CANADA

DEPARTMENT OF MINES

AND

TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

WATER SUPPLY PAPER No. 79

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF ARM RIVER NO. 252 SASKATCHEWAN

By

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

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF ARM RIVER, NO. 252, SASKATCHEWAN

INTRODUCTION

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

Publication of Results

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

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

How to Use the Report

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

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

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

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

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

GLOSSARY OF TERMS USED

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Arm River, No. 252, is an area of approximately 276 square miles in southeastern Saskatchewan. It consists of six full townships and three fractional townships, described as tps. 25, 26, and 27, ranges 27, 28, and 29, W. 2nd mer. The centre of the municipality is 58 miles north of the city of Moose Jaw and 22 miles west of Last Mountain lake. The town of Davidson, in the northeast corner of township 26, range 29, on the Saskatoon-Regina branch of the Canadian National railways, is the main trading centre of the area. The area is drained by Arm river which flows in a southerly direction through the centre of the municipality, and by Squaw creek which flows in a southerly direction along the eastern border of the municipality. The maximum elevation of 2,225 feet is attained along the eastern part of the northern boundary and the lowest point, 1,840 feet above sea-level, is in the southern part of Arm River valley.

The glacial drift that mantles the surface of this municipality is composed of four different types of material. Glacial lake clays cover a large area in the central part, extending for a distance of some 3 to 5 miles on either side of Arm river. Part of a moraine occurs along the eastern edge of townships 25, 26, and 27, range 27. With the exception of a few small areas that are covered by glacial outwash sands and gravels the remainder of the municipality is covered by boulder clay or glacial till. The thickness of this drift mantle is not definitely known. Ground water is being obtained from the upper 165 feet of the drift, but it has not been possible to trace out the areal extent of the water-bearing horizons.

Water-bearing Horizons in the Unconsolidated Deposits

Ground water supplies, although varying in quantity and quality throughout the municipality, do not appear to be noticeably different in the various types of glacial deposits. Scattered pockets of sand and gravel are found in the glacial till, moraine, and even

in the glacial lake clays, at depths of 80 feet or less below the surface, and they form the uppermost water-bearing horizon. These pockets do not show any apparent continuity and dry holes may be encountered within short distances of producing wells. The yield from wells tapping this horizon is small, but in most of the wells it is sufficient for local needs. The water varies from moderately soft to very hard, but the concentration of mineral salts in solution is not excessive and the water can be used for all purposes.

A continuous water-bearing horizon occurs in a small area, the proved extent of which is outlined by the "A" boundary line on the accompanying map. The wells tapping this aquifer vary in depth from 65 to 90 feet, and the elevation of the horizon is between 2,010 and 2,035 feet above sea-level. It is not improbable that it extends over a larger area than shown, but the information at hand suggests that it disappears to the south. The yield is more than sufficient for farm needs; the water is hard but not excessively mineralized, and is being used for all farm purposes.

Another fairly continuous aquifer occurs at a depth of 80 to 140 feet in the areas outlined on the map by the "B" boundary lines. A few wells of similar depth and character occur outside the outlined areas, but at the present time there is insufficient information to show that the horizon is continuous in the intervening areas. This horizon appears to extend to the north, especially into township 27, range 28. The yield from wells tapping this horizon is more than sufficient for farm requirements and the water is under a slight hydrostatic pressure. The water is hard and in many wells its iron and other mineral salt content is so high that it is suitable only for stock.

One well located on sec. 7, tp. 27, range 27, derives an abundant supply of water from a depth of 165 feet. The water is under considerable hydrostatic pressure and although it contains some mineral salts in solution, is being used for domestic purposes

as well as for stock.

Water-bearing Horizons in the Bedrock

The bedrock underlying this area is thought to be the Marine Shale series. The thickness of drift that overlies the bedrock varies considerably. In some areas it probably does not exceed 130 feet, but the average covering is approximately 180 feet.

