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BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF PLEASANT VALLEY No. 288 SASKATCHEWAN

BY

B. R. MacKay, H. N. Hainstock & G. Graham

Water Supply Paper No. 100

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF PLEASANT VALLEY NO. 288 SASKATCHEWAN

INTRODUCTION

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

Publication of Results

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

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

How to Use the Report

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

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

If one intends to sink a well and wishes to find the approximate depth to a water-bearing horizon, he must learn: (1) the elevation of the site, and (2) the probable elevation of the water-bearing bed. The elevation of the well site is obtained by marking its position on the map, Figure 2, and estimating its elevation with respect to the two contour lines between which it lies and whose elevations are 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.

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

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

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

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

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

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

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

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

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

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

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

Cypress Hills Formation. The name given to a series of conglomerates and sand beds which occur in the southwest corner of Saskatchewan, and 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.

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

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

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Pleasant Valley, No. 288, consists of nine townships described as tps. 28, 29, and 30, ranges 16, 17, and 18, W. 3rd mer., and covers an area of 324 square miles. The centre of the municipality is situated approximately 14 miles west and 5 miles south of the town of Rosetown. A branch line of the Canadian Pacific railway runs through the northeastern corner of the area, and the main line of the Canadian National railways runs in an east-west direction through the centre of the municipality. The villages of Ridpath, McGee, and Fiske are situated on this railway line. Eaglehill creek flows through the northeastern corner of the municipality, and Bad lake, a large alkali flat that sometimes contains water, occurs in the southwestern corner. The valley of Eaglehill creek is at an elevation of approximately 1,868 feet and Bad lake is slightly less than 2,000 feet above sea-level. The maximum elevation occurs along the western boundary of the municipality and is in excess of 2,400 feet.

The larger portion of the northeastern quarter of this municipality is mantled by glacial lake clays. Parts of township 28, range 18; townships 30, ranges 17 and 18, township 28, range 16, and townships 29, ranges 16, 17, and 18, are covered with boulder clay or till. The remainder of the municipality is covered by part of a large moraine. The moraine-covered area is rough and hilly.

Water-bearing Horizons in the Unconsolidated Deposits

Little difference can be noted in ground water conditions in the moraine and glacial till-covered areas. Shallow wells are more numerous throughout the moraine-covered area since depressions are common, and the wells are dug in or near them. Shallow wells are scarce in the glacial lake clay-covered area, but the deeper water-bearing deposits are more uniform in this area than throughout the remainder of the municipality.

Throughout this municipality no continuous water-bearing horizons of large areal extent could be traced. In certain areas where the unconsolidated deposits are unusually thick it is difficult to obtain water at depth. In these areas it appears advisable to dig shallow wells in the vicinity of depressions. These wells yield small supplies of water that is suitable for drinking, unless contaminated by surface pollution. The supply from this type of well is usually sufficient for domestic needs throughout the year and in years of normal rainfall it is also sufficient for a few head of stock. Generally, water is obtained at depths of 15 to 25 feet, but during the drought years most of the wells had to be deepened. The aquifer in a number of wells is sand or gravel, but many of the wells are dug in clay and derive their water by direct seepage from the undrained depressions. Throughout the municipality however, a large number of wells tap scattered pockets of sand and gravel in the weathered zone of the glacial drift, usually within 30 feet of the surface. Over small areas, such as in the vicinity of Fiske, these pockets appear to be fairly continuous and moderate supplies of water should be obtained without difficulty. The pockets are generally widely scattered, however, and dry holes will doubtlessly be dug before a producing well is obtained. Where these sand and gravel deposits outcrop along the sides and bottoms of ravines and valleys, and in the vicinity of lakes, springs are not uncommon. The water obtained from these shallow deposits is generally of good quality, varying from medium soft to very hard, and it can be used for drinking. The supply is usually sufficient for local needs and only in a few isolated wells is it insufficient for farm requirements.

Many wells in this municipality tap scattered deposits of sand and gravel at depths ranging from 35 to more than 200 feet below the surface. As wells are drilled it may be found that some of these deposits form continuous aquifers, but at the present time

no large areas can be outlined in which ground water can definitely be obtained. The water-bearing beds are of scattered distribution and dry holes will no doubt be put down before a producing pocket is tapped. It is improbable that the deposits of sand and gravel in the lower part of the drift mantle form water-bearing horizons of large areal extent, as dry holes have already been put down at numerous locations throughout the area. The great difference in thickness of the drift over small areas makes it almost impossible to forecast at what depth deposits of sand and gravel that may occur at the base of the drift and immediately overlie the bedrock might be tapped. There is little doubt that a number of wells in this area are obtaining their supply of water from such deposits, but the aquifers cannot be traced even over small areas. The wells tapping deposits at depth in the drift yield varying supplies of water. They are not readily affected by drought conditions and are much more dependable than the wells tapping aquifers at shallow depths. The water is usually highly charged with mineral salts in solution, and in some wells the water is unsatisfactory for domestic use.

In the areas outlined on the accompanying map by the "A" boundary lines in townships 29 and 30, range 16, a few wells are obtaining water from a water-bearing horizon that appears to be continuous over the areas shown. The aquifer is formed by a sand and gravel bed that occurs at an elevation of 1,835 to 1,885 feet above sea-level. The wells tapping this aquifer vary from 60 to 240 feet in depth, due largely to the difference in surface elevation. It is improbable that the aquifer is continuous throughout the two outlined areas, as the valley of Eaglehill Creek divides them and its elevation is similar to that of the water-bearing horizon. It is possible that this aquifer may thin out or dissappear as the valley is approached, or it may outcrop along the valley slopes. In both areas water should be obtained at the depths stated above, but a hole was drilled to a depth of 180 feet on sec. 28, tp. 30,

range 16, without obtaining water. In this dry hole, however, the producing horizon may have been passed through unnoticed. The same horizon that appears general in the outlined areas may be encountered by other wells should they be drilled near these localities. The 350-foot drilled well in sec. 2, tp. 30, range 16, however, does not appear to indicate that the horizon extends to the west, but, as in the case of the dry hole mentioned above, the aquifer may have been passed through unnoticed. The yield from the wells tapping this aquifer is sufficient for local stock needs and the water is generally under some hydrostatic pressure. The water is hard and in some wells it is so highly charged with mineral salts that it is unsuitable for drinking.

Water-bearing Horizons in the Bedrock

The glacial drift of this municipality is underlain by the Bearpaw and Belly River bedrock formations. The approximate boundary between these formations is shown on the accompanying map, the Bearpaw formation occurring to the southwest of the line and the Belly River to the northeast. It is probable that the Bearpaw formation is not of great thickness over a large part of the area and some of the wells may have passed through it and are obtaining water from the underlying Belly River formation. The Bearpaw formation outcrops in sec. 7, tp. 28, range 17, at an elevation of 2,100 feet, but elsewhere the depth to this formation is unknown. In certain areas it is probable that it is overlain by at least 250 feet of glacial drift. No definite line of contact between the two formations was established, but the Belly River formation is known to outcrop within a few miles of the northern boundary of this municipality, in the vicinity of the town of Herschel, at an approximate elevation of 1,930 feet above sea-level. This would appear to indicate that the thickness of drift overlying the Belly River formation is greater in places than that covering the Bearpaw, but

the presence of coal at elevations of approximately 2,050 feet above sea-level may indicate that the bedrock is closer to the surface than now assumed.

A number of wells tap aquifers in the bedrock, but as they are located some distance apart it is impossible to outline an area in which other wells might obtain water from the bedrock.

Two dry holes located on sec. 31, tp. 30, range 17, and sec. 25, tp. 30, range 18, drilled to depths of 160 feet, encountered chunks of soft coal, so there is little doubt that these wells are drilled into the Belly River formation. Drilling was suspended in both wells at an approximate elevation of 2,050 feet above sea-level. From data obtained in the surrounding areas it seems probable that a well in this area would have to be drilled to a depth of at least 200 feet before an aquifer in the bedrock was tapped.

