CANADA
DEPARTMENT OF MINES

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BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF MARYFIELD No. 91 SASKATCHEWAN

BY

B. R. MacKay & H. N. Hainstock

Water Supply Paper No. 18

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF MARYFIELD, NO. 91.

SASKATCHEWAN

INTRODUCTION

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

Publication of Results

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

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

How to Use the Report

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

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

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

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

GLOSSARY OF TERMS USED

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

<u>Water Table</u>. 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.

<u>Wells</u>. 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 <u>Flowing Artesian Wells</u>.

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

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

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

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

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

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

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

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

Bearpaw Formation. The Bearpaw consists mostly of incoherent dark grey to dark brownish grey, partly bentonitic shales, weathering light grey, or, in places where much iron is present, buff. Beds of sand occur in places in the lower part of the formation. It forms the uppermost bedrock formation over much of western and southwestern Saskatchewan and has a maximum thickness of 700 feet or somewhat more.

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

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

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Maryfield is an area of 288 square miles in southeastern Saskatchewan. It consists of eight townships described as townships 10, 11, and 12, ranges 30 and 31, W. 1st mer. The centre of the municipality lies 6 miles west of the Manitoba border, and 60 miles north of the International Boundary line.

The municipality is covered by a mantle of unconsolidated glacial drift which varies in thickness from 4 to 350 feet. An area comprising the northern part of township 10, range 31 all of township 11, range 31 the southern part of township 12, range 31, and the western halves of townships 11 and 12, range 30, is nearly driftless. Here the drift is only from 4 to 30 feet thick, except where deep depressions in the old pre-glacial bedrock land surface have been filled by the glacial debris. The thickness of the drift increases from 60 to 80 feet to the north and east of this area. To the south and southeast it also increases in thickness, being from 190 to 250 feet thick in township 10, range 30, 125 to 250 feet in township 9, range 31, attaining its maximum thickness of 350 feet in township 9, range 30. The upper 10-foot to 40-foot zone of these glacial deposits is composed of yellow boulder clay that contains scattered lenses of sand and gravel. More extensive deposits of sand and gravel occur along the ravines and in the valley of Pipestone river. In the area where the drift has its minimum thickness, the yellow clay rests upon the Marine shale formation, but elsewhere in the municipality it is underlain by blue clay. Locally, lenses of sand occur within the blue clay. In the northeastern corner of the municipality fairly continuous deposits of sand and gravel occur at the base of the blue clay, but elsewhere these deposits occur only in the depressions in the bedrock surface.

Water-Bearing Horizons in the Unconsolidated Deposits

The glacial deposits contain three water-bearing horizons. The gravel deposits that occur in the upper 40-foot zone of the glacial drift form a water-bearing horizon. This horizon occurs at elevations of 1,825 to 1,925 feet, and is the source of water for most of the shallow wells in the municipality. It is best developed in the southwestern part of the municipality where the gravel deposits are fairly numerous. Elsewhere, it yields only a meagre supply of water, and in townships 9 and 10, range 30, the majority of the shallow wells derive their water, which in many places is very "alkaline", from seepage from the clay.

At various localities sand lenses within the blue clay have been encountered at depths of 60 to 160 feet. Only a small supply of water can be expected from these lenses. Much of the water is very "alkaline" and is under sufficient pressure to cause it to rise above the top of the aquifer. These porous deposits form a second water-bearing horizon.

The sand and gravel deposits that lie below the blue clay, or at the contact of the glacial drift and bedrock, form another water-bearing horizon. This horizon is fairly continuous in the northeastern half of township 12, range 30, and a fair supply of hard, slightly "alkaline" water is obtained from it at a depth of 60 feet or at an elevation of 1,725 feet. Elsewhere in the municipality gravel pockets occur only in spots and may either yield an abundant supply of hard, slightly "alkaline" water or be entirely barren of water.

Water-bearing Horizons in the Bedrock

The Ravenscrag formation underlies the glacial drift in the southwestern part of the municipality. It is composed of shale and sandy shale, and its greatest thickness is not more than 150 feet. The approximate northern limit of this formation is indicated on the map of the municipality (Figure 1) by a broken line.

The sandy beds in the Ravenscrag formation form a water-bearing horizon at a depth of from 280 to 300 feet. An abundant supply of soft, slightly salty water can be obtained from this horizon in township 9, range 31. The hydrostatic pressure is sufficient to cause the water to rise to within 50 feet of the surface.

To the north of the geological boundary indicated on the map the Marine shale formation immediately underlies the glacial drift. This formation is composed of a light grey shale which is almost entirely lacking in sandy strata. From information obtained in the deep well near Fleming, which was drilled by the Fitzsimmons Gas Company, this Marine shale formation is approximately 1,000 feet in thickness. It outcrops in a few places in the valley of Pipestone river.

In the area in which the Marine shale formation comes close to the surface, a fairly abundant supply of medium soft to hard water is obtained from the upper 5 to 30 feet of the formation. Some of the water is undoubtedly derived by seepage from the overlying clay and in such cases the water is usually "alkaline". The water that is derived from the shale is under slight pressure and rises from 3 to 20 feet above the top of the water-bearing horizon. Where this formation is overlain by the Ravenscrag sediments, or by thick deposits of glacial drift, it does not appear to be water-bearing. Throughout the municipality no water can be expected to occur in this formation at depth.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 9, Range 30

The water-bearing horizons in the glacial drift of this township are of small areal extent and produce only a meagre supply of water. Sand lenses occur within the yellow clay at depths of 10 to 30 feet, but wells dug into these pockets provide only enough water for household purposes and a few head of stock in years of normal precipitation, and are completely dry during the drought periods. A permanent supply of hard, usable water is obtained by a number of shallow wells dug into gravel lenses in the northeastern corner of the township, but several dry holes are usually dug before a lens is located. Small lenses of sand have been encountered in the blue clay at depths of 80, 160, 250, and 320 feet. Some of these lenses contain a small amount of hard, usable water, but the supply usually gives out a short time after the wells are made. The possibilities of locating within the blue clay lenses of sand that are large enough to give a permanent supply of water, are very poor.

A number of wells have been drilled into the bedrock without obtaining water. Due to the compact nature of the shale, and the absence of sandy strata in it, little or no water can be expected from the bedrock in this township.

By damming the creeks and excavating dugouts many of the farmers have been able to store during the summer months a supply of water that is sufficient for stock use. This appears to be the only satisfactory method of obtaining an adequate water supply throughout much of the township. The impervious nature of the sub-soil is particularly suitable for the excavation of dugouts, and if they be made large and deep enough a supply of water can be retained that will be sufficient to last through the winter months as well as the summer.

Township 9, Range 31

Two water-bearing horizons occur in the glacial deposits in this township. The sand and gravel deposits lying above the blue clay at an elevation of from 1,875 to 1,940 feet, or at depths of 10 to 40 feet, form the upper horizon, which is the source of water for all of the shallow wells in the township. The sand and gravel deposits occur as lenses within the yellow clay and as fairly extensive outwash patches along the ravines, the approximate locations of which are shown on the accompanying map of the municipality. In general, wells tapping this horizon yield only a moderate supply of water, but a number of wells dug into the sand and gravel lenses in the depressions, locally designated as "Buffalo Wallows", produce an abundant supply of hard, usable water. The best locations for shallow wells to obtain an adequate supply of water from this upper horizon, appear to be along the shallow ravines that carry water in the spring, in the so-called "Buffalo Wallows" and in the gravel knolls.

Gravel deposits lying below the blue clay and above the bedrock form a second water-bearing horizon in the glacial drift. A well located in the SE. $\frac{1}{4}$, section 34, obtains an abundant supply of hard, usable water from this horizon at a depth of 200 feet, or at an elevation of 1,725 feet. This horizon was also encountered in the NW. $\frac{1}{4}$, section 10, at a depth of 225 feet, but was barren of water. Lack of sufficient information does not permit the determination of the areal extent of this horizon, but the writer is of the opinion that it occurs only as small deposits in depressions in the preglacial bedrock land surface.

The Ravenscrag formation underlies the glacial drift throughout the township. It is approximately 100 feet thick, and contains one water-bearing horizon. This horizon is confined to the western half of the township where the shale beds contain sandy strata. It is pierced at depths of from 160 to 300 feet or at elevations of 1,660 to 1,780 feet. The water derived from it is soft and salty, fairly abundant in quantity, and rises to within 30 feet of the surface. In one case, in the SW. $\frac{1}{4}$, section 7, the water flowed 20 feet above the surface for a short period of time. This horizon, if tapped elsewhere in the western half of the township, probably would provide a supply of water sufficient for local needs.

