village of Talmadge is built in an area where the sand contains highly alkaline water.

On the average, the wells can be depended upon to water 25 head of stock. Several wells, such as those found in NW. $\frac{1}{4}$, section 14, and SE. $\frac{1}{4}$, section 36, yield a large supply of water. The drought of 1930-1934 affected the supply in most of the wells, but not to such an extent that they became intermittent.

The supply of water contained in the sand originates from rainfall, but the sand beds furnish such a huge reservoir for the storage of water that a drought of longer duration than four years would be necessary to exhaust the supply.

Drilling operations are not advised in this township. It is questionable if water in large quantities will be found at depths in excess of 100 feet. The Marine shale bedrock formation underlies the glacial drift. This formation does not contain any water-bearing horizon except possibly salt water. Since no wells were made deeper than 100 feet, the depth to the bedrock is not definitely known. It is probable that it would be within 125 to 150 feet of the surface.

In some localities in the municipality water is obtained from a quicksand layer lying immediately above the bedrock, but the water is highly mineralized. Water of better quality and in sufficient quantities can be obtained within 25 feet of the surface, and it is recommended that test borings should be confined to that depth.

Township 9, Range 14

The entire township lies within the glacial lake bed and the glacial deposit is approximately 75 to 95 feet thick. Three wells in the township passed through the glacial drift and entered the Marine shale formation. "Soapstone" is the term used locally to define the bedrock Marine shale, and it was reported in wells in SE. $\frac{1}{4}$, section 5, NE. $\frac{1}{4}$, section 14, and NW. $\frac{1}{4}$, section 30. Fine sand or quicksand, usually, but not always immediately overlies the bedrock.

The glacial drift consists of 3 to 25 feet of yellow, sandy clay; seams of sand, gravel or quicksand, $\frac{1}{2}$ foot to 3 feet thick, and blue clay. Usually the yellow clay underlies the top soil, and overlies the sand and gravel seams. The blue clay extends from the sand seams to the bedrock and contains small sand veins. The quicksand bed, previously mentioned, in places separates the blue clay from the Marine shale formation.

Only two water-bearing horizons of any importance occur in the glacial drift, none occurs in the Marine shale formation. The first horizon is composed of the sand, gravel, and quicksand beds underlying the yellow and sandy clay. The character, depth, and water-bearing capacity of this horizon vary greatly within short distances. In some places the horizon is composed entirely of sand, in another place, gravel, and in others it may be non-existent and the blue clay underlies the yellow clay. In a word, it is patchy. As a rule the water supply from this horizon is very limited, and in drought years unreliable. The amount of water contained in it is directly proportioned to the amount of precipitation. In the drought years of 1930-1934 wells using this horizon as an aquifer did not yield enough water for 10 head of stock, whereas in years of average rainfall sufficient water for 20 head of stock was available. Occasionally a pocket of sand is tapped in this horizon and the supply of water yielded is above average. Examples of these wells are found in SW. $\frac{1}{4}$, section 18, SW. $\frac{1}{4}$, section 23, SW. $\frac{1}{4}$, section 24, and NW. $\frac{1}{4}$, section 34. Wells that have a quicksand aquifer in this horizon seem to deliver a greater supply of water than those having sand or gravel as an aquifer. The water is hard, contains variable amounts of salts in solution and is not under pressure.

The second horizon is composed of quicksand overlying the bedrock Marine shale and is struck at approximately 80 feet from the surface. In the well located on SE. $\frac{1}{4}$, section 5, the hydrostatic pressure is sufficient to cause the water to rise to within 25 feet of the surface. The water is medium hard, contains soda, and is potable. Sufficient water for 30 head of stock is available. In the well in NW. $\frac{1}{4}$, section 30, the pressure raises the water to within 56 feet of the surface. The water is hard and contains iron and soda. It is not used for household purposes; but is used for stock and is sufficient for 35 head of stock. Neither well was affected by the drought of 1930-1934.

Township 9, Range 15

This township is completely covered by sediments deposited in a glacial lake. The sediments are yellow sandy clay, red or brown clay, and hard black clay, sand, gravel, and quicksand, and are underlain by glacial blue clay.

The yellow silty clay underlies the top soil to an average depth of 12 to 20 feet. Red or brown clay may be found instead of the yellow clay and in places beds of blue clay underlie them. Usually sand and gravel layers occur beneath the surface clays and have an average thickness of 3 feet. Blue clay underlies the sand and gravel to depths of 60 to 140 feet from the surface. A thick bed of greyish black quicksand separates the blue clay from the Marine shale bedrock formation.

As in township 9, range 14, the glacial drift of this township contains two water-bearing horizons. The first horizon consists of sand or gravel; it occurs at depths of 15 to 40 feet beneath the surface and generally underlies the yellow clay. The second horizon is the quicksand bed that overlies the bedrock at a depth of approximately 90 feet from the surface.

The first horizon seems to be broken up into pockets or lenses. Wells that strike the central part of one of these pockets yield an abundant supply of water. These pockets are more numerous 2 miles north of the southern boundary of the townships. In sections 1 to 12 there are only three wells that yield an abundant supply of water and they are located in NE. $\frac{1}{4}$, section 6, SE. $\frac{1}{4}$, section 7, and SE. $\frac{1}{4}$, section 12. In the northern part wells that yield a good supply of water are fairly numerous. However, all through the township there are quarter sections where water cannot be obtained in any quantity, either by shallow digging or by boring to depth. The pocket arrangement of this first water-bearing horizon gives rise to the conditions where one farmer has no water whereas his neighbour has more than a sufficient supply. Wells that do not strike a pocket generally yield a fair supply in years of good rainfall, but in drought years they soon become dry. Water obtained from the sand pockets originates from rainfall, the pockets acting as huge reservoirs, and drought conditions will not affect them to a great extent. The water from wells in the first horizon is usually hard, highly alkaline, and is not under pressure. The second horizon is tapped by three wells, in sections 21, 27, and 28. The supply of water is not easily affected by drought. The water rises, due to hydrostatic pressure, 40 to 50 feet above the source. It is hard and contains iron. Usually the water is not suitable for human use.

Numerous attempts have been made to secure water in the bedrock. The village of McTaggart has drilled holes to a maximum depth of 900 feet without success. Water was obtained in a well 370 feet deep in NW. $\frac{1}{4}$, section 18, but the quality was such that it could not be used even for stock. It is advised in these reports that drilling into the bedrock Marine shale is futile. Only in rare cases has water been located and the highly mineralized quality renders it unsuitable for domestic use or even for stock.

In this township drilling should be confined to the upper 100 feet of glacial drift. Farmers digging wells should first of all test with a 2-inch auger. In this way a lens of sand may be found within 40 feet of the surface. The construction of dugouts is advised where water at shallow depths cannot be obtained by testing methods.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL
MUNICIPALITY OF WEYBURN, NO. 67, SASKATCHEWAN