In township 30, range 18, a 300-foot well located on section 14 may tap an aquifer in the bedrock at an elevation of 1,960 feet above sea-level. It seems probable that this well obtains its supply of hard water from the Belly River formation, but the aquifer may be a sand bed at the base of the glacial drift. In either case this aquifer should be encountered by other wells in the area.

In township 29, range 16, a dry hole was drilled on section 30 to a depth of 230 feet below the surface. Eight feet of sandstone were pierced at the bottom of the well and drilling was discontinued at an elevation of 1,908 feet above sea-level. It is probable that the well entered the Belly River formation and it may be necessary to drill at least another 100 feet before a water-bearing horizon is located in the vicinity of this dry hole.

Two wells located on secs. 1 and 22, tp. 30, range 17, encountered aquifers that are thought to be in the bedrock at depths of 160 and 140 feet or at elevations of 1,850 and 1,860 feet above

sea-level. It is possible, however, that the aquifers occur in the base of the glacial drift, although the water is soft and resembles that obtained from the bedrock. Two wells drilled on section 14 of this township did not encounter water at an elevation of 1,840 feet and drilling was discontinued. The areal extent of the aquifers encountered by the producing wells is unknown. The supply of water is not abundant as it seeps into the wells very slowly, but it is sufficient for household purposes and a few head of stock.

A well located on sec. 36, tp. 30, range 17, appears to have tapped an aquifer in the Belly River formation at a depth of 145 feet, or at an elevation of 1,755 feet above sea-level. The areal extent of this aquifer is unknown.

What may prove to be a continuous aquifer in the Belly River formation is encountered at depths of 350 and 267 feet, or at elevations of 1,600 and 1,673 feet, by two wells located in secs. 2 and 23, tp. 30, range 16. The water from these wells is hard and the supply is fairly abundant. This horizon should be encountered by other wells in this area.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 28, Range 16

Most of this township is covered by a portion of a large moraine. A small area in sections 12 and 13 is mantled by glacial lake clays and a fairly large area in the southeastern corner is covered by boulder clay or glacial till. The till and clay-covered areas are gently undulating, but the part of the township that is covered by moraine is rough and hilly. The maximum elevation of 2,300 feet is attained in the west-central part of the area.

Small supplies of water should be obtained without difficulty within 60 feet of the surface, from wells dug beside depressions in the western two-thirds of the township. Scattered deposits of fine sand appear to underlie these low-lying areas and the water obtained from them is suitable for drinking as well as for stock. One well on the NW. $\frac{1}{4}$, sec. 19, obtains an abundant supply of water from an aquifer at a depth of 57 feet below the surface. It is improbable that the water-bearing sands form a continuous horizon over the western area, but the deposits appear to be fairly extensive.

In the eastern one-third a few wells tap pockets of fine sand or gravel at depths of 40 to 100 feet below the surface. There does not appear to be a general horizon present within the limits of the above depths and it is probable that each well taps an individual pocket. The scattered distribution of these pockets is shown by the fact that dry holes have been sunk to depths ranging from 90 to 120 feet. Much of the water obtained is "alkaline" and is suitable only for stock. Springs occur in the vicinity of small lakes and in the valleys and are used for farm needs. At the present time there is no shortage of ground water in this township. No wells have tapped the underlying bedrock formations.

Township 28, Range 17

This township is mantled by part of a moraine and the surface is very hilly, with a difference of 300 feet in topographic relief. Undrained depressions are fairly common. Deposits of sand and gravel occasionally occur on the surface. In section 7 the Bearpaw formation outcrops at an elevation of approximately 2,100 feet above sea-level.

Ground water conditions in this township are generally good and the majority of the residents find no difficulty in obtaining an adequate supply of water for their local requirements. Most of the wells are sunk to depths of less than 30 feet below the surface and tap deposits of water-bearing sand or gravel. It is not known if the sand and gravel occur as a continuous deposit, but it is thought that they occur as scattered pockets, so that dry holes will doubtlessly be dug before a water-bearing deposit is tapped. The water is hard and is suitable for all farm purposes.

In isolated parts of the township a few wells obtain water from aquifers at depths of 50 to 90 feet below the surface. These wells do not yield an adequate supply for all farm needs and the water is of poorer quality than that from the shallower wells. If water is not obtained within 35 feet of the surface in one location it appears advisable to test in another locality rather than to continue the well to a greater depth.

No wells have been drilled into the bedrock in this township and at the present time the possibilities of obtaining water from it are unknown.

The rough topography of this township offers many suitable locations for the construction of dams for retaining run-off water for stock use.

Township 28, Range 18

The surface of this township is very rolling and hilly and is cut by many deep valleys that contain small, intermittent

streams that flow into an "alkali" lake in the southeastern corner of the township. The elevation of the ground surface rises from less than 2,000 feet above sea-level at the "alkali" lake to more than 2,300 feet above sea-level along parts of the western boundary. The western 2 miles, and a strip along the northern boundary of the township, are mantled by part of a large moraine, whereas the remainder of the township is covered with boulder clay or glacial till.

Lack of data makes it impossible to outline any water-bearing horizons in this township. Only a few records are available and they are of dry holes rather than producing wells. Springs are common along the base of the hills surrounding the lake and they are being used extensively by the farmers for both domestic and stock use. The water is slightly "alkaline". Shallow wells in the vicinity of the lake should obtain water, but it will probably prove to be too highly mineralized for drinking.

Two wells located on sections 5 and 7 are sunk to depths of 130 feet below the surface or to elevations of 2,095 feet and 2,170 feet above sea-level. The extent of the aquifers is unknown and they may be formed by isolated pockets of sand or gravel. The supply of water is not large and the well on section 7 was not in use. A well on section 6 encountered an aquifer at a depth of 214 feet, or at an elevation of 2,036 feet. The areal extent of this aquifer is not known, but it seems probable that it should be encountered by other wells sunk to the required depth in this locality. The water from this aquifer is abundant in quantity, but it is highly mineralized and is not used for domestic purposes.

In the northern part of the township it is difficult to obtain water at depths exceeding 30 feet. In the western areas dry holes have been sunk to a depth of 150 feet and in the eastern part they have been sunk to a depth of 360 feet. The 360-foot hole may have entered the Bearpaw formation.

It appears advisable in this township to excavate deep dugouts or to construct small dams to retain a supply of run-off water for stock use, and to use shallow wells, dug near depressions, for domestic supplies.

Township 29, Range 16

The southern two-thirds of this township is covered by part of a moraine the surface of which is characterized by numerous hills and undrained depressions. A strip of land approximately ½ mile in width to the south of the railway line is covered by boulder clay or till. The northern part of the township is overlain by glacial lake clays to a depth of approximately 40 feet. The ground surface in this area is cut by many steep valleys.

In a large part of the moraine-covered area a good supply of ground water is difficult to obtain. Shallow seepage wells are used extensively. In some areas these wells have tapped isolated pockets of sand and yield a sufficient supply for farm needs, but in many localities the yield must be augmented from other sources during at least part of the year. The water from the majority of the wells is suitable for drinking. Dry holes have been dug to a depth of 120 feet below the surface and show the absence of any continuous water-bearing horizons in the glacial drift above this depth. On the SW. ¼, section 30, a dry hole was drilled to a depth of 230 feet. This hole definitely encountered bedrock, probably the Belly River formation, at a depth of 222 feet.