Township 10, Range 30

Three water-bearing horizons have been encountered in the glacial drift in this township. The sand and gravel deposits lying above the blue clay and within the yellow clay at elevations of 1,780 to 1,880 feet, or at depths up to 30 feet, form the uppermost horizon. Throughout most of the township the sand and gravel deposits that comprise this horizon are in the form of lenses and fairly extensive glacial outwash patches, and in years of normal rainfall the supply of water obtained from them is sufficient for local needs. Along the valley of Pipestone river, shallow wells are poor and it is thought that the numerous springs along the river are draining the water from the aquifer in the higher land. On the uplands, between Stony and Jackson creeks, only a small supply of water is obtained as the gravel lenses are scarce. Dugouts can be used to advantage in this area. Shallow wells, tapping this upper water-bearing horizon in the vicinity of Jackson creek and in the southeast corner of the township, yield a fairly abundant supply of hard usable water.

In the NW. $\frac{1}{4}$, section 32, and the SE. $\frac{1}{4}$, section 34, a second water-bearing horizon is encountered at a depth of 68 feet, or at elevations of 1,810 to 1,840 feet. A sand deposit within the blue clay forms this horizon, but only a small amount of water is obtained from it. It was not encountered at any other location in the township so its extent cannot be traced, but it is thought to be only of small areal distribution.

In the SE. $\frac{1}{4}$, section 36, a well 225 feet in depth encountered water in sand deposits that lie below the blue clay and form the third water-bearing horizon in the glacial drift. In driving the casing, however, the water was sealed off and at the present time the well is dry. In the southwestern corner of the township, wells were drilled to depths of from 240 to 400 feet and were still in blue clay and no water was encountered. It is possible that a small amount of water will be found at the contact of the glacial deposits and the bedrock at various locations in the township.

So far as known the bedrock has been encountered only at one locality in the township. In the NW. $\frac{1}{4}$, section 32, the Marine shale formation was found to underlie the glacial deposits at a depth of 190 feet, and a hole was drilled into it to a depth of 160 feet without encountering any water-bearing horizons. If the Ravenscrag formation is absent throughout the township, and it appears that it is, little or no water can be expected from the Marine shale formation.

Township 10, Range 31

The glacial deposits in township 10, range 31, contain three water-bearing horizons. The gravel and sand deposits, which occur as small glacial outwash patches along the creek valleys or as pockets and lenses within the yellow clay, form the upper water-bearing horizon. Wells dug into the glacial outwash gravels yield an abundant supply of hard, usable water. Those dug into the gravel pockets give a fair supply in years of normal rainfall, but are intermittent in dry years. As a rule, small seepages of "alkaline" water are obtained from the yellow clay.

A deposit of gravel lying within the blue clay was encountered at a depth of 87 feet in the SE. $\frac{1}{4}$, section 8, and it constitutes a second water-bearing horizon in the drift. The water is hard, and rises to within 14 feet of the surface but the supply is small. This aquifer is only of local extent, as one mile to the north shale underlies the yellow clay at a depth of 20 feet, and the blue clay is absent.

The third water-bearing horizon is a sand deposit lying between the blue clay and the bedrock at a depth of 120 feet or at elevations of 1,775 to 1,800 feet. This horizon has been tapped in the NW. $\frac{1}{4}$, section 26, and in the SW. $\frac{1}{4}$, section 34. The water from it is hard and slightly salty, abundant in quantity, and rises to within 60 feet of the surface. The areal distribution of this horizon is not known, but the possibilities of obtaining a moderate supply of water at the contact of the glacial drift and bedrock are fair.

In sections 16 to 21, and 28, to 33, the bedrock, which is shale, comes to within 10 to 50 feet from the surface and then slopes downward to the south and east, where it is encountered at depths of 135 to 170 feet. The greater part of this shale is taken to be part of the Marine shale formation. The approximate northern limit of the Ravenscrag formation is shown on the accompanying map of the municipality. In the area where the shale comes close to the surface a fairly abundant supply of water is found in the upper 2 to 10 feet of the formation, at depths of 15 to 50 feet or at elevations of 1,880 to 1,915 feet. The water is hard and clear and as a rule rises to within 10 to 20 feet from the surface. It is possible that most of this water is being derived from the contact zone of the glacial drift. In this same area a small supply of medium-hard, salty water was encountered at depths of 110 and 198 feet, or at elevations of 1,820 and 1,735 feet respectively. An abundant supply of water cannot be expected at depth in the bedrock formation at this locality. In the NE.$\frac{1}{4}$, section 36, an abundant supply of hard, salty water is derived from a series of sandy beds in the bedrock formation at depths of 135 to 200 feet, but the writer is of the opinion that these sandy beds do not exist at other places.

Township 11, Range 30

The gravel and sand deposits that have been laid down by the water of Pipestone river on its narrow flood-plain in this township form a water-bearing horizon. The water in this horizon is derived by seepage from the river and from precipitation. In the SW.$\frac{1}{4}$, section 34, an abundant supply of hard, usable water, which has a sulphur taste, is derived from a well that taps this horizon.

In the glacial drift the sand and gravel deposits that occur as lenses within the yellow clay form a water-bearing horizon at an elevation of from 1,790 feet in the eastern part of the township to 1,850 feet in th western part, or at depths up to 35 feet. A few of the wells that are dug into these lenses produce an abundant supply of hard, usable water, but the majority of them give a sufficient supply only in years of normal rainfall. Several dry holes are usually put down before a gravel lens is located.

In the SW. ¼, section 36, a sand bed at a depth of 60 feet yields an abundant supply of "alkaline" water. This horizon appears to be of small areal extent.

In the western part of the township the Marine shale formation occurs within 20 to 30 feet of the surface. In the eastern part it is encountered at lower depths, being struck at a depth of 126 feet in the NW. ¼, section 22, and at 80 feet in the NW. ¼, section 36. In general a fair supply of soft water is derived from wells dug into the upper 40 feet of the shale in the western part of the township, but wells drilled in the eastern sections have not encountered any water-bearing horizons in the formation. The water that is derived from this Marine shale formation is under slight hydrostatic pressure and rises only a few feet in the wells. It is possible that a portion of the water is derived from seepage from the overlying clay.

Township 11, Range 31

Throughout the greater part of the township the glacial drift is from 4 to 45 feet in thickness and is composed of yellow clay which lies directly on the Marine shale bedrock. Only small seepages of water are obtained from this thin deposit of yellow clay. In two or more localities, however, the glacial deposits contain definite water-bearing horizons. In sections 34 and 35 a sand deposit underlies the yellow clay at a depth of 30 to 35 feet or at an elevation of 1,900 feet, and an abundant supply of hard water is obtained from this horizon. The water is under slight pressure, as the sand bed is usually capped by a layer of "hard pan", and rises from 3 to 12 feet in the wells. The same type of deposit occurs in the S.$\frac{1}{2}$, section 7, but only a small supply of water is obtained here. In the SW. $\frac{1}{4}$, section 8, a deep channel occurs in the bedrock, and the blue clay attains a thickness of 175 feet. A sand deposit underlying the clay forms a water-bearing horizon at an elevation of 1,769 feet, and an abundant supply of hard, usable water, which rises to within 80 feet of the surface, is obtained from it. It is doubtful if this channel will be encountered at any other locality.

Throughout the township a fairly abundant supply of water can be obtained from the upper 40 feet of the Marine shale formation. Of the twenty-seven wells recorded, only five were over 50 feet in depth and the deepest was 115 feet. The majority of the wells obtain their water at elevations of 1,900 to 1,965 feet, but in others the elevation of the top of the water-bearing horizon is from 1,824 to 1,880 feet. The water is medium soft to hard, is usable for drinking, and in most cases is under sufficient pressure to rise from 3 to 30 feet above the top of the water-bearing horizon. In a few wells in which most of the water is derived by seepage from the overlying clay the water was found to be "alkaline".