The uppermost water-bearing horizon is encountered at an elevation of 1,850 feet above sea-level, in a well on sec. 23, tp. 25, range 29. This aquifer does not appear to be extensive, but as it has not been tapped by many wells its areal extent is unknown. A well in sec. 19, tp. 26, range 27, has apparently tapped a similar water-bearing horizon in the bedrock. The drill passed through a seam of coal at a depth of 140 feet below the surface and the total depth of the well is 156 feet. The aquifer occurs at an elevation of 1,804 feet above sea-level. In sec. 19, tp. 27, range 28, another well encountered bedrock at an elevation of 1,857 feet and an aquifer at an elevation of 1,852 feet or a depth of 178 feet. It is possible that only the upper part of the bedrock was pierced in these wells, and that the water is being derived from the base of the glacial drift. The water from two of the wells is hard, and from one it is soft and tastes of "soda". The supply in all three wells is abundant, but the water from the last-mentioned well is not used for drinking.

On sec. 30, tp. 27, range 27, a well encountered a bedrock aquifer at a depth of 340 feet below the surface, or at an elevation of 1,710 feet above sea-level. Bedrock was apparently pierced at an elevation of 1,810 feet above sea-level. The areal extent of this horizon is not known, but it is possible that it extends over a considerable area. The water is hard, contains mineral salts in solution, and is under pressure, rising to a point 140 feet below the surface.

In township 25, range 27, a number of wells have encountered aquifers, in the bedrock, at depths 500 and 545 feet below the surface, or at elevations of 1,365 to 1,425 feet above sea-level. The area in which these wells occur is outlined by the "C" boundary line on the accompanying map. It is apparent that two aquifers have been tapped by this group of wells as hard water is being obtained at elevations of 1,413 to 1,420 feet, and soft water from an elevation of 1,365 to 1,395 feet above sea-level. These water-bearing horizons may be encountered outside the area outlined. The water derived from the wells in the outlined area is generally too salty for domestic purposes. Two wells drilled to depths of 500 feet, in sections 24 and 27, encountered an aquifer at an elevation of 1,455 feet above sea-level. It is possible that these wells tap one of the aquifers that occur in the outlined area. The water in the last two wells mentioned is under pressure, it is soft and tastes of soda, but is used for drinking as well as for stock.

Throughout the municipality a number of wells have tapped aquifers in the bedrock at depths of 579 to 945 feet. Due to the fact that the wells occur in isolated localities the areal extent of the horizons can not be determined. However, two wells, one located on sec. 12, tp. 25, range 29, and the other on sec. 18, tp. 25, range 28, and drilled to depths of 750 and 700 feet below the surface, appear to have tapped the same aquifer at an elevation of 1,240 and 1,255 feet above sea-level. This horizon may extend over a considerable area.

One well located on sec. 14, tp. 25, range 27, and another on sec. 19, tp. 27, range 28, are drilled to depths of 1,000 and 1,050 feet below the surface. They tap aquifers at 940 and 945 feet above sea-level and the water is under sufficient pressure to rise to a point 50 feet below the ground surface. It is possible that this water-bearing horizon may extend throughout

the municipality. The waters in both cases are soft, taste of soda, and have a high concentration of common salt in solution. One well is being used for domestic purposes, but the other is used only for stock.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 25, Range 27

Glacial till or boulder clay forms the predominant glacial covering in this township, with glacial lake clays mantling a strip 1 to 2 miles wide along the western border, and moraine covering a small area in the northeastern corner.

A few wells obtain small supplies of ground water from scattered sand and gravel pockets at depths of 60 feet or less below the surface. The pockets give no appearance of continuity and cannot be depended upon to yield a sufficient supply for local needs. The water from wells tapping these pockets of sand and gravel is usually hard, and is highly charged with mineral salts. About one-half the wells are being used for drinking, but all are suitable for stock requirements.

Two wells located on the SW. $\frac{1}{4}$, section 24, and the SE. $\frac{1}{4}$, section 27, are drilled to depths of 500 feet from the surface and encounter an aquifer in the bedrock at an elevation of 1,455 feet above sea-level. The water in both wells is under pressure. The areal extent of this aquifer is not defined. The water is soft, salty, and tastes of soda, but is being used for all farm needs. It is abundant in quantity.