In the area that is mantled by glacial lake clays some water is being obtained from springs that occur along the ravines and no doubt wells sunk in these ravines would yield small supplies of water during at least a part of the year. However, the majority of the wells are dug to depths ranging from 120 to 168 feet below the surface and one has been sunk to a depth of 240 feet. The wells on the SE. ¼, sections 33, 34, and 35, and on

the NW. $\frac{1}{4}$, section 36, do appear to show some relationship to one another and the aquifers they tap may form a continuous water-bearing horizon over this area. At any rate, it is probable that wells sunk to an elevation of 1,885 to 1,855 feet above sea-level in the area surrounding these wells should encounter the same water-bearing horizon. The deposits forming these aquifers may occur at the base of the drift and immediately overlie the bedrock. The supply of water from the wells tapping this horizon is not abundant and the water is so highly charged with mineral salts in solution that it cannot be used for drinking. Two other wells, located on the SW. $\frac{1}{4}$, section 31, and the NW. $\frac{1}{4}$, sec. 34, obtain water from depths of 140 and 135 feet below the surface. It is probable, however, that these two wells tap pockets of sand or gravel of very small local distribution and it does not seem probable that the aquifer is of large extent. However, the aquifer tapped by the well on section 31 may extend to the west, but the supply from this well is only slightly more than sufficient for domestic needs. It appears improbable that a supply of water sufficient for local needs will be obtained within at least 100 feet of the surface in the area covered by glacial lake clays. In this area, when a sufficient supply for domestic needs can be obtained from a seepage well, it would appear advisable to excavate dugouts or construct small dams for the retention of run-off water to be used for stock.

Township 29, Range 17

This township is quite rolling, with broad, deep valleys, and is covered largely by part of a moraine. An area in the north-eastern corner is mantled by boulder clay or glacial till and in parts of sections 25 and 36 glacial lake clays overlie the boulder clay.

In the southern half of the township it is not difficult to obtain water from wells dug into the upper 45 feet of the glacial

drift. Most of the wells have tapped pockets of sand or gravel. These pockets appear general over the southern area, but it is not known if they form a continuous water-bearing horizon. The pockets become less numerous towards the north and in this area the wells are deriving water at greater depths, and dry holes are not uncommon, one on section 25 being 160 feet deep. The water in this township is of good quality and it can be used for drinking.

In those areas where it is difficult to obtain adequate supplies of water for stock use, dugouts can be excavated and a supply of run-off water retained by this method.

Township 29, Range 18

The ground surface of the northwestern part of this township is very rolling and the elevation approximates 2,400 feet above sea-level. In the eastern and southeastern areas, the surface is slightly rolling to gently undulating. With the exception of a small area in the northwestern corner that is mantled by glacial till or boulder clay, the township is covered by part of a large moraine and small hills and undrained depressions are not uncommon.

In the vicinity of the town of Fiske it appears possible to obtain an adequate supply of ground water from shallow wells usually less than 20 feet deep. The extent of the sand bed that forms this horizon is, however, not large and a few miles from the town wells must be sunk to greater depths before an adequate supply is obtained. A few other wells in isolated sections of the township obtain water from scattered pockets of sand and gravel that occur within 30 feet of the surface. In general these wells yield an adequate supply for local needs and the water is suitable for drinking.

A number of wells at widely separated points in the township obtain water from deposits of fine sand, but only over very local areas do the aquifers show any continuity and it is improbable that a general horizon is present within 200 feet of the surface. However, in certain areas it may be possible to sink wells with some hope of obtaining

adequate supplies of water. On the NE. $\frac{1}{4}$, sec. 2, a well taps an aquifer at a depth of 80 feet or at an elevation of 2,180 feet above sea-level and obtains a fair supply of water that is being used only for stock requirements. It is probable that the areal extent of this aquifer is small.

On the SW. $\frac{1}{4}$, sec. 36, a well sunk to a depth of 120 feet encountered a gravel aquifer at an elevation of 2,150 feet above sea-level, but the yield from this well is insufficient for stock needs and the water is too highly mineralized for domestic purposes. This aquifer is not thought to be of large areal extent.

On sections 5, 11, 12, 24, and 35, wells drilled to depths ranging from 100 to 203 feet below the surface tap aquifers at elevations varying from 2,075 to 2,152 feet above sea-level. The individual aquifers tapped by this group of wells are probably of greater areal extent than the aquifers of the two individual wells mentioned above and the water-bearing sands or gravels that these five wells encounter may be tapped by other wells sunk to the required depths in this area. The yield from some of these wells is insufficient for local needs and the location of these wells and the data pertaining to them should be ascertained from the well record sheets before the site of a well is finally chosen. The water from all these wells is hard and highly charged with mineral salts in solution, and although some of them are used for drinking they are not particularly suitable for that purpose.

One well located on the SE. $\frac{1}{4}$, sec. 2, drilled to a depth of 250 feet below the surface, encountered a fine sand aquifer at an elevation of 2,010 feet above sea-level. The supply from this well is more than sufficient for local needs. The water is under some hydrostatic pressure is hard, and contains iron and other mineral salts in solution, but they are not in sufficient concentration to render the water unfit for drinking.

Where the topography and character of the soil are favourable for the collection and retention of run-off water, small dams and dugouts might be constructed and the water so collected used for stock. By using a shallow seepage well that yields a supply adequate for domestic needs and the dam or dugout for stock use, a sufficient supply of water for farm needs should be obtained.

Township 30, Range 16

With the exception of two small areas in the eastern part that are mantled by glacial till this township is covered by glacial lake clay. Glacial till underlies the lake clays. The ground surface of the southern part of the area is rough and hilly, being deeply dissected by the tributaries of Eaglehill creek. The northern part of the township is only slightly undulating.

There are a few wells in this township that are obtaining water from sand and gravel deposits within 42 feet of the surface. Along the draws and in the bottoms of the ravines the depth to the water-bearing sand and gravel deposits is considerably less. Springs should also prove a source of supply in the area to the south of Eaglehill creek, and their yield could probably be increased by the construction of small collecting galleries. The supply from these shallow sources varies considerably; on section 1 a spring that has been excavated yields more than sufficient for local needs, whereas wells on sections 25 and 30 yield insufficient supplies. The supply from the remainder of the shallow wells is sufficient for farm requirements.

On the NW. $\frac{1}{4}$, sections 33 and 34, two wells sunk to depths of 60 and 85 feet encounter aquifers at elevations of 1,910 and 1,915 feet above sea-level. It is probable that the same aquifer is supplying both wells, but it is not thought that the horizon is of large areal extent; it is assumed that it thins out or dissappears in a southerly direction. The yield from these wells is sufficient for local needs and the water is under some hydrostatic pressure.

The water is hard and contains mineral salts in solution and the water from the well on section 34 is not used for drinking.

Two small areas are outlined on the accompanying map by the "A" boundary lines within which a number of wells appear to tap a fairly continuous water-bearing horizon at elevations of 1,885 to 1,835 feet above sea-level. The wells vary in depth from 60 to 128 feet below the surface. A hole on the NW. $\frac{1}{4}$, sec. 28, failed to encounter the aquifer. A producing well on section 23 missed this aquifer proving the aquifer may not be continuous between the outlined areas. The water derived from this aquifer is hard, is sufficient for local needs, and is under considerable hydrostatic pressure. The water from the wells in the southern area is highly charged with mineral salts in solution and is not being used for drinking.

Two wells located on the NE. $\frac{1}{4}$, sec. 2, and the SW. $\frac{1}{4}$, sec. 23, drilled to depths of 350 and 267 feet, respectively, tap aquifers at elevations of 1,600 and 1,673 feet above sea-level. It is probable that these two wells tap what may prove to be a general and continuous water-bearing horizon in the Belly River formation. There is insufficient information at hand at present to say that this water-bearing horizon is of large areal extent, but its extent may be proved by further drilling. The two wells yield large supplies of water which is under hydrostatic pressure, but the pressure differs in the individual wells. The water is hard and contains mineral salts in solution but is being used for drinking.

Township 30, Range 17

The eastern part of this township is mantled by glacial lake clays. A portion of a moraine covers the southwestern corner and the remainder of the township is overlain by boulder clay or glacial till. In the vicinity of Eaglehill creek and its tributaries the ground surface is rough and rolling, but elsewhere it is fairly flat.

The main supply of water in this township is derived from pockets of sand and gravel that are scattered throughout the glacial drift. Wells tapping these pockets vary from a few feet to 110 feet deep. Where the deposits of gravel outcrop along the sides of ravines springs are of common occurrence. Over small areas some correlation is found in the occurrence of the water-bearing deposits, but these areas are isolated and a continuous water-bearing horizon is not in evidence. In most of the wells tapping these small isolated pockets the water does not rise above the aquifer, but generally the supply is sufficient for local needs. The water is hard and that from two wells contains such a concentration of mineral salts in solution that it causes scour among stock.