Township 12, Range 30

The glacial drift, which mantles this township, varies in thickness from 40 feet in the central part of the block, to 70 and 90 feet in the eastern and southeastern parts. It contains two water-bearing horizons. Small lenses of sand within the yellow clay, and larger patches of gravel, either in the form of knolls or as deposits along the ravines, compose the upper horizon at depths up to 30 feet. Only a small supply of water is derived from this aquifer as the gravel and sand deposits are scarce. The seepage water from the yellow and blue clays is usually very "alkaline".

A layer of gravel occurring below the base of the blue clay forms a second water-bearing horizon at an average depth of 55 feet or at an elevation of 1,730 feet. This horizon appears to be confined to the northeastern half of the township. The water is hard and slightly "alkaline" and the hydrostatic pressure is sufficient to cause the water to rise to within 10 to 30 feet from the surface. Other wells tapping this horizon probably will obtain a supply of water that will be sufficient for local needs.

A well located in the NE.$\frac{1}{4}$, section 16, is deriving its supply of hard, "alkaline" water from the upper 40 feet of the Marine shale formation. Other wells have been drilled into this shale without obtaining any water. Worthy of mention is the deep well drilled in the SE.$\frac{1}{4}$, section 14, by the Fitzsimmons Gas Company, in 1916. This well was drilled to a depth of 1,804 feet without encountering water. The Marine shale formation is encountered at a depth of 75 feet and extends to a depth of approximately 1,200 feet, and is underlain by a darker shale series. Throughout the township no water can be expected in the bedrock at depth and only a small supply, if any, will be obtained from the upper 40 feet of the Marine shale formation.

Township 12, Range 31

Two water-bearing horizons occur in the glacial drift, which is 4 to 50 feet thick in the southern part of the township, and somewhat thicker in the northern two rows of sections. Throughout much of the township deposits of gravel occurring either in the form of lenses within the yellow clay or as layers between the yellow clay and the shale, or the blue clay where present, form a water-bearing horizon. This horizon varies in elevation from 1,830 feet in the southeast to 1,890 feet in the northwest part of the township. In years of normal rainfall shallow wells tapping this horizon at depths up to 30 feet give a supply of water that is sufficient for local needs. The possibilities of deriving a suitable supply of water from wells dug into this horizon are best along the ravines and on or near the gravel knolls.

In the NE. $\frac{1}{4}$, section 32, and the SE. $\frac{1}{4}$, section 36, a layer of gravel that occurs within the blue clay, and is encountered at depths of 48 and 61 feet, respectively, constitutes a second water-bearing horizon. It is not known if this aquifer is continuous between the two locations mentioned above. The water is hard, fairly abundant, and rises to within 20 to 30 feet of the surface.

A fairly abundant supply of medium hard to soft water is being derived from the upper 10 to 15 feet of the Marine shale formation in some parts of the township. Several wells have been drilled to a depth of 80 feet in this formation, however, without encountering any water. An abundant supply cannot be expected from the bedrock in this township, as the shale formation is barren of sandy strata.

Statistical Summary of Well Information in Rural Municipality of Maryfield, No. 91, Saskatchewan

Township	9	9	10	10	11	11	12	12	Total No. in Municipality
West of 1st meridian Range	30	31	30	31	30	31	30	31	
Total No. of Wells in Township	36	52	43	43	56	60	58	53	401
No. of wells in bedrock	4	7	3	8	11	35	7	16	91
No. of wells in glacial drift	32	45	40	35	43	25	49	37	306
No. of wells in alluvium	0	0	0	0	2	0	2	0	4
Permanency of Water Supply									
No. with permanent supply	16	41	25	34	28	54	40	40	278
No. with intermittent supply	5	4	4	3	12	3	5	4	40
No. dry holes	15	7	14	6	16	3	13	9	83
Types of Wells									
No. of flowing artesian wells	0	1	0	0	0	0	0	0	1
No. of non-flowing artesian wells	0	5	1	12	11	26	13	11	79
No. of non-artesian wells	21	39	23	25	29	31	32	33	238
Quality of Water									
No. with hard water	17	41	22	36	30	50	39	33	268
No. with soft water	4	4	7	1	10	7	6	11	50
No. with salty water	0	1	0	5	1	1	0	0	8
No. with alkaline water	2	8	1	2	5	5	15	5	43
Depths of Wells									
No. from 0 to 50 feet deep	29	41	36	31	50	47	41	46	321
No. from 51 to 100 feet deep	1	1	2	5	5	12	15	7	48
No. from 101 to 150 feet deep	0	1	0	4	0	0	0	0	5
No. from 151 to 200 feet deep	1	2	1	3	0	1	0	0	8
No. from 201 to 500 feet deep	5	7	4	0	1	0	1	0	18
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	1	0	1
How the Water is used									
No. usable for domestic purposes	21	39	27	29	37	49	40	40	282
No. not usable for domestic purposes	0	6	2	8	3	8	5	4	36
No. usable for stock	21	43	29	37	40	56	45	43	314
No. not usable for stock	0	2	0	0	0	1	0	1	4
Sufficiency of Water Supply									
No. sufficient for domestic use	21	45	24	37	39	55	45	43	309
No. insufficient for domestic needs	0	0	5	0	1	2	0	1	9
No. sufficient for stock needs	12	30	19	17	17	38	19	22	174
No. insufficient for stock needs	9	15	10	20	23	19	26	22	144

ANALYSES AND QUALITY OF WATER

General Statement

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

Total Dissolved Mineral Solids

The term "total dissolved mineral solids" as here used refers to the residue remaining when a sample of water is evaporated to dryness. It is generally considered that waters that have less than 1,000 parts per million of dissolved solids are suitable for ordinary uses, but in the Prairie Provinces this figure is often exceeded. Nearly all waters that contain more than 1,000 parts per million of total solids have a taste due to the dissolved mineral matter. Residents accustomed to the waters may use those that have much more than 1,000 parts per million of dissolved solids without any marked inconvenience, although most persons not used to highly mineralized water would find such waters highly objectionable.

Mineral Substances Present

Calcium and Magnesium

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

Sodium

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

Sulphates

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

Chlorides

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

Iron

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

Hardness

Calcium and magnesium salts impart hardness to water. Hardness of water is commonly recognized by its soap-destroying powers as shown by the difficulty of obtaining lather with soap. The total hardness of a water is the hardness of the water in its original state. Total hardness is divided into "permanent hardness" and "temporary hardness". Permanent hardness is the hardness of the water remaining after the sample has been boiled and it represents the amount of mineral salts that cannot be removed by boiling. Temporary hardness is the difference between the total hardness and the permanent hardness and represents the amount of mineral salts that can be removed by boiling. Temporary hardness is due to the bicarbonates of iron, 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. Water that has a total hardness of 300 parts per million or more is usually classed as excessively hard. Many of the Saskatchewan water samples have a total hardness greatly in excess of 300 parts per million; when the total hardness exceeded 3,000 parts per million no exact hardness determination was made. Also no determination for temporary hardness was made on waters having a total hardness less than 50 parts per million. As the determinations of the soap hardness in some cases were made after the samples had been stored for some time, the temporary hardness of some of the waters as they come from the wells probably is higher than that given in the table of analyses.

Analyses of Water Samples from the Municipality of Maryfield, No. 91, Saskatchewan

LOCATION						Depth of Well, Ft	Total dis'vd Solids	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS									Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alkalinity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	$CaCl_2$	Na_2SO_4	NaCl	$MgCl_2$	
1.	SW.	7	9	31	1	300	1,540	375	325	50	270	205	110	50	603	553	1,516	197		6	140		727	446		x 2
2.	SW.	12	9	31	1	11	2,540											(4)	(1)		(2)	(5)	(3)			x 1
3.	SW.	16	9	31	1	16	4,380	3000	3000+	n.d.	55	250	70	623	2722	921	4,037	125		105	1,707		2,009	91		x 1
4.	NE.	28	9	31	1	16	720	300			48	140	80	72	119	7	356	140	5		144			13	54	x 1
5.	NW.	17	10	30	1	25	2,480	1300	1,300		120	490	560	234	545					Anomalous						x 1
6.	SW.	34	10	30	1	12	1,960	1,800	1,700	100	240	290	60	454	646	42	1,396	107		155	795			79	260	x 1
7.	NW.	26	10	31	1	120	2,500	1,100	1050	50	57	345	440	151	1426	462	2,436	345	600		450		947	94		x 1
8.	NE.	36	10	31	1	200	7,100	1000	1,000		3,750	140	260	140	258	3030	6,619	140	366			63		5,720	330	x 3
9.	NW.	13	12	30	1	12	3,140	1,800	1,800		950	365	600	277	849	516	2,985	365	952		208			974	486	x 1
10.	NW.	13	12	30	1	50	2,543												(1)		(3)			(2)		x 1
11.	SE.	26	12	31	1	27	4,460	2900	2,900		69	600	730	698	424					Anomalaous						x 1

Water samples indicated thus, x 1, are from glacial drift.
Water samples indicated thus, x 2, are from bedrock, Ravenscrag formation.
Water samples indicated thus, x 3, are from bedrock, Marine shale formation.
Analyses are reported in parts per million; where numbers (1), (2), (3), and (4) are used instead of parts per million, they represent the relative amounts in which the four main constituents are present in the water.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).