West of 2nd mer. Township / Range	7 / 13	7 / 14	7 / 15	8 / 13	8 / 14	8 / 15	9 / 13	9 / 14	9 / 15	Total No. in municipality
Total No. of Wells in Township	33	71	70	79	82	98	71	79	126	709
No. of wells in bedrock	7	4	1	0	0	2	0	1	8	23
No. of wells in glacial drift	23	67	69	79	82	96	71	78	118	683
No. of wells in alluvium	3	0	0	0	0	0	0	0	0	3
Permanency of Water Supply										
No. with permanent supply	20	37	45	30	42	40	38	38	41	331
No. with intermittent supply	5	13	13	18	14	25	12	22	44	166
No. dry holes	8	21	12	31	26	33	21	19	41	212
Types of Wells										
No. of flowing artesian wells	0	0	0	0	0	0	0	0	0	0
No. of non-flowing artesian wells	3	2	0	0	3	1	0	2	7	18
No. of non-artesian wells	22	48	58	48	53	64	50	58	78	479
Quality of Water										
No. with hard water	11	42	55	42	49	58	43	54	83	437
No. with soft water	14	8	3	6	7	7	7	6	2	60
No. with salty water	1	0	0	1	0	1	1	1	6	11
No. with alkaline water	7	17	18	14	25	28	25	46	52	232
Depth of Wells										
No. from 0 to 50 feet deep	29	68	70	76	70	88	67	75	101	644
No. from 51 to 100 feet deep	1	1	0	3	11	6	4	4	13	43
No. from 101 to 150 feet deep	1	1	0	0	1	2	0	0	6	11
No. from 151 to 200 feet deep	0	0	0	0	0	2	0	0	1	3
No. from 201 to 500 feet deep	0	1	0	0	0	0	0	0	3	4
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	2	2
No. over 1,000 feet deep	2	0	0	0	0	0	0	0	0	2
How the water is used										
No. usable for domestic purposes	22	38	52	35	35	36	35	34	37	324
No. not usable for domestic purposes	3	12	6	13	21	29	15	26	48	173
No. usable for stock	23	46	57	47	38	56	40	46	48	401
No. not usable for stock	2	4	1	1	18	9	10	14	37	96
Sufficiency of Water Supply										
No. sufficient for domestic needs	23	50	57	45	50	61	50	56	82	474
No. insufficient for domestic needs	2	0	1	3	6	4	0	4	3	23
No. sufficient for stock needs	14	21	37	35	36	33	30	34	39	279
No. insufficient for stock needs	11	29	21	13	20	32	20	26	46	218

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 and unless the figure is very high it does not imply that the water is too alkaline for irrigation purposes. The analyses are given in parts per million--that is, in parts by weight of the constituents in 1,000,000 parts by volume 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 practically all rocks, but in larger amounts 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 boilers and teakettles 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, and watersthat contain a large amount of them cannot be used for irrigation.

Sulphates

Sulphates (SO_4) are one of the common constituents of natural water. The sulphate salts most commonly found are sodium sulphate (Glauber's Salt, Na_2SO_4), magnesium sulphate (Epsom

Salts, $MgSO_4$) and calcium sulphate ($CaSO_4$). Waters that contain these sulphate salts are called "sulphated waters". When the water contains large quantities of the sulphate of sodium ("White Alkali") it is injurious to vegetation and cannot be used for irrigation. According to Thresh and Beale, London, the continued use of water that contains 1,200 parts or more per million of magnesium sulphate and 500 parts or more per million of sodium sulphate causes diarrhoea and scour among stock, and one half this quantity makes the water unfit for domestic use.

Chlorides

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

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 out 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 had 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 to the bicarbonates of calcium and magnesium, 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. The following table from "The Examination of Water and Water Supplies" by Thresh and Beale, London, 1925 , can be used for determining the relative hardness of a water.

Total Hardness	Character
Less than 50 parts per million.	Very soft
50 - 100 " " "	Moderately soft
100 - 150 " " "	Slightly hard
150 - 200 " " "	Moderately hard
200 - 300 " " "	Hard
Over 300 " " "	Excessively hard

Many of the Saskatchewan water samples analysed by the Geological Survey 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.

The term "alkaline" has been applied rather loosely to some ground waters. Its original meaning was a chemical one and it implied that the substance in question would neutralize acids. The carbonates of calcium, magnesium, and sodium are the only compounds found in ground water that would make it alkaline chemically. A later application of the term "alkaline" was to soils that contain sufficient "black alkali" or "white alkali" to make them unfit for vegetation. In the Prairie Provinces a water is usually considered to be alkaline when it contains so much dissolved solids that it is not very suitable for human consumption; except that 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".

Analyses of Water Samples from the Municipality of Weyburn, No. 67, Saskatchewan

LOCATION					Depth of Well, Ft.	Total dis'vd Solids	Cl.	HARDNESS			CONSTITUENTS AS ANALYSED					CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS								Source of Water
Qtr.	Sec.	Tp.	Rge.	Mer.				Total	Perm.	Temp.	Alkalinity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	
SW.	9	7	15	2	32	3,160	191	1,300	1,300		360	420	198	1,718	728	3,081	360	530		590		1,286	315	*l
NE.	11	7	15	2	40											2,160		(2)		(3)	(4)	(1)	(5)	*l
SW.	30	8	14	2	24	400	29	360	360		225	90	47	70	38	356	161		54	63		30	48	*l
NE.	26	9	13	2	16											1,791		(2)		(3)	(4)	(1)	(5)	*l
NE.	31	9	13	2	18	4,560	105	3,000+	3,000+		375	290	612	2,936	956	4,548	375	194		1,824		1,982	173	*l
NE.	35	9	13	2	28											4,640		(2)		(3)	(4)	(1)	(5)	*l
NW.	4	9	14	2	12	440	16	350	275	75	200	30	76	156	88	424	54		123	57		170	26	*l

Water samples indicated thus, *l, are from glacial drift.
Analyses are reported in parts per million; where numbers (1), (2), (3), (4), and (5) are used instead of parts per million, they represent the relative amounts in which the five main constituents are present in the water.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
Analyses Nos. 2, 4 and 6 by Provincial Analyst, Regina.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

The accompanying analyses show the mineral character of the water from seven wells whose aquifer lies in the glacial drift. The deepest well from which a sample was taken is 40 feet deep and all the wells have tapped the first water-bearing horizon in the glacial drift.

It will be noticed that the wells in SW. $\frac{1}{4}$, sec. 30, tp. 8, range 14, and in NW. $\frac{1}{4}$, sec. 9, range 14, give samples that contain only 356 and 424 parts per million of dissolved salts. The remaining five wells yield water whose total dissolved content ranges from 1,800 to 4,600 parts per million. Since all the wells are approximately the same depth and tap the first sand beds, this wide difference requires explanation.

Water derived from wells is never chemically pure, but it always contains solids in solution. In the shallow wells of this municipality the water comes from rainfall that seeps into the ground. In order to reach the sand aquifer the water must pass through yellow clay from which salts are more easily dissolved than from the sand. In the two wells from which the water sampled has a relatively small amount of dissolved salts, the aquifer was struck very close to the surface and is in the form of a thick bed of white sand. There was very little overlying clay, hence the rainfall passed almost directly into the sand. In the wells from which the water is high in mineral content, the sand aquifer underlies yellow or blue clay, and the surface water became impregnated with salts as it seeped through to the sand.

Two wells in secs. 31 and 35, tp. 9, range 13, yield water that has too high a mineral content to be potable. This water can possibly be used for stock, however, provided that the scouring effect of the $MgSO_4$ content is not too great.

Water from the Bedrock

No samples of the water from the bedrock were taken, but it was reported that one well that was drilled to shale produced a water containing 12 per cent of total solids. If this figure is accurate the water contains almost four times the mineral content of sea water. It is very doubtful if water can be obtained at depth from the bedrock Marine shale deposits in this municipality that would be usable either for humans or stock.

WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67 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
1	SE.	1	7	13	2	Drilled	102	1,885	- 60	1,825			Bedrock fine blue sand	Soft, salty, clear, iron		D, S	Sufficient for 40 head stock.
2	SE.	6	"	"	"	Dug	30	1,857	- 20	1,837			Glacial sand and gravel	Hard, clear, alkaline		D, S	Insufficient for house and few stock.
3	NW.	6	"	"	"	"	16	1,866	- 8	1,858	12	1,854	Glacial fine white sand	Soft, clear, alkaline		D, S,	Sufficient for 20 head stock.
4	NW.	11	"	"	"	"	6	1,856	0	1,856	5	1,851	Recent stream gravel	Soft, clear, soda		D,	" " household needs.
5	NE.	12	"	"	"	"	15	1,904	- 7	1,897			Glacial	Hard, black, alkaline		N,	Not used for anything.
6	SW.	13	"	"	"	Drilled	70	1,900	- 12	1,88	60	1,840	Becrock fine grey sand	Soft, clear, soda		D, S	Sufficient for 50 head stock.
7	NW.	14	"	"	"	Dug	12	1,892	- 2	1,890			Glacial fine yellow sand	Hard, clear, iron, alkaline		D,	Intermittent well.
8	NE.	15	"	"	"	" Drilled	33	1,859	0	1,859	33	1,826	White mud sandstone	Soft, clear		D, S	Will water 100 head stock.
9	NE.	15	"	"	"	Dug	18	1,857	- 14	1,843	16	1,841	Glacial sand and gravel	Hard, clear		D,	Intermittent well.
10	SE.	16	"	"	"	"	8	1,865	- 4	1,861	4	1,861	Glacial sand	Soft, clear		D,	Sufficient for household needs only.
11	SW.	16	"	"	"	"	7	1,862	- 1	1,861			Recent stream gravel	Soft, clear		D, S	" " 21 head stock.
12	SW.	16	"	"	"	"	16	1,863	- 12	1,851			Recent stream gravel	Soft, clear		N,	Too far away to bother using it.
13	NW.	20	"	"	"	"	6	1,827	- 2	1,825			Glacial sand	Soft, clear		S,	Sufficient for 25 head stock.
14	NE.	20	"	"	"	"	12	1,856	- 7	1,849	7	1,849	" "	Soft, clear		D, S	" " 3 " ".
15	SW.	22	"	"	"	"	1515	1,900					Bedrock	Hard, clear			Dry hole.
16	SW.	27	"	"	"	"	14	1,898	- 8	1,890	12	1,886	Glacial hard, fine grey sand	Hard, clear, iron, alkaline		N,	Too alkaline for use, dry now.
17	SE.	28	"	"	"	Drilled	1735	1,898					Bedrock				Dry hole.
18	SE.	28	"	"	"	Dug	10	1,894	- 6	1,888	8	1,886	Glacial fine grey sand	Hard, clear, alkaline, iron		N,	Became too alkaline for use.
19	SE.	30	"	"	"	"	16	1,884	- 8	1,876	12	1,872	Glacial yellow sand	Soft, clear		D, S	Sufficient for 5 head stock.
20	SE.	33	"	"	"	"	19	1,909	- 10	1,899	15	1,894	Glacial loam with gravel	" "		D, S	Insufficient; waters only 4 head stock in winter.
21	NW.	34	"	"	"	Bored	28	1,922	- 10	1,912	20	1,902	Glacail sand	Hard, clear alkaline, iron		D,	Hardly sufficient for household needs.
1	SW.	2	7	14	2	Dug	20	1,903	- 12	1,891			Glacail clay	Hard, clear		D, S	Sufficient for house, pigs and calves.
2	NW.	2	"	"	"	"	18	1,902	- 6	1,896			" sand	" " alkaline		D, S	" " 18 head stock.
3	NE.	3	"	"	"	Bored	26	1,904	- 20	1,884	20	1,884	" fine red sand	Hard, clear		D, S	" " household needs only.
4	NW.	4	"	"	"	Dug	20	1,901	- 12	1,889			Bedrock sand	" "		D, S	" " 16 head stock.
5	SE.	5	"	"	"	"	24	1,906	- 14	1,892			Glacial course sand	" " alkaline, iron		D, S	Insufficient; waters only 8 horses now.
6	NE.	5	"	"	"	Bored	45	1,909	- 30	1,879	45	1,864	Glacial course sand	Hard, clear, alkaline, iron		D, S	" " " 8 head of cattle. Plugged with quicksand.

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 WEYBURN NO. 67 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
7	NW.	6	7	14	2	Dug	40	1,900	- 28	1,872	40	1,860	Glacial sand	Hard, clear		D, S	Intermittent well.
8	SE.	8	"	"	"	Bored	30	1,903	- 15	1,888	15	1,888	" clay	" " iron		D, S	Poor supply.
9	NE.	8	"	"	"	Dug	25	1,901	- 2	1,899	24	1,877	" "	Hard, "		D, S	Sufficient; waters 12 head stock.
10	NW.	9	"	"	"	Bored	80	1,904	- 10	1,894	80	1,824	" sand	" " alkaline		S,	Partly clogged with quicksand. Sufficient; waters 10 head stock.
11	NE.	10	"	"	"	Dug	18	1,900	- 8	1,892	18	1,882	" "	Hard, clear, alkaline		D,	Intermittent well.
12	NW.	14	"	"	"	"	25	1,882					"	Soft, clear		D, S	Insufficient; waters 12 head stock.
13	NE.	15	"	"	"	"	30	1,879	- 10	1,869	15	1,864	" sand	" "		D, S	Sufficient; waters 2 head stock in winter.
14	NE.	17	"	"	"	"	26	1,903	- 12	1,891	15	1,888	" "	Hard, clear		D, S	" " 30 " ".
15	SE.	20	"	"	"	"	44	1,906	- 41	1,865	40	1,866	" blue "	" " alkaline		S,	" " 30 " ".
16	SW.	21	"	"	"	"	20	1,906	- 8	1,898	19	1,887	" gravel	Hard, clear		D, S	Intermittent well.
17	NW.	21	"	"	"	"	16	1,901	- 8	1,893	16	1,877	" sand	" "		D,	Sufficient; keeps no stock.
18	NE.	22	"	"	"	"	16	1,888	- 4	1,884	13	1,875	" "	" "		D, S	" for 80 head stock.
19	NW.	23	"	"	"	"	16	1,878	- 4	1,874			" black brown loamy clay	Soft, clear		D, S	Well is dry in winters.
20	NW.	23	"	"	"	"	18	1,886					Glacial black clay				Dry hole.
21	NE.	24	"	"	"	"	12	1,856	- 8	1,848	2	1,854	Glacial course sand	Soft, clear		D, S	Sufficient for local needs.
22	SE.	25	"	"	"	"	4	1,874	0	1,874	0	1,874	Glacial fine brown sand	" "		D, S	Sufficient for house and 4 head stock. (spring)
23	SE.	27	"	"	"	"	18	1,872					Glacial sand and gravel	Hard, clear, alkaline		D,	Sufficient for household needs.
24	SW.	28	"	"	"	"	28	1,908	- 17	1,891	15	1,893	Glacial gravel	Hard, clear, alkaline		S,	Insufficient; watered 6 head stock, last year.
25	NW.	28	"	"	"	"	33	1,903	- 17	1,886			" sand	Hard, clear		D, S	" " 8 " ", in winter.
26	SE.	29	"	"	"	Bored	150	1,905	- 15	1,890			Bedrock	Soft, clear, soda, sulphur, alkaline, iron		S,	Sufficient for 200 head stock, poor quality.
27	NE.	29	"	"	"	Dug	14	1,900	- 10	1,890	14	1,886	Glacial clay	Hard, clear		D,	Sufficient for household needs.
28	SE.	30	"	"	"	"	20	1,909	- 12	1,897	19	1,890	" sand	" " alkalino		S,	Insufficient; waters 20 head stock in summer. Dry in winter.
29	SW.	32	"	"	"	"	23	1,878	- 2	1,876	14	1,864	" "	Soft, clear		S,	Sufficient for 19 head stock.
30	NE.	32	"	"	"	"	24	1,914	- 14	1,900			" gravel	Hard, clear, iron		D,	" " household needs only.
31	NW.	33	"	"	"	Bored	26	1,901	- 8	1,893			" sand	Soft, clear,		D, S	" waters 47 head stock.
32	SW.	34	"	"	"	Dug	20	1,884	- 8	1,876	17	1,867	" gravel	Hard, cloudy iron, alkaline		S,	Insufficient 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 WEYBURN NO.67, 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
33	NE.	34	7	14	2	Dug	20	1,908	- 11	1,897	12	1,896	Glacail sand and clay	Hard, clear, iron,alkaline		D, S	Sufficient for 50 head stock.
34	NW.	36	"	"	"	"	22	1,884	- 18	1,866			Glacial gravel	Hard, clear, alkaline		D, S	Insufficient; waters 8 head stock in winter.
1	NW.	2	7	15	2	Dug	11	1,898	- 7	1,891	9	1,889	" sand	Hard, clear iron		D, S	Sufficient for 15 head stock.
2	NE.	2	"	"	"	"	10	1,886	- 6	1,880	7	1,879	" sand	Hard, clear		D, S	" " 25 " " .
3	NW.	3	"	"	"	"	14	1,908	- 8	1,900	7	1,901	" "	" " iron		D, S	Insufficient; enough for house only.
4	NE.	4	"	"	"	"	14	1,920	- 10	1,910	8	1,912	" gravel	Hard, clear, alkaline		S,	Insufficient; waters 10 head stock.
5	NW.	5	"	"	"	"	23	1,935	- 20	1,915	21	1,914	" sand	Hard, clear, iron,alkaline		D, S	Sufficient for 45 head stock.
6	NW.	6	"	"	"	"	20	1,910	- 12	1,898			" "	Hard, clear		D, S	" " 4 " " .
7	NE.	8	"	"	"	"	15	1,910	- 9	1,901	10	1,900	" gravel	" "		D, S	Intermittent well.
8	SW.	9	"	"	"	"	32	1,915	- 12	1,903	13	1,902	" "	" " iron		D, S	Insufficient, just used for house and stock occasionally. #.
9	SW.	10	"	"	"	"	8	1,897	- 6	1,891	6	1,891	" "	Soft, clear,		D, S	Sufficient for 50 head stock in winter.
10	NE.	10	"	"	"	"	10	1,896	- 4	1,892	7	1,889	" fine rusty brown sand	Hard,clear, iron,alkaline		S,	" " 12 " " .
11	NE.	11	"	"	"	Bored	40	1,893	- 19	1,874	39	1,854	Glacial sand	Hard, cloudy, iron,alkaline		D, S	" " 14 " " , in winter.
12	SW.	12	"	"	"	Dug	12	1,888	- 9	1,879	10	1,878	" gravel	Hard, clear		D, S	Insufficient; waters 12 head stock.
13	NE.	12	"	"	"	"	18	1,891	- 9	1,882			" quicksand	" "		D, S	Sufficient; waters 27 head stock in winter.
14	NE.	16	"	"	"	"	26	1,903	- 16	1,887	12	1,891	" sand and gravel	" "		S,	Insufficient; waters only 10 head stock.
15	SE.	17	"	"	"	"	15	1,928	- 12	1,916			Glacial sand	" "		D,	Sufficient for household needs only.
16	NW.	17	"	"	"	"	16	1,913	- 8	1,905			" "	" " alkaline		D, S	" " 14 head stock.
17	SE.	18	"	"	"	Tested	20	1,932					" "				Dry hole.
18	SW.	18	"	"	"	Dug	22	1,935	- 14	1,921			" "	Hard, clear		D, S	Sufficient for 11 head stock.
19	NE.	18	"	"	"	"	20	1,920	- 16	1,904			" yellow sand	" "		D, S	" " 25 " " .
20	SE.	19	"	"	"	"	24	1,901	- 18	1,883			Glacial yellow clay	" " alkaline		D,	" " household needs only.
21	NW.	19	"	"	"	"	26	1,897	- 20	1,877	25	1,872	Glacial sand	Hard, clear, iron,sulphur		D, S	" " 50 head stock.
22	NE.	20	"	"	"	"	12	1,904	- 8	1,896	10	1,894	" fine sand	Hard, clear		D, S	" " 25 " " .
23	SW.	22	"	"	"	"	16	1,904	- 11	1,893	10	1,894	" " "	Soft, clear		S,	" " 40 " " .
24	NE.	22	"	"	"	"	10	1,900	- 2	1,898	5	1,895	" sand and gravel	Hard, iron clear		S,	" " 30 " " .
25	SW.	24	"	"	"	"	12	1,900	- 8	1,892	12	1,888	Glacial sand	Hard, clear		D,	" " domestic needs.