On the SE. $\frac{1}{4}$, sec. 22, a 140-foot well encountered an aquifer that is assumed to be in the bedrock at an elevation of 1,857 feet above sea-level. As the approximate contact of the Bearpaw and Belly River formations is near this well, it is not definitely known from which formation the water is being derived. Since a gravel bed was encountered at a depth of 80 feet below the surface in the well it is even possible that some of the water may be coming from the glacial drift. The areal extent of this aquifer is unknown, but two dry holes in section 14 appear to indicate that the aquifer thins out or disappears in that direction. The water in the well is under hydrostatic pressure and rises 60 feet above the top of the aquifer. The supply is not large and the water seeps into the wells very slowly. The water is soft and has a "soda" taste, but is suitable for drinking.

A well, located on the SE. $\frac{1}{4}$, section 1, drilled to a depth of 160 feet below the surface, encountered an aquifer in what is believed to be the Belly River formation at an elevation of 1,850 feet above sea-level. Another well on the NE. $\frac{1}{4}$, sec. 36, drilled 145 feet below the surface, encountered a similar aquifer

at an elevation of 1,755 feet above sea-level. The water rises to a point 2,000 feet above sea-level in one well and 1,900 feet above sea-level in the other. It is improbable that the same aquifer is feeding both wells but it is altogether likely that wells sunk to similar depths in the vicinity of either of these wells will obtain water. The well on section 36 is now dry due to a defect in the casing, but the other well yields a large supply of hard water that is used for all purposes.

A hole, located on section 31, drilled into the Belly River formation, did not encounter any water-bearing horizons and drilling was discontinued at a depth of 160 feet below the surface. There appears to be a fairly large area in the northwestern corner in which ground water is difficult to obtain. It does not appear advisable to sink a well deeper than 30 feet unless one is prepared to drill to depths in excess of 160 feet. It may be possible in this area to obtain sufficient water for domestic needs from a shallow seepage well and to excavate dugouts for the retention of run-off water for stock requirements.

There is an ideal location for a small dam on section 33 and sufficient water should be obtained to water a large number of stock. A spring occurs on this section the large flow of water from which would supplement the supply of run-off water and thus a supply that would last throughout the year should be available.

Township 30, Range 18

The southwestern portion of this township is covered by part of a moraine, the surface of which is rough and hilly. The northeastern part is mantled by boulder clay or glacial till and its ground surface is gently undulating. A small ravine runs from Shrimp lake towards Eaglehill creek.

The main source of water supply in this township is from scattered deposits of sand and gravel that occur within the upper 50 feet of the drift. These deposits are in the form of pockets

and show little or no relationship to one another, and in no area can they be said to form a continuous water-bearing horizon. Where the deposits are near the surface, as along the sides of a valley or in the vicinity of Shrimp lake, springs are fairly common. These springs yield a large supply of water that can be used for drinking. With few exceptions the supply of water from the shallow wells is sufficient for local needs and can be used for all farm requirements.

A 146-foot well on the SE. $\frac{1}{4}$, sec. 17, encountered a gravel aquifer at an elevation of 2,254 feet above sea-level. The limits of this aquifer are undefined since only one well has been drilled to this depth and elevation in this area. The water is under considerable pressure and the supply is sufficient for local needs. It is hard and contains some iron and other mineral salts in solution, but it can be used for all purposes.

On the SE. $\frac{1}{4}$, sec. 14, a well 150 feet deep taps an aquifer at an elevation of 2,085 feet above sea-level. This aquifer does not appear to extend to the west as a well on the SW. $\frac{1}{4}$, sec. 14, had to be drilled to a depth of 300 feet before a sufficient supply of water was obtained. However, the aquifer pierced by the 150-foot well may extend over a considerable area in the other directions. The well yields a large supply of hard, highly mineralized water that is suitable only for stock. Water appears difficult to obtain in the northeastern part of the township. A dry hole on the SE. $\frac{1}{4}$, section 25, was drilled to a depth of 160 feet before drilling was discontinued in the bedrock Belly River formation. Unless a well of greater depth than 160 feet is contemplated it does not appear advisable to attempt to obtain water below 30 feet. Seepage wells for domestic needs supplemented by dugouts for stock requirements should solve the water problem in those areas where water is scarce.

On the SW. $\frac{1}{4}$, sec. 14, a 300-foot drilled well encountered what is believed to be a sand aquifer in the bedrock at an elevation

of 1,960 feet above sea-level. The Bearpaw formation probably underlies the drift in this area, but it is thought that the well passed through this formation and is obtaining its water from the underlying Belly River formation. The areal extent of this aquifer has not been determined, but it appears probable that it should be tapped in the surrounding areas. The water is under sufficient pressure to rise to a level 50 feet below the surface. The supply is more than sufficient for local needs. The water is hard, contains iron and other mineral salts in solution, but it is suitable for all farm needs.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF PLEASANT VALLEY, NO. 288, SASKATCHEWAN.

West of 3rd meridian — Township / Range	28 / 16	28 / 17	28 / 18	29 / 16	29 / 17	29 / 18	30 / 16	30 / 17	30 / 18	Total No. in municipality
Total No. of Wells in Township	18	24	14	42	24	26	32	28	20	228
No. of wells in bedrock	0	0	1	1	0	0	2	5	2	11
No. of wells in glacial drift	18	24	13	41	24	26	30	23	18	217
No. of wells in alluvium	0	0	0	0	0	0	0	0	0	0
Permanency of Water Supply										
No. with permanent supply	16	23	8	24	20	24	31	25	19	190
No. with intermittent supply	0	0	0	2	2	1	0	0	0	5
No. dry holes	2	1	6	16	2	1	1	3	1	33
Types of Wells										
No. of flowing artesian wells	0	0	0	0	0	0	0	0	0	0
No. of non-flowing artesian wells	10	3	2	7	4	11	17	8	9	71
No. of non-artesian wells	6	20	6	19	18	14	14	17	10	124
Quality of Water										
No. with hard water	16	23	8	19	14	22	30	20	19	171
No. with soft water	0	0	0	7	8	3	1	5	0	24
No. with salty water	0	0	0	0	0	0	0	1	0	1
No. with "alkaline" water	6	2	4	5	3	8	2	2	2	34
Depths of Wells										
No. from 0 to 50 feet deep	12	20	5	24	20	14	15	16	15	141
No. from 51 to 100 feet deep	5	4	0	6	2	5	9	5	1	37
No. from 101 to 150 feet deep	1	0	3	9	1	3	5	5	2	29
No. from 151 to 200 feet deep	0	0	3	1	1	2	1	2	1	11
No. from 201 to 500 feet deep	0	0	3	2	0	2	2	0	1	10
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	0	0	0	0
How the Water is Used										
No. usable for domestic purposes	14	22	3	21	22	18	20	23	18	161
No. not usable for domestic purposes	2	1	5	5	0	7	11	2	1	34
No. usable for stock	16	23	8	26	22	25	31	25	19	195
No. not usable for stock	0	0	0	0	0	0	0	0	0	0
Sufficiency of Water Supply										
No. sufficient for domestic needs	16	23	8	24	20	24	31	25	19	190
No. insufficient for domestic needs	0	0	0	2	2	1	0	0	0	5
No. sufficient for stock needs	16	18	2	20	18	15	24	19	14	146
No. insufficient for stock needs	0	5	6	6	4	10	7	6	5	49

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 mainly to the bicarbonates of calcium and magnesium and iron, and permanent harness 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 Pleasant Valley, No. 288, 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	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	
1.	NW.	19	28	16	3	57	640	600	500	100	22	135	90	104	279	23	525	135	34		310		10	36	* 1
2.	SE.	2	29	18	3	250	2,700	340	240	100	47	230	70	68	1,756	1,128	2,870	125		88	107		2,472	78	* 1
3.	NE.	13	29	18	3	20	400	300	240	60	11	245	120	58	66			Anomalous							* 1
4.	SW.	35	30	16	3	128	2,080	700	600	100	17	170	70	130	1,090	545	1,741	126		37	334		1,216	28	* 1
5.	SE.	34	29	16	3	168	3,703				124	393	598		2,282										* 1