Analyses Nos. 2, and 10, by Provincial Analyst, Regina.
For interpretation of the table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

The waters that are derived from the glacial drift of this municipality vary greatly in quality. They contain the same mineral salts in solution, but the magnitude of these salts differs greatly. It is not uncommon to find water so highly mineralized as to be unfit for use, at the same depth, and not far distant, as water that is usable for both humans and stock. As a large percentage of the mineral salts are dissolved out of the clays through which the water seeps, waters that are derived from gravel deposits that lie close to the surface, or are overlain by a thin veneer of clay, are purer than those that are derived from porous materials that are overlain by thick deposits of clay.

Seven samples of water from the upper 50 feet of the drift were analysed and their results are listed in the accompanying table. Of these samples, six were obtained at depths of less than 27 feet. With the exception of one sample that has a total dissolved solid content of 356 parts per million, the waters analysed have a total dissolved solid content ranging from 1,410 to 4,460 parts per million, with an average of approximately 3,000 parts per million. Unless this total dissolved solid content is composed principally of one or two harmful mineral salts, this solid content figure does not render the water unfit for use. It is advisable, however, to have water that is being used for domestic purposes analysed both for mineral salts and bacteria, by the Provincial Analyst in Regina.

In the sample from a depth of 50 feet, sodium chloride (common salt) is the most abundant mineral salt present, with 974 parts per million. This content renders the water unfit for domestic purposes. Calcium sulphate or gypsum is second with 952 parts per million, but outside of imparting hardness to the water this salt is not harmful. Calcium chloride, calcium carbonate, and magnesium sulphate, are next in order of abundance, their quantities being 486,365, and 208 parts per million, respectively. This sample differs somewhat from those that are derived from shallow depths. No one mineral salt is predominant in all the samples. Either calcium carbonate, magnesium sulphate, calcium sulphate, or sodium sulphate is the predominant salt in four samples. As a rule however, magnesium sulphate is the most common mineral salt. Its content ranges from 144 to 1,707 parts per million and in three samples it is so high that it renders the water unfit for domestic use, due to its strong purgative effect.

All of the samples analysed are extremely hard, the total hardness ranging from 300 to 3,000 parts per million. In summary, the waters from the upper part of the glacial drift, are highly mineralized and are excessively hard. In the majority of cases the waters may be unsuitable for domestic purposes due to their laxative effect, and in a few cases they may be so highly mineralized as to be unfit for stock use.

One sample of water from a depth of 120 feet, presumably from deposits in a buried stream channel, was analysed. It has a total hardness of 2,500 parts per million and a total dissolved solid content of 2,436 parts per million. Of the total dissolved solid content, sodium sulphate (Glauber's Salts) makes up 947 parts per million, calcium sulphate (Gypsum) 600, magnesium sulphate (Epsom Salts) 450, calcium carbonate 345, and common salt 94 parts per million. This water is unsuitable for domestic use due to the laxative effect of the Epsom and Glauber's Salts.

Water from the Bedrock

One sample of water from the Ravenscrag formation was analysed. It contains a total dissolved solid content of 1,540 parts per million and has a total hardness of 375 parts per million. Sodium sulphate (Glauber's Salt) is the most abundant mineral salt present. Common salt, or sodium chloride is second in abundance and is in sufficient quantity, 446 parts per million, to render the water too salty for domestic purposes. Lesser amounts of calcium carbonate, magnesium sulphate, and magnesium carbonate, occur, their abundance decreasing in the order given. This water is suitable for stock.

One sample of water from the Marine shale formation was analysed. It is derived from a depth of 200 feet and is indicative of the type of water that will be obtained at depth in this formation. It has a total dissolved solid content of 6,619 parts per million, 5,720 parts of which are composed of sodium chloride or common salt. Smaller amounts of calcium sulphate, magnesium chloride, and calcium carbonate also occur. This water is unfit for domestic purposes and its continued use by stock may prove injurious to them. If other water is obtainable it should not be used for any purpose.