Three wells located on sections 5, 8, and 16 encounter an aquifer at a depth of 510 feet below the surface, or at an elevation of 1,413 to 1,425 feet above sea-level. The areal extent of this aquifer is not definitely known, but it appears to thin out or disappear towards the east, as wells drilled to greater depths in that locality do not encounter an aquifer at that depth. This horizon yields an abundant supply of hard, salty water, but it is too salty to be used for drinking. Four wells located on sections 3, 4, and 9 tap an aquifer in the bedrock at slightly greater depths, 517 to 555 feet, or at an elevation of 1,365 to 1,395 feet. It is possible that this is the same horizon as that encountered by the

510-foot wells, but the water is much softer, is salty, and tastes of soda. In only one well is it being used for drinking. The area in which these wells occur is outlined by the "C" boundary line, but an abundant supply of water can probably be obtained at similar depths elsewhere in the township.

On the SW. $\frac{1}{4}$, section 10, an abundant supply of soft, salty water, which tastes of soda, is being obtained from an aquifer in the bedrock, at a depth of 600 feet or at an elevation of 1,320 feet above sea-level. This water is only being used for stock.

A well located on the NE. $\frac{1}{4}$, section 14, drilled to a depth of 1,000 feet, is obtaining an abundant supply of soft, salty water that tastes of sulphur and soda, from an aquifer in bedrock at an elevation of 940 feet above sea-level. The water, although highly charged with mineral salts, is being used for all farm purposes. The areal extent of this horizon is not known.

Township 25, Range 28

Arm river flows in a southerly direction through the central part of the township. With the exception of a very small area in the southwestern corner, which is mantled by glacial till, the township is covered by glacial lake clays.

Pockets of sand and gravel occur in the glacial lake clays and form the uppermost water-bearing horizon. These pockets are encountered by wells at depths of 20 to 140 feet below the surface, although the deeper pockets may occur in the underlying boulder clay. The pockets are of local distribution, and many dry holes have been dug, especially in the southwestern corner of the township. The supply in many wells is insufficient for local requirements. The water is usually hard and in many wells it is so highly charged with mineral salts in solution that it is objectionable for drinking. What appears to be a second water-bearing horizon

in the drift mantle is more continuous, and its proved extent is outlined by the "B" line on the accompanying map (Figure 1). It is encountered at depths of 84 to 147 feet below the surface at elevations of 1,815 to 1,865 feet above sea-level. The yield from these wells is as a rule more than sufficient for local needs. There is sufficient hydrostatic pressure to raise the water to a level 60 feet or less below the surface. The water is hard and is highly charged with mineral salts in solution. In some wells the water's laxative qualities renders it unfit for drinking.

One well located on the SW. $\frac{1}{4}$, section 16, and drilled to a depth of 579 feet, is obtaining an abundant supply of hard, salty water from a bedrock aquifer at an elevation of 1,331 feet above sea-level. The water which rises to a point 120 feet below the surface, is too salty for drinking. It does not appear that this aquifer extends any great distance to the north or west, but it may extend to the east and south.

A 700-foot drilled well, on the NW. $\frac{1}{4}$, section 18, is obtaining an abundant supply of soft, salty water that tastes of soda, from a second bedrock aquifer at an elevation of 1,255 feet above sea-level. One well in the township to the east appears to be obtaining water from the same source, but the areal extent of the horizon is not known. The water is under sufficient pressure to rise to a point 25 feet below the surface, but it is used only for stock as it is highly mineralized.

A third bedrock aquifer is encountered at an elevation of 1,155 feet above sea-level, or at a depth of 786 feet, by a well located on the NW. $\frac{1}{4}$, section 21. The areal extent of this horizon is not known. The hydrostatic pressure causes the water to rise to a point 140 feet below the surface and the water, although abundant, is highly charged with mineral salts and is used only for stock.

Township 25, Range 29

This fractional township, lies adjacent to the third meridian and has an area of approximately 24 square miles. Squaw creek flows in a general southerly direction through the centre of the area. Glacial till or boulder clay mantles the entire township.