Water samples indicated thus, * 1, are from glacial drift.
Analyses are reported in parts per million.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
Analysis No. 5 by University of Saskatchewan.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

Five samples of water from the glacial drift in the municipality of Pleasant Valley were analysed and the results are listed in the accompanying table. These waters are quite hard, which is not unusual for waters derived from the glacial deposits. The total dissolved solid content of the samples varies from 400 to 3,703 parts per million, the amount of mineral salts in solution apparently increasing with depth. The total dissolved solid content of sample No. 1 is low and the water is of good quality. Sample No. 3 also has a low total dissolved solid content, but contains nitrates and, therefore, it is impossible to calculate the assumed constituents in reasonable combinations. The water in this well is probably contaminated by surface waters containing sewage and the water should be examined for bacteria. The waters represented by samples Nos. 2 and 4 may have a laxative effect upon those not accustomed to their use as they contain relatively large amounts of Na_2SO_4 (Glauber's salt). The water represented by sample No. 5 is used only for stock. Samples Nos. 4 and 5 may be characteristic of the types of water obtained from wells within the areas outlined by the "A" boundary lines on the accompanying map, Figure 1. Many of the waters in this municipality were reported to contain iron in solution.

Since the composition of the glacial drift varies widely over small areas, the waters obtained from it will also vary considerably in quality in the same areas. It should not be assumed, therefore, that since water of poor quality is obtained from one well water of similar quality will be obtained from another well in the same vicinity.

Water from the Bedrock

No samples of water known to be derived from bedrock aquifers were taken for analyses.

Only one well in the municipality is thought to be deriving its water from the Bearpaw formation. The water from this well is soft and tastes of "soda", the sodium salts being the predominant mineral salts in solution. In some of the well waters these salts are in sufficient concentration to render the water unfit for drinking.

The water derived from the Belly River formation in this municipality is quite hard, although in other municipalities it may be soft and contain a large amount of NaCl (common salt) in solution. Two wells in township 30, range 16, thought to be tapping the Belly River formation, yield water that is hard, and "alkaline". It is used, however, for drinking. Two wells in township 30, range 17, are reported as obtaining water from the Belly River formation at an elevation approximately 100 feet higher than that of the wells in township 30, range 16. The water from these wells is hard, but is suitable for all farm needs. Usable water should be obtained from the Belly River formation in most places.

WELL RECORDS—Rural Municipality of PLEASANT VALLEY NO. 288, 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	28	16	3	Dug	70	1,985	- 35	1,950	70	1,915	Glacial sand	Hard, clear, iron, "alkaline"		S	Sufficient for local needs.
2	SW.	3	"	"	"	Bored	50	2,090	- 33	2,057	50	2,040	Glacial sand and gravel	Hard, clear, iron		D, S	Sufficient for local needs; also a 120 foot dry hole.
3	SW.	6	"	"	"	Bored	40	2,210	- 27	2,183	40	2,170	Glacial sand	Hard, clear		S	Sufficient for local needs.
4	NW.	7	"	"	"	Dug	22	2,200	- 12	2,188	22	2,178	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
5	SW.	9	"	"	"	Dug	13	2,275	- 3	2,272	13	2,262	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
6	SW.	12	"	"	"			2,040					Glacial sand and gravel	Hard, cloudy, iron, "alkaline"	42	D, S	
7	NE.	13	"	"	"			2,010					Glacial sand	Hard, cloudy, iron, "alkaline"			Have a 90 foot dry hole.
8	SE.	14	"	"	"	Bored	60	2,080	- 44	2,036	60	2,020	Glacial sand	Hard, cloudy, iron, "alkaline"	42	D, S	Sufficient for local needs.
9	SW.	14	"	"	"	Bored	100	2,100	- 86	2,014	100	2,000	Glacial sand	Hard, cloudy, iron, "alkaline"	42	D, S	Sufficient for local stock needs.
10	N½.	17	"	"	"	Dug	32	2,280	- 18	2,262	32	2,248	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
11	SE.	18	"	"	"	Dug	16	2,250	- 13	2,237	16	2,234	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
12	NW.	19	"	"	"	Dug	57	2,185	- 37	2,148	57	2,128	Glacial gravel	Hard, clear, iron	42	D, S	Sufficient for local needs. #
13	SW.	20	"	"	"	Dug	22	2,270	- 11	2,259	22	2,248	Glacial sand	Hard, clear	43	D, S	Sufficient for local needs.
14	NW.	20	"	"	"	Dug	25	2,275	- 21	2,254	25	2,250	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
15	NE.	26	"	"	"	Dug	40	2,100	- 30	2,070	40	2,060	Glacial sand	Hard, clear, iron, "alkaline"		S	Oversufficient for 50 head stock.
16	NE.	29	"	"	"	Dug	28	2,205	- 22	2,183	28	2,177	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
1	SE.	1	28	17	3	Dug	22	2,200	- 15	2,185	22	2,178	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
2	SE.	2	"	"	"	Bored	17	2,220	- 9	2,211	9	2,211	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
3	NW.	3	"	"	"	Dug	20	2,290	- 12	2,278			Glacial drift	Hard, clear, iron, "alkaline"		D, S	Sufficient for 20 head stock; also a 100 foot dry hole.
4	SE.	4	"	"	"	Dug	18	2,200	- 2	2,198			Glacial clay	Hard, clear		D, S	Sufficient for local needs; also a similar well.
5	SE.	6	"	"	"	Dug	30	2,210	- 27	2,183	30	2,180	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
6	NE.	13	"	"	"	Bored	60	2,240	- 40	2,200	60	2,180	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
7	SE.	14	"	"	"	Bored	90	2,295	- 87	2,208	90	2,205	Glacial sand	Hard, clear	42	D, S	Insufficient for local needs; also has a 20 foot well; good 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 PLEASANT VALLEY NO.288, 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
8	NE.	14	28	17	3	Dug	30	2,285	- 28	2,257	30	2,255	Glacial sand	Hard, clear	42	D, S	Insufficient for local needs.
9	SE.	15	"	"	"	Dug	10	2,290	- 4	2,286	4	2,286	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
10	SW.	15	"	"	"	Dug	12	2,275	- 8	2,267	12	2,263	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
11	NE.	16	"	"	"	Dug	28	2,275	- 24	2,251	24	2,251	Glacial sand	Hard, clear, sulphur		D, S	Sufficient for local needs.
12	SE.	17	"	"	"	Dug	22	2,235	- 13	2,222	22	2,213	Glacial sand and gravel	Hard, clear	42	D, S	Sufficient for local needs.
13	NE.	17	"	"	"	Dug	12	2,165	- 8	2,157	8	2,157	Glacial sand	Hard, clear, iron		D, S	Sufficient for local needs.
14	E½.	18	"	"	"	Bored	70	2,110	- 60	2,050	70	2,040	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
15	NW.	19	"	"	"	Dug	15	2,070	- 6	2,064	6	2,064	Glacial sand	Hard, cloudy, "alkaline"		S	Insufficient for local needs.
16	NE.	23	"	"	"	Dug	8	2,255	- 1	2,254			Glacial sand and gravel	Hard, clear	42	D, S	Sufficient for local needs.
17	NE.	24	"	"	"	Bored	50	2,265	- 45	2,220	50	2,215	Glacial sand	Hard, clear	42	D, S	Insufficient for local needs.
18	NE.	25	"	"	"	Dug	25	2,210	- 15	2,195	15	2,195	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
19	NW.	25	"	"	"	Dug	28	2,200	- 18	2,182	28	2,172	Glacial gravel and sand	Hard, clear	42	D, S	Sufficient for local needs.
20	SE.	28	"	"	"	Dug	4	2,300	0	2,300	0	2,300	Glacial gravel and sand	Hard, iron, sulphur, clear		D, S	Sufficient for local needs.
21	SW.	31	"	"	"	Bored	50	2,200	- 30	2,170			Glacial clay	Hard, clear, iron		D	Sufficient for domestic needs only.
22	NW.	36	"	"	"	Dug	30	2,225	- 25	2,200	30	2,195	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
1	SW.	5	28	18	3	Bored	130	2,225	-121	2,104	121	2,104	Glacial sand	Hard, clear, iron, "alkaline"		S	Sufficient for 8 head stock only.
2	NW.	6	"	"	"	Drilled	214	2,250	-164	2,086	214	2,036	Glacial sand	Hard, clear, iron, "alkaline"		S	Sufficient for local needs.
3	NW.	7	"	"	"	Bored	130	2,300	-113	2,187	130	2,170	Glacial gravel	Hard, cloudy, iron, "alkaline"		N	Fair supply. Use a seepage well.
4	NW.	25	"	"	"		25	2,150					Glacial sand			D	
5	NW.	30	"	"	"	Bored	150	2,350									Dry hole, base in glacial clay.
6	NE.	34	"	"	"	Spring		2,115					Glacial drift	Hard, iron, "alkaline"		S	Sufficient for local needs.
7	SE.	35	"	"	"		250	2,260									Several dry holes 150 feet to 250 feet deep.
8	SE.	36	"	"	"	Drilled	367	2,350									Dry hole in Bearpaw bedrock. Several seepage wells.
1	NE.	3	29	16	3	Dug	10	2,230	- 5	2,225	10	2,220	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
2	NE.	4	"	"	"	Dug	38	2,275									Dry hole, base in glacial drift. Several other dry holes.
3	SE.	7	"	"	"	Dug	45	2,310									Dry hole, base in glacial drift.