WELL RECORDS—RURAL MUNICIPALITY OF MARYFIELD NO. 91, 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	SW.	2	9	30	2	Dug	8	1,797					Glacial clay	Soft, clear		D,	Seepagc well beside dammed ravine.
2	SW.	7	"	"	"	"	16	1,870	- 5	1,865	5	1,865	" sand	Hard, #alkaline#		D, S	Domestic supply and 25 head stock.
3	NE.	10	"	"	"	"	16	1,848	- 4	1,844	8	1,840	" gravel	Hard, clear	48	D, S	Waters 40 head stock.
4	SE.	12	"	"	"	"	14	1,825	- 4	1,921	10	1,815	" sand	" "		D, S	2 bbls. a day.
5	SW.	12	"	"	"	"	20	1,848	- 14	1,834	11	1,837	" gravel	" "		D, S	Sufficient for local needs.
6	SE.	14	"	"	"	"	6	1,852			6	1,846	" clay	Soft, clear		D,	Dug beside dugout.
7	SW.	14	"	"	"	Bored	45	1,850					Marine shale				Dry hole.
8	NW.	16	"	"	"	Dug	12	1,878	- 2	1,876	8	1,870	Glacial sand	Hard, clear		D,	Domestic supply only; use dugout for stock.
9	NE.	18	"	"	"	"	18	1,875	- 6	1,869	4	1,871	" "	" #alkaline#		D, S	" " and some stock use dugout 300 foot dry hole.
10	NW.	20	"	"	"	"	9	1,900	- 6	1,894	6	1,89[illegible]	" "	" clear		D, S	Poor supply, use dugout for stock.
11	SE.	21	"	"	"	"	18	1,870	- 10	1,860	10	1,860	" "	" "		D,	Domestic supply only, use dugout for stock.
12	NW.	24	"	"	"	"	14	1,840	- 4	1,836	5	1,835	" gravel	Soft, clear		D, S	Waters 60 head stock.
13	NE.	26	"	"	"	"	14	1,850	- 8	1,842	8	1,842	" "	Hard, clear		D, S	" 40 " " .
14	NE.	27	"	"	"	"	8	1,860	- 3	1,857	3	1,857	" "	" "		D, S	Supplies two farms.
15	SW.	30	"	"	"	"	14	1,900	- 1	1,899			" clay	" "		D, S	Very poor supply; have creek dammed.
16	NW.	30	"	"	"	"	10	1,895	- 6	1,889	6	1,889	" sand	" "		D,	Domestic supply only; use creek for stock.
17	NW.	35	"	"	"	"	14	1,856	- 2	1,854	7	1,849	" "	" "		D, S	Sufficient in years of normal rainfall; use dugout.
18	NW.	36	"	"	"	"	14	1,805	- 6	1,799	6	1,799	" gravel	" "		D, S	Abundant supply.
19	NE.	3	"	"	"	"	30	1,855					" clay				Dry hole.
20	NW.	4	"	"	"	"	45	1,855					" "				Dry hole.
21	SW.	12	"	"	"	Drilled	320	1,848	- 40	1,808	320	1,528	Sand below blue clay	Hard		N,	Casing broken by dynamite.
22	NW.	12	"	"	"	Dug	35	1,850					Glacial clay				Cannot get water; hauled water for 30 years.
23	SW.	15	"	"	"	Drilled	480	1,856					Marino shale				Dry hole.
24	SW.	28	"	"	"	"	310	1,869					" "				Dry hole, also 265 foot dry holo.
25	SW.	29	"	"	"	Dug	8	1,868					Glacial sand				Dry hole, use dugout.
26	NE.	34	"	"	"	"	80						" clay				Dry hole.
1	NE.	2	9	31	1	Dug	10	1,885	- 8	1,877	9	1,876	Glacial sand	Hard, clear	52	D, S	Waters 30 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 MARYFIELD NO. 91, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
2	SW.	3	9	31	1	Dug	9	1,895	- 1	1,894	1	1,894	Glacial sand	Hard, clear		D, S	Waters 100 head stock.
3	NW.	4	"	"	"	"	20	1,915	- 17	1,898	17	1,898	" "	" "		D, S	Medium supply; have creek dammed.
4	NE.	4	"	"	"	"	10	1,898	- 5	1,893	5	1,893	" gravel	" "		D, S	Fair supply.
5	NE.	6	"	"	"	"	18	1,948					" clay	" "		S,	Poor supply.
6	SW.	6	"	"	"	"	12	1,950	- 9	1,941	9	1,941	" sand	" "		D, S	Sufficient for local needs in summers.
7	SW.	7	"	"	"	Drilled	300	1,956	+ 20	1,976	290	1,666	Ravenscrag sand	" cloudy, iron	44	D, S	Flowed 500 bbls. a day.
8	SW.	7	"	"	"	Bored	106	1,955					Glacial clay				Dry hole, also numerous dry shallow holes.
9	SW.	7	"	"	"	"	86	1,953					" "				Dry hole,little alkaline water.
10	NW.	10	"	"	"	Drilled	225	1,910					Gravel below blue clay				Dry hole.
11	NE.	10	"	"	"	Dug	18	1,898	- 9	1,889	9	1,889	Glacial sand	Hard, clear		D, S	Sufficient in years of normal rainfall.
12	SE.	11	"	"	"	"	14	1,888	- 6	1,882	4	1,884	" "	" "		D, S	Insufficient for 15 head stock.
13	SW.	12	"	"	"	"	11	1,880					" clay	" "alkaline"		N,	Not fit for use. #
14	NE.	15	"	"	"	"	8	1,897	- 3	1,894	3	1,894	" gravel	" clear		D, S	Supplies most farms in neighbourhood.
15	SE.	16	"	"	"	"	13	1,915	- 7	1,908	7	1,908	" sand	" "		D, S	Waters 40 head stock year round.
16	SW.	16	"	"	"	"	16	1,918	- 12	1,906	10	1,908	" "	" "alkaline"	52	D, S	Strong supply.
17	NE.	19	"	"	"	"	6	1,945	- 3	1,942	5	1,940	" "	" clear		D, S	Waters 100 head stock.
18	NW.	20	"	"	"	"	18	1,940	- 3	1,937			" "	" "		D, S	" 20 " " .
19	NW.	23	"	"	"	"	12	1,885	- 8	1,877	8	1,877	" "	" "		D, S	" 40 " " .
20	NE.	23	"	"	"	Drilled	215	1,887					shale ?				Dry hole.
21	NE.	24	"	"	"	Dug	15	1,898	- 7	1,891	7	1,891	Glacial gravel	Hard, "alkaline"		D, S	Domestic supply and 4 bbls. a week for stock.
22	SW.	25	"	"	"	"	12	1,901	- 6	1,895	6	1,895	" "	Hard, "alkaline"		N,	Fair supply.
23	NE.	26	"	"	"	Drilled	245	1,895					" blue clay				Dry hole.
24	NW.	26	"	"	"	Dug	20	1,905	- 7	1,898	7	1,898	" sandy clay	Soft, clear		D, S	Domestic supply and 9 horses.
25	NW.	27	"	"	"	"	18	1,903	- 10	1,893	10	1,893	" gravel	Hard, clear		D, S	Waters 35 head stock.
26	NW.	28	"	"	"	"	11	1,917	- 8	1,909	8	1,909	" "	" "		D, S	" 40 " " .
27	NE.	28	"	"	"	"	16	1,910	- 12	1,898	12	1,898	" sand	" "		D, S	" 30 " " .
28	SW.	29	"	"	"	"	10	1,938	- 6	1,932	6	1,932	" gravel	" "		D, S	" 40 " " .

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 MARYFIELD NO. 91, 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
29	NW.	30	9	31	1	Drilled	290	1,950	- 30	1,920	175	1,775	Ravenscrag sandy shale	Soft, soda		D, S	Fair supply.
30	NE.	31	"	"	"	"	160	1,940	- 15	1,925	160	1,780	Ravenscrag sandy shale	Hard, "alka-line"		D, S	Sufficient for local needs.
31	NW.	32	"	"	"	"	285	1,945	- 30	1,915	285	1,660	Ravenscrag sandy shale	Soft, salty		D, S	Waters 100 head stock.
32	NE.	32	"	"	"	Dug	16	1,930	- 12	1,918	12	1,918	Glacial sand	Hard, clear		S,	" 25 " " .
33	SE.	34	"	"	"	Drilled	200	1,920	- 25	1,895	195	1,725	Gravel below blue clay	" "		D, S	Abundant supply.
34	SE.	36	"	"	"	Dug	14	1,910	- 5	1,905	10	1,900	Glacial gravel	" "		D, S	Waters 40 head stock.
35	NW.	36	"	"	"	"	16	1,912	- 11	1,901	11	1,901	" "	" "		D, S	Waters 20 head stock in summer; haul water in winter.
1	NE.	1	10	30	1	Dug	8	1,790	- 4	1,786	4	1,786	" "	" "		D, S	Bountiful supply.
2	NW.	2	"	"	"	"	12	1,835	- 7	1,828	8	1,827	" "	" "		D, S	Sufficient for local needs.
3	SW.	2	"	"	"	"	16	1,850	- 4	1,846	4	1,846	" "	" "	50	D, S	Sufficient for local needs.
4	NE.	3	"	"	"	"	6	1,845	- 4	1,841	6	1,839	" sand	" "		D, S	Abundant supply.
5	SW.	4	"	"	"	"	16	1,885	- 12	1,873	12	1,873	" "	" "		D, S	" " .
6	NW.	5	"	"	"	"	25	1,945	- 23	1,922	18	1,927	" gravel	" "		D, S	Poor supply 400 foot dry hole in blue clay.
7	NE.	6	"	"	"	"	14	1,902	- 8	1,894	8	1,894	" sand	" "		D, S	Sufficient for local needs; 2 similar wells.
8	SE.	9	"	"	"	"	14	1,868	- 9	1,859	9	1,859	" gravel	" "		D, S	Sufficient in years of normal rainfall.
9	SE.	11	"	"	"	"	12	1,795	- 8	1,787	5	1,790	" "	" "		D, S	16 tanks a day.
10	NE.	12	"	"	"	"	26	1,805	- 12	1,793	15	1,790	" "	" "	43	D, S	
11	NE.	12	"	"	"	"	14	1,790	- 10	1,780	10	1,780	" "	" "		D,	Sufficient for domestic use only.
12	SE.	13	"	"	"	"	16	1,790	- 8	1,782	10		" "	" "		D, S	" " " " " .
13	SE.	16	"	"	"	"	10	1,865	- 5	1,860	?	?	" clay	" "		D,	Beside dugout; sufficient in summer.
14	NW.	17	"	"	"	"	25	1,902	- 10	1,892	10	1,892	" sand	" "		D, S	One of several similar wells in town of Maryfield. #
15	SW.	18	"	"	"	"	12	1,894	- 5	1,889	6	1,888	" gravel	" "		D, S	Dry in winter of 1934 for first time.
16	SE.	19	"	"	"	"	14	1,902	- 9	1,893	9	1,893	" sand	Soft, clear		D, S	Strong supply.
17	NE.	20	"	"	"	"	14	1,878	- 6	1,872			" "	Hard, clear		D,	Seepage from dugout.
18	SW.	21	"	"	"	"	14	1,870	- 8	1,862	8	1,862	" clay	" "		D, S	" " "
19	NW.	24	"	"	"	"	18	1,648	- 16	1,632	16	1,632	" gravel	" "		D, S	Fair supply.
20	SW.	28	"	"	"	"	14	1,860	- 8	1,852	12	1,848	" sand	" "		D, S	Not a ggod supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of MARYFIELD NO. 91. 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
21	SW.	30	10	30	1	Dug	26	1,900	- 19	1,881	12	1,888	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
22	NW.	32	"	"	"	Drilled	100	1,940	- 12	1,928	66	1,874	Sand in blue clay	" "	44	D,	Poor supply.
23	SE.	34	"	"	"	Bored	70	1,880	?	?	68	1,812	Sand in blue clay	" "		S,	Small supply.
24	SW.	34	"	"	"	Dug	12	1,858	- 6	1,852	5	1,853	Glacial sand	" "alkaline"		S,	" " , laxative for humans. #.
25	NW.	35	"	"	"	"	12	1,870	- 7	1,863	7	1,863	" "	" clear		D, S	Domestic supply only, laxative for humans.
26	SE.	7	"	"	"	Drilled	240	1,896					" clay				Dry hole.
27	SW.	10	"	"	"	Dug	20	1,855					" sand				" ".
28	NW.	15	"	"	"	"	20	1,851					" clay				" ".
29	NW.	24	"	"	"	"	12	1,765					" "				" ".
30	NE.	25	"	"	"	"	30	1,758					" "				" ".
31	NW.	32	"	"	"	Drilled	350	1,940			190	1,750	Marine shale	Hard, salty			Too saline for use.
32	SE.	36	"	"	"	"	200	1,788									Dry hole. Water at 200 feet in 225 foot well.
1	SE.	2	10	31	1	Dug	14	1,913	- 4	1,909	12	1,901	Glacial sand	Hard, "alka-line"		S,	Poor supply; not suitable for humans.
2	NE.	2	"	"	"	"	14	1,918					" clay				Dry holes.
3	NE.	4	"	"	"	"	11	1,930	- 8	1,922	8	1,922	" gravel	Hard, clear		D, S	Sufficient for local needs.
4	SE.	6	"	"	"	"	14	1,941	- 8	1,933	8	1,933	" "	" "		D, S	Sufficient for local needs.
5	NW.	6	"	"	"	"	13	1,938	- 9	1,929	9	1,929	" sand	" "alkaline"		D, S	Domestic supply only.
6	SE.	8	"	"	"	Drilled	87	1,936	- 14	1,922	82	1,854	Sand in blue clay	" clear		D, S	Poor supply; uses 4 other wells.
7	SE.	10	"	"	"	Dug	15	1,923	- 11	1,912	11	1,912	Glacial sand	" "		D, S	Abundant supply; 3 similar wells.
8	SW.	12	"	"	"	"	14	1,912					" "				Dry hole; many similar holes on quicksand.
9	SE.	14	"	"	"	"	12	1,909					" gravel				" " uses dugout.
10	NE.	14	"	"	"	Drilled	172	1,914	- 30	1,884	166	1,748	Shale	Hard, salty		S,	Waters 60 head stock.
11	NE.	16	"	"	"	Dug	27	1,927	- 22	1,905	22	1,905	Glacial sand	" clear		D, S	Poor supply; hauls water.
12	NW.	17	"	"	"	Drilled	198	1,933	- 40	1,893	198	1,735	Marine shale	Soft, salty		S,	Poor supply.
13	SE.	20	"	"	"	"	100	1,930	- 20	1,910	50	1,880	Glacial sand	Hard, clear		D, S	Sufficient with similar well.
14	SW.	20	"	"	"	"	96	1,936	- 16	1,920	77	1,859	Marine shale	" salty		D, S	Waters 100 head stock; water at 57 feet in sand.
15	NE.	21	"	"	"	"	100	1,927	- 10	1,917	100	1,827	" "	" reddish		D, S	Sufficient for local needs.