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(#) Sample taken for analysis.

WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67, 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
26	NW.	24	7	15	2	Dug	22	1,893	- 5	1,888			Glacial fine sand	Hard, clear, iron		D,	Sufficient for domestic needs only.
27	NE.	24	"	"	"	"	28	1,898	- 6	1,892	24	1,874	" sand	Hard, clear, alkaline		D, S	" " 22 head stock.
28	SE.	26	"	"	"	"	32	1,884	- 16	1,868			" sand and clay	Hard, clear, alkaline		D, S	Insufficient for local needs.
29	NE.	26	"	"	"	"	22	1,898	- 12	1,886	10	1,888	Glacial sand	Hard, clear		D, S	Sufficient for 30 head stock.
30	NE.	32	"	"	"	"	20	1,899	0	1,899			" clay	" " alkaline		S,	Intermittent well.
31	SE.	34	"	"	"	"	21	1,899	- 15	1,884			" gravel	Hard, clear, iron		D, S	Sufficient for 25 head stock.
32	SW.	35	"	"	"	"	20	1,894					" "	Hard, clear, iron		D, S	" " 21 " " .
33	SE.	36	"	"	"	"	26	1,894					" quicksand	Hard, clear, alkaline		D, S	" " 15 " " .
34	NE.	36	"	"	"	"	16	1,895	0	1,895			" clay	Hard, clear, alkaline		D, S	Intermittent well.
1	SW.	1	8	13	2	Dug		1,955					Glacial	Hard, clear, alkaline		D,	Intermittent well.
2	SW.	2	"	"	"	"	15	1,935	- 4	1,931	4	1,931	" gravel	Hard, clear,	45	D, S	Sufficient for 20 head stock.
3	NW.	3	"	"	"	"	19	1,930	- 11	1,919	11	1,919	" sand	" "	44	D, S	" " 10 " " .
4	NE.	7	"	"	"	"	18	1,895	- 7	1,88			" clay	Soft, clear	53	D, S	Intermittent well.
5	NE.	8	"	"	"	"	20	1,910					" "				Dry hole.
6	NE.	9	"	"	"	"	12	1,920	- 6	1,914			" sand	Hard, clear		D, S, I	Over sufficient for local needs.
7	NE.	9	"	"	"	"	8	1,925	0	1,925			" "	" "		D, S	" " 30 head stock and 5 tanks a day.
8	NE.	10	"	"	"	"	16	1,945	- 5	1,940	14	1,931	" sand and clay	Soft, clear		D, S	Sufficient for 30 head stock.
9	NE.	10	"	"	"	"	14	1,940	- 6	1,934			Glacial sand	Hard, clear		D, S	Over sufficient, 1 tank an hour.
10	SW.	11	"	"	"	"	8	1,970	- 2	1,968	2	1,968	" " and gravel	" " alkaline		D, S	" " for local needs.
11	NW.	11	"	"	"	"	16	1,965	- 4	1,961	4	1,961	Glacial blue clay	Hard, clear, alkaline	48	S,	Sufficient for 20 head stock.
12	SW.	12	"	"	"	Bored	26	1,963	- 13	1,950	16	1,947	" clay and sand	Hard, clear	50	D, S	" " 20 " " .
13	SE.	14	"	"	"	Dug	16	1,960	- 8	1,952			Glacial sand	" alkaline		S,	Intermittent well.
14	SW.	14	"	"	"	"	14	1,950	- 9	1,941	8	1,942	" gravel	" clear		D, S	Sufficient for 50 head stock.
15	NW.	15	"	"	"	"	11	1,950	- 2	1,948	6	1,944	" sand	" "	46	D, S, I	Intermittent well.
16	SE.	16	"	"	"	"	12	1,930					" "	" "		D, S	Sufficient for 25 head stock.
17	NW.	16	"	"	"	"	15	1,925	- 8	1,917	8	1,917	" quicksand	Soft, clear		D, S	Over sufficient for local needs.
18	NE.	17	"	"	"	"	10	1,905	- 4	1,901	10	1,895	" "	" "		D, S	Sufficient for 100 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67, SASKATCHEWAN.