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 PLEASANT VALLEY NO.288, 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
4	NE.	9	29	16	3	Dug	25	2,290	- 23	2,267	23	2,267	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
5	SE.	10	"	"	"	Dug	20	2,225	- 10	2,215	17	2,208	Glacial sand	Soft, clear	42	D, S	Sufficient for local needs; also a 28 foot dry hole.
6	NW.	10	"	"	"	Dug	22	2,190	- 20	2,170	22	2,168	Glacial gravel	Hard,clear	42	D, S	Sufficient for local needs.
7	SW.	15	"	"	"	Bored	35	2,200	- 15	2,185	35	2,165	Glacial sand	Hard, clear, iron	42	D, S	Sufficient for local needs.
8	SW.	17	"	"	"	Dug	20	2,280	- 5	2,275			Glacial clay	Soft,cloudy		D, S	Insufficient for local needs; also 10 dry holes 20 to 120 feet deep.
9	NE.	17	"	"	"	Dug	35	2,200	- 18	2,182	18	2,182	Glacial clay	Hard,clear	42	D, S	Intermittent supply; near slough.
10	SW.	20	"	"	"	Dug	24	2,210	- 22	2,188	22	2,188	Glacial gravel	Soft, clear	42	D, S	Sufficient for local needs.
11	SE.	20	"	"	"	Dug	13	2,200					Glacial drift	Soft, clear		D, S	Sufficient for local needs.
12	NE.	20	"	"	"	Dug	20	2,100					Glacial drift	Soft, clear		D, S	Sufficient for local needs.
13	NW.	20	"	"	"	Dug	18	2,200	- 15	2,185	18	2,182	Glacial sand	Soft, clear	42	D	Sufficient for domestic needs only. Three more wells about 18 feet deep.
14	SE.	21	"	"	"	Bored	80	2,165									Dry hole, base in glacial drift.
15	NW.	24	"	"	"	Dug	55	2,100									Dry hole, base in glacial drift.
16	SW.	27	"	"	"	Dug	20	2,050	- 10	2,040	17	2,033	Glacial gravel	Hard, clear	42	D, S	Sufficient for local needs.
17	SW.	30	"	"	"	Bored	230	2,138									Dry hole, base in Belly River.
18	NW.	30	"	"	"	Dug	80	2,100									Dry hole, base in glacial drift.
19	SW.	31	"	"	"	Bored	140	2,080					Glacial drift	Hard,clear, iron		D	Intermittent supply.
20	NW.	32	"	"	"	Dug	8	1,955					Glacial drift	Hard,cloudy, "alkaline"	43	D, S	Sufficient for local needs.
21	SE.	33	"	"	"	Drilled	240	2,095			240	1,855	Glacial gravel	Hard,clear, iron,"alkaline"	42	S	Sufficient for local needs.
22	SE.	34	"	"	"	Bored	168	2,050	-156	1,894	156	1,894	Glacial clay	Hard,cloudy, "alkaline"		S	Sufficient for local needs. #
23	NW.	34	"	"	"	Bored	135	2,090	- 95	1,995	135	1,955	Glacial drift	Hard,cloudy, iron,"alkaline"	42	S	Sufficient supply. Yields two tanks per day.
24	SE.	35	"	"	"	Drilled	120	2,005					Glacial drift	Hard, clear, "alkaline"	42	S	Sufficient for local needs.
25	NW.	36	"	"	"	Bored	125	2,000	-105	1,895	125	1,875	Glacial sand	Hard,iron, cloudy	42	S	Sufficient for local needs.
1	NE.	1	29	17	3	Bored	46	2,310	- 40	2,270	46	2,264	Glacial gravel	Hard, clear	42	D, S	Sufficient for local needs.
2	NE.	2	"	"	"	Dug	41	2,270	- 37	2,233	37	2,233	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
3	SW.	2	"	"	"	Dug	14	2,270	- 8	2,262	8	2,262	Glacial sand	Soft, clear	42	D, S	Sufficient for local needs.
4	NW.	4	"	"	"	Dug	18	2,195	- 13	2,182	13	2,182	Glacial sand	Hard, clear, iron,"alkaline"	42	D, S	Sufficient for local needs.