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WELL RECORDS—Rural Municipality of MARYFIELD NO. 91, 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				
16	SW.	22	10	31	1	Dug	13	1,922	- 5	1,917	9	1,913	Glacial gravel	Hard, clear		D, S	Waters 40 head stock.
17	NE.	22	"	"	"	"	14	1,918	- 1	1,917	8	1,910	" "	" "		D, S	Sufficient for local needs.
18	NW.	23	"	"	"	"	14	1,918	- 4	1,914	6	1,912	" "	" "		D, S	3 similar wells, waters 65 head stock.
19	NE.	25	"	"	"	"	22	1,910	- 9	1,901	16	1,894	" "	" "alkaline"		N,	Uses two dugouts.
20	NW.	26	"	"	"	Drilled	120	1,920	- 45	1,875	120	1,800	Quicksand below blue clay	" salty	40	S,	Abundant supply. #
21	SE.	27	"	"	"	Dug	12	1,916	- 3	1,913	10	1,906	Glacial gravel	" clear		D, S	Goes dry in winters.
22	SW.	28	"	"	"	"	30	1,928	- 15	1,913	15	1,913	Shale	" "		D, S	Fair supply.
23	SW.	32	"	"	"	Drilled	150	1,930	- 35	1,895	110	1,820	Marine shale?	" salty		S,	Sufficient for 10 head stock only. Yellow sediment.
24	NE.	32	"	"	"	Dug	32	1,934	- 20	1,914	20	1,914	" "	" clear		D, S	Sufficient for local needs.
25	SW.	34	"	"	"	Drilled	150	1,926	- 60	1,866	120	1,806	Sand below blue clay	" "		D, S	Abundant supply.
26	NE.	34	"	"	"	Dug	22	1,923	- 19	1,904	20	1,903	Glacial sand	" "		D, S	Not sufficient for 15 head stock.
27	NW.	36	"	"	"	Drilled	101	1,912	- 16	1,896	98	1,814	sandy shale	" "		D, S	Abundant supply.
28	NE.	36	"	"	"	"	200	1,910	- 35	1,875	135	1,775	" "	" salty		S,	Sufficient for stock use. #
1	SW.	2	11	30	1	Dug	14	1,860	- 10	1,850	10	1,850	Glacial clay	" clear	45	D,	" " house use only; dugout and dam for stock.
2	SE.	4	"	"	"	"	8	1,940	- 5	1,935	5	1,935	" gravel	" "		D,	
3	SE.	5	"	"	"	"	4	1,890	- 3	1,887	3	1,887	" "	" "		D,	Sufficient for domestic use; have ravine dammed.
4	SE.	6	"	"	"	"	30	1,930	- 12	1,918	12	1,918	" "	" "alkaline"		D, S	Abundant supply.
5	SW.	8	"	"	"	"	18	1,890	- 12	1,878	12	1,878	Marine shale	Soft, clear		D, S	Sufficient for local needs.
6	NW.	11	"	"	"	"	20	1,840	- 15	1,825	15	1,825	Glacial gravel	Hard, clear		D,	Haul water for stock; very poor quality.
7	SE.	12	"	"	"	"	11	1,800					" clay	" "		D, S	Goes dry in winters.
8	NW.	12	"	"	"	"	12	1,800	- 4	1,796	4	1,796	" "	" "alkaline"		D, S	Poor supply; use dugout and haul from Pipestone
9	SE.	15	"	"	"	"	10	1,875	- 7	1,868	7	1,868	" sand	" clear		D,	Poor supply.
10	NE.	15	"	"	"	"	34	1,824	- 19	1,805	19	1,805	" clay	" "		N,	" " .
11	SE.	18	"	"	"	"	40	1,915	- 25	1,890	25	1,890	Marine shale	Soft, clear	43	D, S	Fair supply.
12	SE.	19	"	"	"	"	45	1,900	- 27	1,873	30	1,870	" "	" "		D, S	Sufficient for local needs.
13	SW.	20	"	"	"	"	15	1,965	- 6	1,959	8	1,957	Glacial sand	Hard, clear		D, S	Abundant supply.
14	NW.	21	"	"	"	"	20	1,890	- 16	1,874	18	1,872	" gravel	" "	43	D,	Sufficient for house use; dugout for stock.
15	SE.	22	"	"	"	"	12	1,800	- 7	1,793	7	1,793	" "	" "		D, S	Abundant supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of MARYFIELD NO. 91, 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
16	NW.	22	11	30	1	Dug	12	1,860	- 8	1,852	8	1,852	Glacial sand	Soft, clear		D, S	Intermittent supply; 315 foot well, water at 126 feet.
17	SW.	23	"	"	"	"	16	1,700	- 3	1,697			" sandy clay	Hard, clear		N,	Bad taste.
18	SE.	24	"	"	"	"	12	1,800	- 8	1,792	8	1,792	" gravel	" "		D, S	Waters 30 head stock.
19	SE.	25	"	"	"	"	9	1,800	- 4	1,796	[illegible]	1,791	" sand	" "		D, S	Sufficient for local needs.
20	NE.	27	"	"	"	"	20	1,855	- 18	1,837	18	1,837	" "	" "		D,	" " house use.
21	NE.	28	"	"	"	"	38	1,850	- 35	1,815	35	1,815	Marine shale	Soft, clear	43	D, S	" " " " .
22	NW.	30	"	"	"	"	14	1,900	- 7	1,893	14	1,886	Glacial sand	Hard, clear		D, S	Abundant supply.
23	NE.	32	"	"	"	"	53	1,900	- 49	1,851	49	1,851	" "	" "		D, S	Waters 100 head stock.
24	NE.	33	"	"	"	"	6	1,800	- 3	1,797	3	1,797	" gravel	Soft, "		D, S	30 bbls an hour.
25	NW.	33	"	"	"	"	43	1,800	- 23	1,777	24	1,776	Marine shale	Hard "		D, S	Waters 50 head stock.
26	SE.	34	"	"	"	"	12	1,830					Glacial clay				Dry hole.
27	SW.	34	"	"	"	"	12	1,700	- 9	1,691	9	1,691	Recent gravel	Hard, sulphur		D, S	Abundant supply.
28	NE.	34	"	"	"	"	10	1,855	- 4	1,851	4	1,851	Glacial gravel	" clear	43	D, S	Sufficient in years of normal rainfall.
29	NE.	36	"	"	"	"	12	1,785	- 4	1,781	9	1,776	" sand	" "		D, S	Sufficient for 60 head stock.
30	NW.	36	"	"	"	"	9	1,800	- 2	1,798	2	1,798	" gravel	" "		D, S	Sufficient in years of normal rainfall; 100 foot dry hole into shale.
31	SW.	36	"	"	"	"	60	1,800	- 20	1,780	58	1,742	" sand	" "alkaline"		S,	Sufficient for stock.
32	SE.	30	"	"	"	"	57	1,930	- 32	1,898	32	1,898	Marine shale	Soft, clear		D, S	" " local needs.
1	NE.	1	11	31	1	Dug	26	1,940	- 12	1,928	24	1,916	" "	Hard, "alkaline"		S,	Abundant supply.
2	SE.	3	"	"	"	"	20	1,935	- 10	1,925	10	1,925	Glacial yellow clay	Hard, "alkaline"		D, S	Sufficient for local needs.
3	SW.	3	"	"	"	"	30	1,945	- 21	1,924	21	1,924	Marine shale	Hard, clear		D, S	" " " " .
4	SW.	4	"	"	"	"	22	1,938	- 14	1,924	22	1,916	" "	" "	41	D, S	Waters 200 head stock.
5	NW.	4	"	"	"	Bored	76	1,940	- 52	1,888	76	1,864	" " sand	" "		D, S	" 100 " " .
6	SW.	5	"	"	"	Drilled	85	1,945	- 20	1,925	80	1,865	Marine shale	" "		D, S	Abundant supply.
7	SE.	6	"	"	"	Dug	28	1,946	- 20	1,926	12	1,934	" "	Soft, clear		D, S	Waters 50 head stock.
8	SE.	7	"	"	"	"	40	1,945	- 37	1,908	37	1,908	Glacial clay	Hard, clear		D, S	Poor supply.
9	SW.	7	"	"	"	"	13	1,948	- 10	1,938	10	1,939	" sand	" "		D, S	Sufficient for local needs.
10	SW.	8	"	"	"	Drilled	186	1,943	- 80	1,863	174	1,769	Sand below blue clay	" "		D, S	Waters 60 head stock.
11	SE.	12	"	"	"	"	80	1,945	- 20	1,925	80	1,865	Marine shale	Soft, salty		D, S	" 65 " " .