5

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
19	SW.	19	8	13	2	Dug	19	1,910	0	1,910			Glacial clay	Hard, clear, iron	48	D,	Sufficient for local needs.
20	NW.	19	"	"	"	"	15	1,920	0	1,920			" sandy clay	Hard, clear	47	S,	Intermittent well.
21	NW.	20	"	"	"	"	16	1,950	- 8	1,942			"	"			Sufficient for local needs.
22	NE.	20	"	"	"	"	28	1,935	- 10	1,925	10	1,925	" sandy clay	" clear		D, S	Sufficient for 20 head stock.
23	SW.	21	"	"	"	"		1,940					"	" "		D, S	Over sufficient for local needs.
24	NE.	22	"	"	"	"	18	1,960	- 10	1,950			" sand	" "	52	D, S	Sufficient for 25 head stock.
25	NE.	23	"	"	"	"	20	1,990	0	1,990	0	1,990	" clay and sand	" "	48	D, S	Over sufficient for local needs.
26	SW.	24	"	"	"	Bored	25	1,985	- 20	1,965			Glacial clay	" "	49	S,	Intermittent well.
27	SE.	25	"	"	"	Dug	20	1,990	- 10	1,980	10	1,980	" gravel	" "	45	D, S	Sufficient for 30 head stock.
28	NW.	25	"	"	"	"	15	1,990	- 4	1,986			" clay	" "	51	S,	Intermittent well.
29	SW.	28	"	"	"	"	28	1,965	- 18	1,947			" sand	alkaline Soft, clear	48	D, S	" " .
30	SE.	30	"	"	"	"	16	1,935	- 4	1,931	4	1,931	"	Hard, clear		S,	Sufficient for stock except in winter.
31	NW.	30	"	"	"	Bored	22	1,935	- 12	1,923	16	1,919	" sand and clay	" " alkaline	48	S,	" " 28 head stock.
32	SE.	34	"	"	"	Dug	35	1,980	- 5	1,975	25	1,955	Glacial gravel	Hard, clear, alkaline, salty		S,	" " 60 " " .
33	SE.	35	"	"	"	"	20	1,990	- 8	1,982	8	1,982	" clay	Hard, clear	45	D, S,	" " domestic needs.
34	SW.	36	"	"	"	"	20	1,990	- 8	1,982	8	1,982	" sand	" "	44	D, S	Over sufficient for local needs.
35	NW.	36	"	"	"	"	20	1,990	- 17	1,973	19	1,971	" "	" "	48	S,	Abundant supply.
36	NE.	36	"	"	"	"	28	1,908	- 16	1,892	24	1,884	" "	alkaline Hard, clear	40	D, S	" " .
1	NE.	1	8	14	2	Auger	80	1,850					Glacial				Dry hole.
2	SW.	2	"	"	"	Dug	11	1,888	- 5	1,883	6	1,882	" course sand			D,	Sufficient for local needs.
3	SE.	3	"	"	"	"	30	1,890	0	1,890	28	1,862	Glacial sand	Soft, clear		D, S	" " 30 head stock.
4	SW.	5	"	"	"	"	20	1,880	- 9	1,871	16	1,864	" "	Hard, clear, iron, soda		D, S	" " 60 " " .
5	NE.	7	"	"	"	"	30	1,884	- 14	1,870			" clay	Hard, clear		D, S	" " 10 " " .
6	NW.	8	"	"	"	"	30	1,860	- 18	1,842			" "	" "		D, S	" only in wet years.
7	NE.	9	"	"	"	Bored	90	1,868	- 20	1,848			" course sand	" "		N,	Not used at present.
8	SW.	9	"	"	"	Dug	33	1,868	- 15	1,853			" sand and gravel	" "		D, S	Sufficient for 16 head stock.
9	SW.	10	"	"	"	"	36	1,878	-,32	1,846			Glacial sand	" "		D, S	Insufficient for 12 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67, SASKATCHEWAN.

WELL No.	LOCATION					TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE		PRINCIPAL WATER-BEARING BED			CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
	¼	Sec.	Tp.	Rge.	Mer.				Above (+) Below (−) Surface	Elev.	Depth	Elev.	Geological Horizon				
10	NW.	10	8	14	2	Dug	15	1,850	- 32	1,846			Glacial sand and gravel	Hard, clear iron,alkaline		S,	Sufficient for 14 head stock.
11	NE.	12	"	"	"	Drilled	189	1,895					Glacial				Dry hole.
12	NE.	12	"	"	"	Dug	16	1,891	- 6	1,885			" gravel	Soft, clear, alkaline		D,	Insufficient for local needs, dry now.
13	SE.	14	"	"	"	"	24	1,892	- 3	1,889			" sand	Hard, clear, iron,alkaline		D,	Sufficient for household in summer.
14	SW.	14	"	"	"	Bored	14	1,869	- 7	1,862	9	1,860	" clay and sand	Hard, clear		D, S	Unreliable in dry years.
15	NE.	14	"	"	"	Dug	22	1,908	- 2	1,906			Glacial sand	" "		D, S	Sufficient for 100 head stock.
16	SW.	15	"	"	"	"	22	1,858	- 16	1,842			" "	" " alkaline		S,	" " 17 head stock at least.
17	SE.	18	"	"	"	"	38	1,866	- 20	1,846			" "	Hard, clear, iron		D, S	" " local needs.
18	SW.	18	"	"	"	"	52	1,876	- 14	1,862	17	1,859	" gravel and sand	Hard, clear, alkaline		S,	" " 30 head stock.
19	SW.	19	"	"	"	"	54	2,000	- 20	1,980	54	1,946	Glacial sand	Hard,clear	45	D, S	" " 15 " " .
20	SE.	19	"	"	"	Drilled	125	2,00	- 34	1,966	125	1,875	" gravel	" "		D, S	" " local needs.
21	NW.	20	"	"	"	"	71	1,865	- 36	1,829	36	1,829	" grey sand	" " iron		D, S	200,000 gals. a day.
22	NW.	20	"	"	"	"	66	1,865	- 27	1,838	27	1,838	" sand and gravel	Hard, clear, iron		D,	150,000 " " " .
23	SW.	24	"	"	"	Dug	16	1,921	- 4	1,917	15	1,906	Glacial sand	Soft, clear		D,	Sufficient for household needs.
24	SW.	25	"	"	"	"	15	1,932	- 7	1,925			" "	Hard, "		N,	Stagnant; not used.
25	SW.	25	"	"	"	"	26	1,890					"				Dry hole, filled in now.
26	NE.	25	"	"	"	"	20	1,945	- 8	1,937			" sand	Hard, clear, alkaline		S,	Intermittent well.
27	NE.	26	"	"	"	"	15	1,905	- 10	1,895			" "	Hard, clear, alkaline		D, S	Over sufficient for local needs.
28	SE.	27	"	"	"	"	14	1,870	- 8	1,862	8	1,862	" clayey sand	Soft, clear		D,	Sufficient for local needs.
29	SW.	29	"	"	"	?	20	1,850						Hard,alkaline			Dry hole.
30	SW.	29	"	"	"	Dug	32	1,860	- 12	1,848			Glacial sand and gravel	" clear, iron			50,000 gals. a day.
31	NW.	29	"	"	"	"	31	1,874	- 27	1,847			Glacial sand	Hard, clear,		D, S	Insufficient for 6 head stock.
32	SE.	30	"	"	"	"	25	1,875	- 9	1,866	15	1,860	" "	" " alkaline			Filled in now went dry.
33	SW.	30	"	"	"	"	24	1,874	- 20	1,854	13	1,861	" gravel	Soft, clear		D, S	Sufficient for 7 head stock.
34	SW.	31	"	"	"	"	21	1,870	- 16	1,854	17	1,853	" sand	Hard, clear, alkaline		D, S	" " 24 " " .
35	NW.	31	"	"	"	"	16	1,870	- 10	1,860			" clay	Hard, clear, iron,alkaline		D, S	" " 16 " " .
36	SE.	33	"	"	"	Auger	30	1,880					" blue clay				Dry hole.

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(#) Sample taken for analysis.

WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67, 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
37	SE.	34	8	14	2	Dug	16	1,890	- 12	1,878			Glacial sand	Hard, clear		D, S	Insufficient; waters 3 head stock.
38	NW.	34	"	"	"	"	17	1,914	- 10	1,904	12	1,902	" gravel	" "		D, S	Sufficient for 15 head stock.
39	SW.	35	"	"	"	"	13	1,900	- 8	1,892	9	1,891	" " and sand	" " alkaline		D, S	" " 25 " " .
40	NW.	35	"	"	"	"	19	1,917					Glacial	Hard, clear		D, S	" " 12 " " .
1	NW.	1	8	15	2	Bored	25	1,894	- 13	1,881	16	1,878	" clay	Hard, clear		D,	Sufficient for household needs, dry in winter 1934.
2	NE.	1	"	"	"	Dug Bored	28	1,882	- 20	1,862			" "	" " iron		D, S	Sufficient for house and 8 head stock.
3	NE.	2	"	"	"	Dug	25	1,896	0	1,896			" "	Hard, clear		D, S	Intermittent well.
4	NW.	3	"	"	"	"	20	1,913	- 12	1,901			" " and sand	" "		D,	Sufficient for household only.
5	NE.	4	"	"	"	"	26	1,913					Glacial	" "		D,	" " " " .
6	NE.	6	"	"	"	"	35	1,900	- 32	1,868			" clay	" " alkaline		N,	Non-potable.
7	NW.	9	"	"	"	" "	16	1,900	- 3	1,897			" yellow clay	Hard, clear, alkaline		D, S	Intermittent well.
8	SE.	10	"	"	"	"	19	1,904	- 13	1,891			" sand	Hard, clear		D, S	" " .
9	NE.	11	"	"	"	"	16	1,895	- 8	1,887			" "	" " alkaline		S,	Sufficient for 45 head stock.
10	SE.	13	"	"	"	"	16	1,862	- 8	1,854			" coarse sand	Hard, clear		D, S	Insufficient for local needs.
11	NE.	13	"	"	"	"	31	1,868	- 15	1,853			" clay	" " alkaline		S,	" " " " .
12	SW.	14	"	"	"	"	18	1,895	0	1,895			" yellow clay	Soft, clear,		S,	Intermittent well.
13	NE.	14	"	"	"	"	20	1,892	- 6	1,886			" " "	Hard, clear, alkaline		D, S	Sufficient for household needs only.
14	SE.	15	"	"	"	"	20	1,902					"	Hard, clear, alkaline		S,	" " 8 head stock.
15	NE.	16	"	"	"	"	20	1,907	- 12	1,895			" sand	Soft, clear		D,	" " household needs only.
16	SE.	17	"	"	"	"	38	1,902	- 28	1,874	36	1,866	" clay	" " alkaline		D, S	" " " " " .
17	NW.	17	"	"	"	"	20	1,909	- 17	1,892			" yellow clay	Hard, clear		D,	" " " " " .
18	SE.	18	"	"	"	"	26	1,903					" "	" " alkaline		N,	Too alkaline for use.
19	NE.	19	"	"	"	"	20	1,907	- 3	1,904	12	1,895	" sand and gravel	Soft, clear		D, S	Sufficient for 10 head stock.
20	SE.	20	"	"	"	Borod	90	1,900	- 70	1,830	70	1,830	Glacial clay	Hard, "		D, S	Insufficient for local needs.
21	NW.	22	"	"	"	Dug	14	1,898	- 2	1,896			" yellow clay	Soft, clear		D, S	" " " " .
22	SE.	23	"	"	"	"	16	1,880	- 8	1,872	8	1,872	" gravel	Hard, "		D, S	Intermittent well.
23	NW.	23	"	"	"	"	24	1,891	- 17	1,874			" clay	" " alkaline		S,	Sufficient for 25 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67, 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	HEIGHT TO WHICH WATER WILL RISE Elev.	PRINCIPAL WATER-BEARING BED Depth	PRINCIPAL WATER-BEARING BED Elev.	PRINCIPAL WATER-BEARING BED Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
24	NW.	24	8	15	2	Dug	14	1,882	- 8	1,874			Glacial sand	Hard, clear, alkaline		D, S	Good supply of water.
25	SE.	25	"	"	"	"	25	1,875	- 2	1,873			" fine white sand	Hard, clear		D, S	Will water 12 head stock.
26	SE.	26	"	"	"	"	24	1,885	- 8	1,877			Glacial yellow clay	" "		D, S	Insufficient for local needs.
27	SW.	26	"	"	"	"	25	1,894	- 18	1,876			Glacial gravel	" " alkaline		D, S	" " " ".
28	SE.	27	"	"	"	Bored	90	1,897	- 30	1,867			" sand	Hard, clear, alkaline		S,	Sufficient for 50 head stock.
29	SE.	27	"	"	"	Drilled	200	1,897					Marine shale				Dry hole.
30	NE.	28	"	"	"	Dug	27	1,904	- 18	1,886	20	1,884	" bluish sandy soil	Hard, clear		S,	Sufficient for 8 head stock.
31	NW.	30	"	"	"	"	20	1,902	- 2	1,900			Marine gravel sand	Hard, clear, alkaline		S,	Intermittent well.
32	NE.	30	"	"	"	"	14	1,903	- 6	1,897			Marine yellow clay	Hard, clear		D,	" ".
33	SW.	32	"	"	"	"	20	1,904	0	1,904	12	1,892	Marine clay	Soft, clear		S,	" ".
34	NE.	33	"	"	"	"	23	1,891	- 5	1,886			" gravel and sand	Hard, clear, alkaline		D,	" ".
35	SW.	34	"	"	"	"	17	1,887	- 7	1,880			Marine sand	Hard, clear		D,	Sufficient for household needs.
36	SW.	35	"	"	"	"	18	1,889	- 6	1,883	16	1,873	" course sand	" " iron		D, S	Intermittent well.
37	SE.	36	"	"	"	"	18	1,870	- 9	1,861			" clay	Hard, clear, alkaline		D, S	Sufficient for 20 head stock.
38	NE.	36	"	"	"	"	24	1,868	- 16	1,852			" course sand	Hard, clear		S,	" " 30 " ".
1	SW.	2	9	13	2	Dug	16	1,973	- 10	1,963	13	1,960	Glacial sand	Hard, clear, alkaline		D, S	Sufficient for 25 head stock.
2	SW.	3	"	"	"	"	12	1,983	- 6	1,977	8	1,975	" gravel	Soft, clear,		D, S	" " 17 " ".
3	SE.	4	"	"	"	"	12	1,991					" "	Hard, cloudy alkaline		S,	" " local needs.
4	SW.	6	"	"	"	"	15	1,950	- 8	1,942			" sand and gravel	Hard, clear, iron		D, S	" " 15 head stock.
5	NE.	6	"	"	"	Bored Dug	14	1,951					Glacial gravel				Dry hole.
6	NW.	8	"	"	"	Dug	16	1,980	- 5	1,975	12	1,968	" sand	Hard, clear		D, S	Intermittent well.
7	NW.	10	"	"	"	"	20	1,992	- 15	1,977	5	1,987	" "	Soft, "		D, S	Sufficient for 15 head stock.
8	SW.	12	"	"	"	Bored	30	2,016	- 20	1,996			" "	Hard, "		D, S	" " house and cow.
9	NW.	14	"	"	"	Dug	26	2,007	- 21	1,986			" gravel	Soft, "		D, S	" " 100 head stock.
10	SW.	15	"	"	"	"	17	1,995	- 10	1,985	14	1,981	" sand	Hard, " alkaline		S,	" " 30 " ".
11	NW.	15	"	"	"	"	16	2,007	- 10	1,997	10	1,997	" "	Hard, clear		D, S	" " 50 " ".
12	NE.	16	"	"	"	"	12	2,027	- 9	2,018	8	2,019	" gravel	" " alkaline		D, S	Abundant supply.