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

WELL RECORDS—Rural Municipality of PLEASANT VALLEY NO.288, 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
5	N½.	5	29	17	3	Dug	16	2,200	- 8	2,192	8	2,192	Glacial sand	Soft, clear	42	D, S	Sufficient for local needs.
6	NW.	7	"	"	"	Dug	21	2,215	- 14	2,201	14	2,201	Glacial yellow clay	Hard, clear	42	D, S	Sufficient for local needs; also a similar well.
7	N½.	8	"	"	"	Dug	14	2,200	- 11	2,189	11	2,189	Glacial sand	Soft, clear		D, S	Sufficient for local needs.
8	SE.	10	"	"	"	Dug	22	2,255	- 19	2,236	19	2,236	Glacial drift	Hard, clear	42	D, S	Intermittent supply; also another 14 foot well, small supply.
9	SW.	12	"	"	"	Dug	18	2,290	- 9	2,281	18	2,272	Glacial gravel	Soft, clear	42	D, S	Sufficient for local needs.
10	NW.	13	"	"	"	Dug	13	2,280	- 4	2,276	13	2,267	Glacial sand	Soft, clear	42	D, S	Sufficient for local needs.
11	NW.	18	"	"	"	Dug	22	2,220	- 14	2,206	22	2,198	Glacial sand	Hard, clear	42	D, S	Sufficient for 80 head stock.
12	SW.	19	"	"	"	Bored	32	2,240	- 15	2,225	26	2,214	Glacial sand	Hard, clear, iron	42	D, S	Sufficient for local needs.
13	NW.	20	"	"	"	Dug	9	2,205	- 6	2,199	6	2,199	Glacial sand	Soft, clear	42	D, S	Sufficient for local needs.
14	SE.	23	"	"	"	Dug.	20	2,190	- 15	2,175	18	2,172	Glacial sand	Soft, clear	42	D, S	Sufficient for local needs.
15	SE.	24	"	"	"	Dug	20	2,160	- 16	2,144	19	2,141	Glacial gravel and sand	Hard, clear, "alkaline"	42	D, S	Sufficient for local needs; also a 20 foot well with soft water.
16	E½.	25	"	"	"	Bored	160	2,115									Dry hole, base in glacial drift.
17	SW.	28	"	"	"	Bored	24	2,210	- 20	2,190	20	2,190	Glacial gravel	Soft, clear	42	D, S	Sufficient for local needs.
18	SW.	30	"	"	"	Bored	93	2,245									Dry hole; base in glacial drift.
19	NE.	30	"	"	"	Dug	40	2,210	- 35	2,175	35	2,175	Glacial sand	Hard, iron		D, S	Sufficient for local needs.
20	NE.	31	"	"	"	Dug	20	2,230	- 18	2,212	18	2,212	Glacial sand	Hard, clear, iron, "alkaline"	42	D, S	Insufficient for local needs.
21	SW.	32	"	"	"	Bored	84	2,215	- 78	2,137	78	2,137	Glacial gravel	Hard, clear	42	D, S	Sufficient for 100 head stock.
22	SE.	36	"	"	"	Bored	150	2,085	-146	1,939			Glacial drift	Hard, clear, iron	42	D	Intermittent supply.
1	SE.	1	29	18	3	Dug	18	2,230	- 12	2,218	16	2,214	Glacial sand	Soft, clear	42	D, S	Sufficient for local needs.
2	NW.	1	"	"	"	Bored	65	2,230									Dry hole; base in glacial drift.
3	SE.	2	"	"	"	Drilled	250	2,250	-185	2,065	240	2,010	Glacial sand	Hard, clear, iron	42	D, S	Sufficient for local needs. #
4	NE.	2	"	"	"	Bored	80	2,260	- 65	2,195	80	2,180	Glacial drift	Hard, clear, iron, "alkaline"		S	Insufficient for local needs.
5	S½.	5	"	"	"	Drilled	203	2,330	-189	2,141			Glacial sand	Hard, clear, iron	42	S	Insufficient for local needs.
6	NW.	5	"	"	"	Drilled	183	2,335	-143	2,192	183	2,152	Glacial gravel	Hard, clear, iron		D, S	Sufficient for local needs.
7	NE.	11	"	"	"	Drilled	150	2,230	- 70	2,160	100	2,130	Glacial sand	Hard, clear, iron	42	D, S	Sufficient for local needs; also three 20 foot seepage wells and a 100 foot dry hole.
8	SW.	12	"	"	"	Drilled	145	2,230	-120	2,110	145	2,085	Glacial sand	Hard, cloudy, iron, "alkaline"		D, S	Insufficient for local needs.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of PLEASANT VALLEY NO.288, 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
9	SE.	13	29	18	3	Dug	22	2,220	- 14	2,206	22	2,198	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
10	NE.	13	"	"	"	Dug	20	2,225	- 6	2,219	20	2,205	Glacial sand	Hard, clear		D, S	Sufficient for local needs. #
11	SE.	14	"	"	"	Dug	11	2,220	- 8	2,212	11	2,209	Glacial sand and gravel	Soft, clear		D, S	Sufficient for local needs.
12	SW.	23	"	"	"	Dug	13	2,240	- 10	2,230	11	2,229	Glacial sand	Hard, clear, "alkaline"	42	D, S	Sufficient for local needs.
13	NE.	23	"	"	"	Dug	11	2,230	- 9	2,221	10	2,220	Glacial gravel	Hard, clear, "alkaline"	42	D, S	Sufficient for local needs.
14	SW.	24	"	"	"	Dug	100	2,205	- 97	2,108	97	2,108	Glacial sand	Hard, clear, iron, "alkaline"		S	Intermittent supply; also a 24 foot seepage well.
15	SW.	26	"	"	"	Bored	40	2,340	- 30	2,310	38	2,302	Glacial sand	Hard, clear, "alkaline"		S	Sufficient for local stock needs.
16	SE.	30	"	"	"	Dug	12	2,375	- 8	2,367	8	2,367	Glacial sand	Soft, clear	42	D, S	Sufficient for local needs; also a 55 foot bored well.
17	NE.	33	"	"	"	Bored	55	2,310	- 50	2,260			Glacial gravel and sand	Hard, clear, iron	42	D, S	Sufficient for local needs.
18	SE.	35	"	"	"	Drilled	200	2,275	-100	2,175	100	2,175	Glacial sand	Hard, clear, iron, "alkaline"		S	Sufficient for local needs.
19	SW.	36	"	"	"	Bored	120	2,270	-110	2,160	120	2,150	Glacial gravel	Hard, iron, "alkaline"		S	Insufficient for local needs. Two seepage wells 35 and 20 feet deep for stock.
1	SE.	1	30	16	3	Bored	110	1,995	- 80	1,915			Glacial drift	Clear, "alkaline"		S	Sufficient for local needs.
2	SW.	1	"	"	"	Dug	5	1,945					Glacial sand	Hard, clear	43	D, S	Municipal well, good yield.
3	NE.	2	"	"	"	Drilled	350	1,950	-250	1,700	350	1,600	Belly River sand	Hard, clear, "alkaline"	42	D, S	Sufficient for local needs.
4	NW.	3	"	"	"	Dug	14	2,000	- 11	1,989	14	1,986	Glacial sand	Hard, clear, "alkaline"	42	D, S	Sufficient for local needs.
5	NE.	11	"	"	"			1,925								D	Neighbours haul from here for drinking.
6	SE.	12	"	"	"	Bored	90	1,945	- 80	1,865	90	1,855	Glacial gravel	Hard, cloudy, iron	42	S	Sufficient for local needs.
7	NW.	12	"	"	"	Bored	72	1,920	- 42	1,878	70	1,850	Glacial sand	Hard, clear, "alkaline"	42	S	Sufficient for local needs.
8	NE.	12	"	"	"	Bored	90	1,930	- 70	1,860	90	1,840	Glacial gravel	Hard, clear, "alkaline"	42	S	Sufficient for local needs.
9	SE.	14	"	"	"	Bored	62	1,920	- 32	1,888	60	1,860	Glacial gravel	Hard, clear "alkaline"	42	S	Sufficient for local needs.
10	NW.	16	"	"	"	Dug	5	1,880	- 3	1,877	3	1,877	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs.
11	NE.	20	"	"	"	Bored	80	1,915	- 60	1,855			Glacial drift	Hard, clear, iron, "alkaline"	42	S	Sufficient for local needs; spring also not used.
12	N½	22	"	"	"	Dug	23	1,995	- 20	1,975	21	1,974	Glacial sand	Hard, clear	42	D, S	Sufficient for local needs; also a similar 20 foot well.
13	SW.	23	"	"	"	Drilled	267	1,940	- 67	1,873	267	1,673	Belly River sand	Hard, clear, iron	42	D, S	Sufficient for local needs; also 4 shallow wells; good quality water.
14	S½	25	"	"	"	Dug	15	1,985	- 9	1,976	14	1,971	Glacial gravel	Soft, clear		D, S	Insufficient for local needs.
15	NW.	25	"	"	"	Dug	115	1,995	-112	1,883	112	1,883	Glacial drift	Hard, clear, "alkaline"	42	D, S	Sufficient for local needs.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of PLEASANT VALLEY NO. 288, 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
16	E½	26	30	16	3	Bored	124	1,990	-100	1,890	124	1,866	Glacial gravel	Hard, clear, iron	42	D, S	Sufficient for local needs.
17	SE.	27	"	"	"	Bored	100	1,970	- 92	1,878	100	1,870	Glacial sand	Hard, iron, cloudy	42	D, S	Sufficient for local needs.
18	SW.	28	"	"	"	Bored	60	1,910	- 25	1,885	60	1,850	Glacial sand	Hard, clear		N	Good supply; good quality water, deserted.
19	NW.	28	"	"	"	Bored	180	1,960									Dry hole base in glacial drift.
20	SW.	29	"	"	"	Bored	35	1,945					Glacial drift	Hard, clear, iron, "alkaline"	42	D, S	Sufficient for local needs.
21	SW.	30	"	"	"	Bored	35	1,940	- 27	1,913	27	1,913	Glacial sand	Hard, clear, iron		D, S	Sufficient for local needs; also an 8 foot sandpoint; good supply.
22	NW.	30	"	"	"	Drilled	42	1,940	- 26	1,914	42	1,898	Glacial sand	Hard, clear, "alkaline"	42	S	Insufficient for local needs.
23	SW.	33	"	"	"	Bored	115	1,970	-105	1,865	115	1,855	Glacial sand	Hard, iron, cloudy	42	D, S	Sufficient for local needs.
24	NW.	33	"	"	"	Bored	60	1,970	- 20	1,950	60	1,910	Glacial sand	Hard, iron, cloudy	42	D, S	Sufficient for local needs.
25	NW.	34	"	"	"	Bored	85	2,000	- 70	1,930	85	1,915	Glacial drift	Hard, iron, "alkaline" cloudy	42	S	Sufficient for local needs.
26	SW.	35	"	"	"	Bored	128	1,992	-114	1,878	128	1,864	Glacial sand	Hard, iron, cloudy	42	D, S	Sufficient for local needs. #
1	SE.	1	30	17	3	Drilled	160	2,010	- 10	2,000	160	1,850	Belly River sand	Hard, clear, iron		D, S	Sufficient for local needs.
2	SW.	5	"	"	"	Bored	70	2,195	- 50	2,145	70	2,125	Glacial sand	Hard, clear, iron		D, S	Sufficient for local needs.
3	SW.	6	"	"	"	Bored	20	2,250	- 14	2,236	20	2,230	Glacial gravel	Soft, clear	42	D, S	Sufficient for local needs.
4	SE.	8	"	"	"	Dug	6	2,250	- 4	2,246	6	2,244	Glacial sand	Soft, clear		D, S	Sufficient for local needs.
5	NW.	9	"	"	"	Drilled	110	2,245	- 40	2,205	110	2,135	Glacial gravel	Hard, clear, iron	42	D, S	Sufficient for local needs.
6	NW.	10	"	"	"	Dug	16	2,090	- 10	2,080	16	2,074	Glacial sand	Hard, clear		D, S	Sufficient for 20 head stock.
7	SW.	10	"	"	"	Spring		2,090					Glacial drift	Hard			Several springs in coulee.
8	NW.	14	"	"	"	Bored	143	1,980									Dry hole base in Belly River shale; also 132 foot dry hole.
9	W½	15	"	"	"	Dug	21	2,000	- 19	1,981	19	1,981	Glacial sand	Hard, clear, iron	42	S	Insufficient for local needs.
10	SE.	21	"	"	"	Bored	60	2,090	- 30	2,060	60	2,030	Glacial gravel	Soft, clear	42	D, S	Sufficient for local needs.
11	NW.	21	"	"	"	Spring		2,350	0	2,350			Glacial drift				
12	SE.	22	"	"	"	Dug	14	1,990	- 8	1,982	14	1,976	Glacial gravelly clay	"Alkaline" clear		S	Sufficient for local needs.
13	SE.	22	"	"	"	Bored	140	2,000	- 80	1,920	140	1,860	Belly River? sand	Soft, clear, soda		D	Insufficient for local needs.
14	NW.	22	"	"	"	Bored	60	2,020	- 34	1,986	60	1,960	Glacial gravel	Hard, clear		D, S	Sufficient for local needs; also an "alkaline" spring.
15	NW.	23	"	"	"	Bored	70	1,990	- 67	1,923			Glacial clay	Hard, cloudy, "alkaline"	42	S	
16	SE.	25	"	"	"	Dug	20	1,940	- 15	1,925	15	1,925	Glacial sand	Hard, clear, iron		D, S	Sufficient for local needs.