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WELL RECORDS—Rural Municipality of MARYFIELD NO. 91, 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
12	SW.	12	11	31	1	Dug	12	1,932	- 11	1,921	12	1,920	Marine shale	Hard, clear		S,	Waters 50 head stock.
13	S .	14	"	"	"	"	46	1,940	- 44	1,896	44	1,896	Glacial gravel	" "		D, S	Abundant supply.
14	NE.	15	"	"	"	Bored	43	1,934	- 14	1,920	43	1,891	Marine shale	" "	40	D, S	Waters 50 head stock.
15	SW.	16	"	"	"	Dug	39	1,930	- 23	1,907	21	1,909	Contact of clay and shale	" soda		D, S	Accumulation of seepage water.
16	SE.	17	"	"	"	Bored	32	1,943	- 20	1,923	32	1,911	Marine shale	" clear		D, S	Waters 70 head stock.
17	NW.	17	"	"	"	"	80	1,939	- 70	1,869	80	1,859	" "	" "		D, S	Poor supply.
18	NE.	17	"	"	"	Dug	42	1,940	- 40	1,900	40	1,900	Glacial sand	" muddy		N,	" " .
19	SW.	18	"	"	"	"	10	1,940	- 5	1,935	7	1,933	" "	Soft, clear		D, S	Sufficient in years of normal rainfall.
20	NE.	18	"	"	"	Drilled	115	1,938	- 40	1,898	114	1,824	Marine shale	Hard, clear		D, S	Fair supply.
21	SE.	19	"	"	"	Dug	22	1,942	- 14	1,928	22	1,920	" "	" "		D, S	Abundant supply.
22	NE.	22	"	"	"	Bored	36	1,943	- 14	1,929	36	1,907	" "	" "		D, S	Poor supply.
23	SE.	22	"	"	"	"	30	1,950	- 20	1,930	30	1,920	" "	Soft, clear		D, S	Sufficient for local needs.
24	NE.	23	"	"	"	Dug	33	1,925	- 15	1,910	33	1,092	" "	Hard, clear		D, S	Fair supply.
25	SE.	24	"	"	"	Drilled	70	1,923	- 40	1,883	52	1,871	" "	Soft, clear		D, S	Sufficient for local needs.
26	SW.	26	"	"	"	Bored	38	1,935	- 15	1,920	30	1,905	" "	Hard, clear		D, S	" " " " .
27	NE.	27	"	"	"	"	40	1,940	- 14	1,926	40	1,900	" "	" "alkaline"		D, S	Poor supply.
28	SE.	28	"	"	"	"	27	1,935	- 7	1,928	5	1,930	" "	" clear		D, S	Waters 60 head stock.
29	NW.	28	"	"	"	Drilled	80	1,948	- 15	1,933	?		" "	" "		D, S	Abundant supply.
30	SW.	30	"	"	"	Bored	38	1,945	- 30	1,915	28	1,917	Glacial gravel	" "		D, S	Waters 50 head stock.
31	SE.	31	"	"	"	"	59	1,940	- 20	1,920	59	1,881	Marine shale	" "		D, S	12 bbls. a day.
32	SE.	32	"	"	"	Dug	27	1,947	- 17	1,930	?		Glacial clay	" "alkaline"		D, S	Seepage well.
33	SW.	32	"	"	"	"	23	1,935	- 15	1,920	18	1,917	Marine shale	" clear		D, S	Good supply.
34	NW.	34	"	"	"	"	40	1,945	- 23	1,922	35	1,910	Glacial sand	" "		D, S	Waters 100 head stock.
35	NE.	34	"	"	"	"	32	1,941	- 28	1,913	30	1,911	" "	" "		D, S	" 60 " " .
36	NW.	35	"	"	"	Bored	40	1,935	- 20	1,915	20	1,915	" "	" "		D, S	" 50 " " .
37	NW.	35	"	"	"	Dug	28	1,930	- 26	1,904	26	1,904	" "	Soft, clear		D, S	Sufficient for local needs.
38	SW.	36	"	"	"	"	30	1,910	- 22	1,888	22	1,888	" "	Hard, clear		D, S	Waters 25 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of MARYFIELD NO. 91, 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.	2	12	30	1	Dug	8	1,805	- 1	1,804	6	1,799	Glacial sand	Soft, clear		D, S	House and 10 head stock.
2	NE.	2	"	"	"	"	20	1,805	- 8	1,797	19	1,786	" "	Hard, "alkaline"		N,	All water hauled.
3	NW.	3	"	"	"	"	29	1,858	- 4	1,854	11	1,847	" sandy clay	Hard, "alkaline"	42	D, S	Poor supply.
4	NE.	4	"	"	"	"	23	1,855	- 11	1,844	11	1,844	Glacial clay	Hard, "alkaline"		D, S	" " , laxative on humans.
5	NE.	7	"	"	"	"	35	1,855	- 31	1,824	31	1,824	" "	Hard, "alkaline"		D,	" " .
6	SW.	9	"	"	"	"	19	1,800	- 4	1,796	4	1,796	" sandy clay	Hard, clear		D,	Waters 25 head stock.
7	SE.	10	"	"	"	"	45	1,850					" clay	" "alkaline"		D, S	Insufficient supply.
8	NW.	10	"	"	"	"	86	1,845	- 10	1,835	40	1,805	" "	" "		D, S	Poor supply.
9	SE.	12	"	"	"	"	10	1,780	- 1	1,779	5	1,775	" gravel	" clear		D, S	Sufficient for local needs.
10	SW.	12	"	"	"	"	10	1,797	- 6	1,791	6	1,791	" "	" "		D, S	Poor supply.
11	NW.	12	"	"	"	"	55	1,785	- 30	1,755	53	1,732	" "	" "alkaline"		D, S	Good " .
12	NW.	13	"	"	"	"	12	1,780	- 4	1,776	8	1,772	" "	" clear		D, S	Fair " , #.
12a	NW.	13	"	"	"	"	50	1,780	- 49	1,731	49	1,731	" "	" "		S,	Good " .
13	SE.	14	"	"	"	Drilled	1804	1,800			20	1,780		"			Drilled for gas. Dry hole.
14	NE.	16	"	"	"	Dug	60	1,840	-,40	1,800	50	1,790	Marine shale	" "alkaline"		D, S	Sufficient for local needs.
15	SW.	17	"	"	"	"	39	1,860	- 22	1,838	22	1,838	Glacial sandy clay	" clear		D, S	Waters 40 head stock.
16	NE.	18	"	"	"	"	30	1,860					Glacial "				Dry hole.
17	NE.	20	"	"	"	"	32	1,855	- 12	1,843	30	1,825	" gravel	Hard, clear		D, S	Insufficient supply.
18	SE.	21	"	"	"	"	58	1,835	- 23	1,812	54	1,781	" "	" "		D, S	Waters 50 head stock.
19	SW.	21	"	"	"	"	68	1,845	- 4	1,841	22	1,823	" clay	" "alkaline"		S,	Poor supply.
20	SW.	22	"	"	"	"	11	1,833	- 3	1,830	3	1,830	" sand	" clear		D, S	Sufficient supply.
21	NW.	22	"	"	"	"	75	1,815	- 60	1,755	70	1,745	" gravel	" "		D, S	Uncertain supply.
22	SE.	23	"	"	"	Bored	65	1,780	- 20	1,760	62	1,718	" "	" "alkaline"		D, S	Poor supply.
23	SW.	23	"	"	"	"	61	1,790	- 2	1,788	60	1,730	" "	" "		D, S	Sufficient supply; 3 similar wells.
24	NW.	24	"	"	"	"	47	1,770	- 15	1,755	45	1,725	" "	" "		D, S	Waters 35 head stock.
25	SW.	27	"	"	"	Dug	90	1,810	- 20	1,790	20	1,790	Blue clay and gravel	" clear		D,	Poor supply.
26	NE.	28	"	"	"	"	9	1,820	- 1	1,819	6	1,814	Glacial gravel	" "		D, S	Abundant supply.
27	NW.	28	"	"	"	"	12	1,840	- 4	1,836	8	1,832	" "	" "		D, S	Fair supply.
28	SW.	31	"	"	"	"	18	1,855	- 10	1,845	16	1,839	" sand	" "alkaline"		D, S	Poor supply.