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WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67, 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
13	NW.	17	8	15	2	Dug	16	1,962	- 2	1,960	6	1,956	Glacial fine yellow sand	Hard, clear		S,	Will water 34 head stock.
14	SE.	18	"	"	"	"	18	1,959					Glacial				Dry hole.
15	SW.	18	"	"	"	"	20	1,956	- 12	1,944			" fine sand	Hard, clear		D, S	Sufficient for 10 head stock.
16	SE.	19	"	"	"	"	20	1,978	- 8	1,970	15	1,963	" sand and gravel	" "		D, S	Insufficient; water only 10 head stock.
17	NE.	23	"	"	"	"	12	1,991					Glacial gravel	Soft, clear		D, S	Sufficient for 12 head stock.
18	SW.	25	"	"	"	"	18	1,975	- 8	1,967	17	1,958	" gravel	Hard, clear alkaline		D, S	" " 20 " " , before well caved in.
19	NE.	26	"	"	"	"	16	1,981	-,12	1,969	14	1,967	" course sand	Hard, clear, alkaline, iron		D,	Sufficient for household needs. #.
20	NE.	28	"	"	"	"	14	2,003	- 9	1,994	13	1,990	" sand	Hard, clear		D, S	" " 33 head stock.
21	SW.	29	"	"	"	"	14	1,989	- 10	1,979	9	1,980	" sand and gravel	" " alkaline		D, S	Intermittent well.
22	NW.	30	"	"	"	"	14	1,982	- 8	1,974			Glacial sand and gravel	Hard, clear, alkaline, iron		D, S	Will water 40 head stock.
23	NE.	31	"	"	"	"	18	2,003	- 12	1,991			Glacial sand	Hard, clear, alkaline, iron salty		S,	Insufficient for 6 head stock. #.
24	SE.	33	"	"	"	"	12	1,989	- 4	1,985	10	1,979	" "	Hard, clear		D, S	Sufficient for 25 head stock.
25	SE.	34	"	"	"	"	24	1,976	- 9	1,967			" quicksand	" "		D, S	" " 100 " " .
26	SW.	34	"	"	"	"	16	1,992	- 6	1,986	14	1,978	" sand	Soft, clear		D,	Intermittent well.
27	NE.	35	"	"	"	"	17	1,873	- 15	1,958	15	1,958	" quicksand	Hard, clear		D,	Sufficient for house use.
28	NE.	35	"	"	"	"	28	1,973	- 20	1,953			" sand	" " alkaline		N,	Water not fit for man or beast. #.
29	SE.	36	"	"	"	"	16	1,990	- 14	1,976	14	1,976	" gravel	Hard, clear, alkaline		D, S	Sufficient for 100 head stock.
1	NW.	2	9	14	2	Dug	14	1,935	- 3	1,932	12	1,923	Glacial fine yellow sand	Hard, clear		D, S	" " 28 " ".
2	SE.	4	"	"	"	"	20	1,918	- 4	1,914			Glacial fine sand	" " alkaline		D, S	" " 14 " ".
3	NW.	4	"	"	"	"	12	1,904	- 9	1,895	9	1,895	Glacial fine sand	Hard, clear		D, S	" " local needs. #.
4	SE.	5	"	"	"	Bored	75	1,890	- 25	1,865			Glacial fine sand	" " soda		D, S	" " 30 head stock.
5	NE.	5	"	"	"	Dug	20	1,894	- 10	1,884	12	1,882	Glacial sand and gravel	Hard, clear		D, S	Insufficient for 60 head stock.
6	SE.	6	"	"	"	"	14	1,881	- 3	1,878	9	1,872	" sand	Soft, clear		D, S	Intermittent well.
7	SW.	6	"	"	"	"	20	1,882	- 10	1,872			"	Hard, clear, alkaline		D, S	Abundant supply.
8	SE.	7	"	"	"	Bored	35	1,892	- 28	1,864	32	1,860	" sand	Hard, clear		S,	Will water 13 head stock.
9	SW.	9	"	"	"	Dug	20	1,910	- 14	1,896	20	1,890	" "	" " alkaline		D, S	Insufficient for local needs.
10	NE.	10	"	"	"	"	8	1,920	0	1,920	6	1,914	" fine sand	Hard, clear, alkaline, iron		D, S	Intermittent well.