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

WELL RECORDS—Rural Municipality of PLEASANT VALLEY NO. 288, 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
17	NW.	25	30	17	3	Dug	4	1,910	0	1,910	0	1,910	Glacial gravel	Soft, clear		D, S	Sufficient for local needs; also a shallow seepage well.
18	SE.	28	"	"	"	Bored	70	2,050	- 40	2,010	70	1,980	Glacial drift	Hard, clear, iron, "alkaline"	42	D, S	Sufficient for local needs; also a spring.
19	SW.	30	"	"	"	Bored	50	2,200	- 48	2,152	50	2,150	Glacial drift	Hard, clear, iron	42	D, S	Insufficient for local needs.
20	SW.	31	"	"	"	Bored	160	2,220									Dry hole; base in clay and soft coal, probably Belly River.
21	NE.	33	"	"	"	Spring		2,060	0	2,060			Glacial drift	Hard, salty, iron, "alkaline" clear		D, S, I	Very large supply.
22	SE.	36	"	"	"	Dug	25	1,950	- 20	1,930	20	1,930	Glacial sand	Hard		D, S	Sufficient for local needs.
23	NE.	36	"	"	"	Drilled	145	1,900	0	1,900	145	1,755	Belly River sand	Hard, clear, iron	42	D, S	Insufficient for local needs, now caved in.
1	SW.	3	30	18	3	Spring		2,280	0	2,280	0	2,280	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
2	SW.	4	"	"	"	Bored	35	2,330	- 30	2,300	30	2,300	Glacial sand	Hard, clear		D, S	Insufficient for local needs.
3	SE.	6	"	"	"	Spring		2,430					Glacial gravel				
4	NE.	9	"	"	"	Dug	35	2,390	- 20	2,370	32	2,358	Glacial gravel	Hard, clear	42	D, S	Sufficient for local needs.
5	NE.	10	"	"	"	Bored	70	2,355	- 48	2,307	70	2,285	Glacial sand	Hard, clear, "alkaline" iron		D, S	Sufficient for 40 head stock.
6	SE.	14	"	"	"	Bored	150	2,235	- 50	2,185			Glacial sand	Hard, clear, iron	42	S	Sufficient for local needs.
7	SW.	14	"	"	"	Drilled	300	2,260	- 50	2,210			Bearpaw ? sand	Hard, clear, iron	42	D, S	Sufficient for local needs.
8	SW.	16	"	"	"	Bored	48	2,410	- 43	2,367	48	2,362	Glacial sand	Hard, clear		D, S	Insufficient for 3 head stock.
9	SE.	17	"	"	"	Drilled	146	2,400	- 66	2,334	146	2,254	Glacial gravel	Hard, clear, iron	42	D, S	Sufficient for local needs.
10	NW.	18	"	"	"	Dug	14	2,410	- 11	2,399	14	2,396	Glacial sand	Hard, clear		D, S	
11	SE.	20	"	"	"	Dug	25	2,360	- 20	2,340	20	2,340	Glacial sand and gravel	Hard, clear		D, S	Sufficient for local needs.
12	NE.	20	"	"	"	Dug	30	2,380	- 24	2,356	24	2,356	Glacial sandy gravel	Hard, clear		D, S	Sufficient for local needs.
13	SW.	21	"	"	"	Dug	25	2,310	- 21	2,289	21	2,289	Glacial sand	Hard, clear		D, S	Oversufficient for local needs.
14	NW.	23	"	"	"	Dug	5	2,200	0	2,200	0	2,200	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
15	SE.	25	"	"	"	Bored	160	2,200									Dry hole, base in Belly River.
16	SW.	27	"	"	"	Spring		2,340	0	2,340	0	2,340	Glacial drift	Hard, iron			Sufficient for local needs.
17	SE.	28	"	"	"	Bored	40	2,300	- 29	2,271	40	2,260	Glacial drift	Hard, clear, "alkaline"		S	Sufficient for local needs.
18	SW.	28	"	"	"	Dug	40	2,320	- 32	2,288	40	2,280	Glacial gravelly sand	Hard, clear			
19	NE.	29	"	"	"	Dug	40	2,340	- 34	2,306	34	2,306	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
20	NW.	31	"	"	"	Bored	30	2,380	- 20	2,360	30	2,350	Glacial sand	Hard, clear, iron		D, S	Insufficient for local needs.

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