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 MARYFIELD NO. 91, 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				
29	NW.	34	12	30	1	Bored	70	1,802	- 30	1,772	70	1,732	Glacial sand	Hard, clear		S,	Poor supply.
30	NW.	34	"	"	"	Dug	18	1,795	- 11	1,784	11	1,784	" gravel	" "		D, S	Waters 40 head stock in summer; domestic use in winter.
31	NW.	36	"	"	"	"	50	1,755	- 30	1,725	50	1,705	" "	" "		D, S	Waters 100 head stock.
1	NE.	1	12	31	1	Bored	53	1,850	- 9	1,841	16	1,834	" gravel	" "		D,	Domestic supply only.
2	NE.	2	"	"	"	Dug ?	26	1,905	- 10	1,895	10	1,895	Marine shale	Soft, clear		S,	Insufficient supply.
3	NW.	2	"	"	"	"	20	1,880	- 18	1,862	18	1,862	Glacial sand	Hard, clear		D, S	Needs deepening; fair supply.
3a	NW.	2	"	"	"	"	30	1,900	- 3	1,897			" gravel	Soft, "		D, S	Sufficient for local needs.
4	NE.	4	"	"	"	"	50	1,910	- 10	1,900	45	1,865	" "	Hard, "alkaline"		D, S	Waters 40 head stock.
5	SW.	10	"	"	"	"	35	1,915	- 17	1,898	24	1,891	" "	Hard, clear		D, S	Sufficient for local needs.
6	NW.	10	"	"	"	"	30	1,875	- 25	1,850	25	1,850	Marine shale	" "alkaline"		D,	Supplies house only.
7	SW.	13	"	"	"	"	18	1,860	- 6	1,854	10	1,850	" "	" clear		D, S	Sufficient for local needs.
8	SE.	14	"	"	"	"	12	1,775	- 7	1,768	5	1,770	Glacial gravel	" "		D, S	Waters 50 head stock.
9	SW.	15	"	"	"	"	23	1,850					Marine shale				Dry hole.
10	NW.	15	"	"	"	"	10	1,800	- 4	1,796	6	1,794	Glacial gravel	Hard, "alkaline"		D, S	Small supply.
11	NW.	17	"	"	"	"	6	1,904	- 4	1,900	4	1,900	" "	Hard, clear		S,	Waters 7 head stock.
12	SW.	18	"	"	"	Bored	60	1,915	- 10	1,905	54	1,861	Marine shale	Soft, odorous		S,	" 50 " " .
13	NW.	18	"	"	"	Dug	18	1,910	- 15	1,895	17	1,893	Glacial gravel	Hard, clear		D, S	" 25 " " .
14	NE.	22	"	"	"	Bored	35	1,855	- 23	1,832	33	1,822	Marine shale	Soft, clear		D, S	Medium supply.
15	NE.	23	"	"	"	Dug	6	1,860	- 2	1,858	2	1,858	Glacial sand	" "		D, S	Waters 30 head stock.
16	NE.	24	"	"	"	"	30	1,860	- 12	1,848	12	1,848	" "	" "		D, S	Sufficient in years of normal rainfall.
17	SE.	26	"	"	"	"	27	1,860	- 15	1,845	15	1,845	" "	" "		D, S	Abundant supply. #
18	SW.	26	"	"	"	"	10	1,860	- 6	1,854	6	1,854	" gravel	" "		D, S	Waters 60 head stock.
19	SW.	28	"	"	"	"	18	1,780	- 9	1,771	9	1,771	" clay	Hard "		D, S	Not fit for use unless boiled.
20	NE.	28	"	"	"	"	8	1,860	- 6	1,854	6	1,854	" sand	" "		D, S	Poor supply.
21	NW.	28	"	"	"	"	20	1,800	- 13	1,787	13	1,787	" gravel	" "		D,	Sufficient for house use only.
22	SW.	30	"	"	"	"	35	1,910	- 32	1,878	32	1,878	" sand	" "	41	D, S	Waters 100 head stock.
23	NE.	32	"	"	"	"	48	1,868	- 30	1,838	48	1,820	" gravel	" "		D, S	" 140 " " .
24	SW.	34	"	"	"	"	27	1,865	- 17	1,848	15	1,850	" "	" "		D, S	Abundant supply.
25	NE.	34	"	"	"	"	25	1,870	- 14	1,856	14	1,856	" "	" "		D, S	" " .
26	NW.	35	"	"	"	Drilled	60	1,840					"blue clay				Dry hole.
27	NE.	36	"	"	"	Dug	50	1,860	- 40	1,820	40	1,820	" " "	" "		D, S	Poor supply.
28	SE.	36	"	"	"	Bored	65	1,865	- 20	1,845	61	1,804	" gravel	" "alkaline"		D, S	Waters 15 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.