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WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67 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	HEIGHT TO WHICH WATER WILL RISE Elev.	PRINCIPAL WATER-BEARING BED Depth	PRINCIPAL WATER-BEARING BED Elev.	PRINCIPAL WATER-BEARING BED Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
11	NE.	13	9	14	2	Dug	17	1,950					Glacial			N,	Too alkaline, so filled in.
12	NE.	14	"	"	"	"	10	1,941	- 7	1,934			" sand	Hard, clear, salty, alkaline		S,	Dry in winter.
13	SE.	15	"	"	"	"	12	1,930					"				Dry hole.
14	SW.	15	"	"	"	"	12	1,937	- 6	1,931	11	1,926	" sand	Hard, clear		D, S	Sufficient for 15 head stock.
15	NE.	15	"	"	"	"	11	1,936	- 7	1,929	6	1,930	" course sand	Soft, "		D, S	Intermittent well.
16	SW.	16	"	"	"	"	18	1,916	0	1,916	11	1,905	" sand	Soft, clear		S,	Intermittent well.
17	SW.	16	"	"	"	"	20	1,918					" clay	Hard, clear, alkaline		S,	" " .
18	SE.	18	"	"	"	"	22	1,918	- 17	1,901	21	1,897	" fine sand	Hard, clear, iron		D, S	Will water 13 head stock.
19	SW.	18	"	"	"	"	18	1,917	- 14	1,903			" quicksand	Hard, clear, alkaline		D, S	" " 50 " " .
20	NE.	18	"	"	"	"	18	1,917	- 13	1,904			" sand	Hard, clear, iron		D, S	" " 35 " " .
21	NE.	20	"	"	"	"	14	1,917	- 8	1,909			" yellow clay	Hard, clear, iron		D, S	Insufficient for 5 head stock.
22	SW.	21	"	"	"	"	15	1,917	- 11	1,906			" sand	Hard, clear, alkaline		D,	Sufficient for household needs.
23		22	"	"	"	"	14	1,940	- 10	1,930	14	1,926	" gravel	Hard, clear		D, S	" " local needs.
24	SW.	22	"	"	"	"	14	1,923	- 6	1,917	12	1,911	" sand	" " alkaline		S,	Insufficient for local needs.
25	SW.	23	"	"	"	"	14	1,948	- 11	1,937	12	1,935	" gravel	Hard, clear, alkaline		D, S	Sufficient for 40 head stock.
26	SW.	24	"	"	"	"	14	1,950	- 8	1,942	14	1,936	" quicksand	Hard, clear, alkaline		S,	" "m 40 " " .
27	NW.	24	"	"	"	"	16	1,948	- 3	1,945	14	1,934	" fine sand	Soft, clear, iron		D, S	" " 40 " " .
28		26	"	"	"	"	18	1,950	- 8	1,942	18	1,932	" sand and clay	Soft, cloudy		D, S	Intermittent well.
29	SE.	27	"	"	"	"	12	1,936	- 4	1,932	8	1,928	Glacial gravel	Hard, clear, iron		D, S	Will water 46 head stock.
30	SW.	28	"	"	"	"	14	1,921					" yellow clay and sand	Hard, clear, alkaline		D, S	Sufficient for 10 head stock.
31	NE.	28	"	"	"	"	12	1,933	- 10	1,923			Glacial gravel	Hard, clear, alkaline, iron		D, S	Will water 3 head stock.
32	SE.	29	"	"	"	"	13	1,920	- 7	1,913	12	1,908	" "	Hard, clear, iron		D, S	Sufficient for 100 head stock.
33	SE.	29	"	"	"	"	26	1,918	- 20	1,898			" "	Hard, clear, alkaline		N,	Not in use stagnant.
34	NW.	29	"	"	"	"	15	1,922	- 10	1,912	10	1,912	" sand and gravel	Hard, clear		D, S	Insufficient for 10 head stock.
35	NW.	30	"	"	"	Bored	96	1,921	- 56	1,865			Glacial qucik-sand	" " iron, soda		S,	Sufficient for 35 head stock. #.
36	SE.	32	"	"	"	Dug	20	1,927	- 16	1,911			Glacial yellow clay	Hard, clear, alkaline		D,	Sufficient for household needs only.
37	SW.	33	"	"	"	"	12	1,929	- 9	1,920			Glacial sand	Hard, clear, alkaline, iron		D, S	" " 6 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—RURAL MUNICIPALITY OF WEYBURN NO. 67, 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
38	NW.	34	9	14	2	Dug	14	1,948	- 8	1,940	13	1,935	Glacial fine sand	Hard, clear, alkaline		D, S	Sufficient for 80 head stock.
39	SE.	36	"	"	"	"	12	1,982	- 8	1,974	10	1,972	Glacial gravel	Hard, clear, alkaline		D, S	Insufficient for 8 head stock.
40	NE.	36	"	"	"	"	22	1,987					"				Dry hole.
1	NW.	2	9	15	2	Dug	18	1,880	- 0	1,880	15	1,865	Glacial sand and gravel	Hard, clear, alkaline	42	S,	Sufficient for local needs.
2	SW.	4	"	"	"	"	18	1,895	- 8	1,887	14	1,881	Glacial clay and sand	Hard, clear	46	D, S, I	Intermittent well.
3	SE.	5	"	"	"	"	20	1,895	- 15	1,880	15	1,880	Glacial clay	Hard, clear, alkaline		D, S	" " .
4	SW.	5	"	"	"	"	24	1,895	- 9	1,886	9	1,886	" clay and sand	Hard, clear, alkaline		S,	" " .
5	NE.	6	"	"	"	"	15	1,905	- 12	1,893	12	1,893	Glacial sand	Hard, clear, alkaline Glauber salts		N,	Over sufficient supply of unusable water.
6	SE.	6	"	"	"	"	22	1,905	- 10	1,895	9	1,896	Glacial clay and sand	Hard, clear, alkaline	42	D, S	Sufficient for household needs only.
7	SE.	7	"	"	"	"	26	1,900	- 6	1,894	16	1,884	Glacial sand	Hard, clear	41	D, S	Oversufficient for local needs.
8	NW.	8	"	"	"	Bored	40	1,895	- 34	1,861	34	1,861	" "	" " alkaline		S,	Intermittent well.
9	SW.	9	"	"	"	Dug	35	1,880	- 12	1,868	18	1,862	" clay	Hard, clear, alkaline		N,	Unpotable for humans or stock.
10	NW.	9	"	"	"	"	32	1,880					"				Dry hole.
11	NW.	9	"	"	"	Drilled	400	1,880	-250	1,630			Bedrock shale	Hard, alkaline clear, salts		N,	150 cubic feet in 20 minutes. (unpotable)
12	NE.	10	"	"	"	Dug	50	1,875	- 47	1,828			Glacial clay	Hard, clear, iron	56	N,	Intermittent well.
13	SE.	10	"	"	"	"	20	1,880	- 12	1,868	12	1,868	" sand	Hard, clear, alkaline		S,	Sufficient for local needs.
14	SW.	12	"	"	"	"	17	1,895	- 15	1,880	15	1,880	" gravel	Hard, clear	41	D, S, I	" " 75 head stock.
15	SE.	14	"	"	"	"	43	1,890	- 5	1,885			" clay	" " iron, salt	43	D, S	Intermittent well.
16	SW.	14	"	"	"	Bored	45	1,890	- 40	1,850	41	1,849	" sand and gravel	Hard, clear, iron	42	D, S	Abundant supply.
17	SW.	15	"	"	"	Dug	20	1,880	- 6	1,874			Glacial clay	Hard, clear		S,	Sufficient for local needs.
18	SE.	16	"	"	"	"	32	1,885	- 27	1,858	32	1,853	" sand	" " alkaline		D, S	" " 100 head stock.
19	SW.	16	"	"	"	Drilled	150	1,880	-125	1,755			"	Hard, clear, salt, alkaline		N,	Not fit to use.
20	SW.	17	"	"	"	"	817	1,883					Bedrock shale				Dry hole, 2 other dry holes 500 feet and 900 feet.
21	SW.	17	"	"	"	Dug	35	1,883	- 24	1,859	24	1,859	Glacial sand	Hard, alkaline		N,	Not potable for humans.
22	NE.	18	"	"	"	"	35	1,885	- 20	1,865			" "	Hard, clear	43	D, S	Sufficient for local needs.
23	SE.	18	"	"	"		35	1,890					"	" alkaline			Small yield.
24	SW.	18	"	"	"	Dug	10	1,895	- 2	1,893			" clay	Hard, clear	48	D, S, I	Intermittent well.

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 WEYBURN NO. 67, 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.	18	9	15	2	Dug	22	1,890	- 16	1,874	16	1,874	Glacial sand	Soft, clear		D, S	Sufficient for local needs.
26	SW.	20	"	"	"	Bored	18	1,880	- 2	1,878			" sandy clay	Hard, "	51	S,	Insufficient for 12 head stock.
27	SE.	20	"	"	"	Dug	20	1,885	- 15	1,870	15	1,870	" sand and gravel	" " alkaline		S,	Sufficient for 80 head stock.
28	NW.	20	"	"	"	"	20	1,885	- 8	1,877	8	1,877	Glacial gravel	Hard, clear, sulphur		D, S	" " 30 " " .
29	SE.	21	"	"	"	"	36	1,890	- 18	1,872			" hardpan	Hard, clear		D, S	Nearly dry in drought periods.
30	NE.	21	"	"	"	Dug Bored	90	1,885	- 50	1,835			"	" " Iron, sulphur	43	D, S	Abundant supply.
31	NW.	22	"	"	"	Bored	64	1,890	- 40	1,850	54	1,836	" sand	Hard, clear, iron		D, S	" " .
32	NE.	23	"	"	"	Dug	24	1,895	- 20	1,875	20	1,875	" fine sand	Hard, clear	42	D, S, I	Sufficient for 35 head stock.
33	SE.	24	"	"	"	"	20	1,895	- 15	1,880	15	1,880	" gravel	" "	41	D, S, I	Oversufficient for local needs.
34	NE.	25	"	"	"	"	22	1,905	- 20	1,885	20	1,885	" "	" " alkaline	44	S,	Intermittent well.
35	NE.	28	"	"	"	Bored	90	1,890	- 30	1,860	85	1,805	" quicksand	Hard, iron, salty, alkaline		D, S	Sufficient for 30 head stock.
36	NE.	28	"	"	"	Drilled	140	1,890	- 35	1,855	90	1,800	" sand	Hard, clear, alkaline		D, S	Abundant supply.
37	SW.	28	"	"	"	Dug	20	1,885	- 12	1,873	12	1,873	"	Hard, clear, iron		S,	Insufficient for local needs.
38	NW.	29	"	"	"	"	25	1,890	- 13	1,877	23	1,867	" sand	Hard, clear, alkaline	41	D, S	Sufficient for 60 head stock.
39	NW.	29	"	"	"	"	18	1,890	- 13	1,877			"	Hard,		S,	Very little water.
40	SE.	30	"	"		"	22	1,890	- 12	1,878			" gravel	" clear	44	D, S	Intermittent well.
41	SE.	30	"	"	"	"	25	1,890	- 10	1,880			" "	" " alkaline		S,	Sufficient supply, but poor quality.
42	NE.	30	"	"	"	Bored	38	1,895	- 32	1,863	32	1,863	" sand	Hard, clear, alkaline		S,	Sufficient for 10 head stock.
43	SW.	33	"	"	"	Dug	25	1,890	- 20	1,870			" clay	Hard, clear	44	D, S, I	" " 25 " " .
44	NE.	33	"	"	"	"	14	1,890	- 5	1,885	12	1,878	" sand	" "		S,	" " local needs.
45	NW.	33	"	"	"	"	28	1,890	- 24	1,866	24	1,866	" gravel	" "	43	D, S, I	Oversufficient for local needs.
46	NW.	34	"	"	"	"	25	1,890	- 11	1,879	11	1,879	" sand	" "	42	D, S	" " " " .
47	NW.	36	"	"	"	"	47	1,900					"				Dry hole.
48	SE.	36	"	"	"	"	200	1,900					Bedrock shale				Dry hole, another 160 foot dry hole.

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.