A few isolated wells obtain small supplies of usable water from scattered sand and gravel pockets or lenses in the glacial clays 90 feet or less below the surface. These pockets are not continuous and in places many dry holes are dug before a lens is tapped. The yield is small, but the water is usually hard and drinkable.

In the northeastern part of the township wells drilled to depths of 100 to 145 feet below the surface encounter what appears to be a continuous water-bearing horizon at elevations of 1,840 to 1,885 feet above sea-level. This area is outlined by the "B" line on the accompanying map (Figure 1). Two wells, 80 and 163 feet in depth, have been included in this area, as they are believed to have encountered the same horizon. It is not known if this aquifer extends outside the area outlined. The water in these wells is under hydrostatic pressure and in most wells it rises considerably above the aquifer. The yield is good, but the high concentration of mineral salts in solution makes the water objectionable for drinking.

One well located on the NE. $\frac{1}{4}$, section 23, is reported to be obtaining a soft, soda-bearing water from a depth of 160 feet below the surface. The aquifer is at an approximate elevation of 1,850 feet above sea-level and is probably in the bedrock. It is not probable that this same horizon would be encountered over a large area at such shallow depths.

On the SE. $\frac{1}{4}$, section 12, a well drilled to a depth of 750 feet taps an aquifer in the bedrock at an elevation of 1,240

feet above sea-level. This well is similar in most respects to the 700-foot well on sec. 18, tp. 25, range 28, and it is probable that they have pierced the same aquifer. It is not improbable that other wells drilled in the immediate vicinity would encounter the same water-bearing horizon, but its areal distribution cannot be outlined definitely. The water in this well is under hydrostatic pressure and rises to a point 80 feet below the surface. The yield is abundant and the water is soft, but the high concentration of mineral salts in solution makes it objectionable for drinking.

Township 26, Range 27

The eastern half of this township is mantled by moraine, the surface of which is quite rolling. In the western half the predominant glacial covering is in the form of boulder clay or glacial till. In the southwestern corner a small area is covered by glacial lake clays and another small area near the northwestern corner is overlaid by glacial outwash sands and gravels.

A small group of wells on sections 28, 32, and 33, and a few isolated wells in the southeastern part of the township, obtain fair supplies of water from scattered sand and gravel pockets within 55 feet of the surface. The pockets are not continuous over any large area and it is probable that each well taps a local deposit of sand or gravel. In most wells tapping these pockets the supply is sufficient for local needs. The water is usually hard and is being used for all purposes.

Over the greater part of the southern half of this township most of the wells tap a water-bearing horizon at depths of 60 to 125 feet below the surface, or at elevations of 1,855 to 1,890 feet above sea-level. The area, in which wells have tapped this aquifer, is outlined by the "B" line on Figure 1 of the map accompanying this report, but it is not improbable that other wells will encounter the same horizon outside the defined area. In the

majority of the wells the yield is more than adequate for farm needs and the water is under hydrostatic pressure. The water is hard, contains iron and other salts in solution, but in almost all cases is being used for domestic as well as for stock needs.

One well located on the SE. $\frac{1}{4}$, section 19, derives a large supply of water from an aquifer at a depth of 155 feet below the surface or an elevation of 1,804 feet above sea-level. Since a seam of coal was encountered in this well at a depth of 140 feet it is possible that the aquifer is in the bedrock. The coal, however, may be in the glacial drift. No areal limits can be outlined for this water-bearing horizon, but it may be encountered at other localities in the township. The water rises to a point 60 feet below the surface, and although it is hard it does not appear to contain a high concentration of mineral salts in solution and can be used for all requirements.

Township 26, Range 28

Arm river flows in a southerly direction through the central part of this township. With the exception of two small areas in the northeastern and northwestern parts that are mantled by boulder clay or glacial till, the township is covered by glacial lake clays.

In only very few and isolated sections of this township are wells obtaining water at depths within 30 feet of the surface. An area in the western half of the township is outlined by the "B" line on Figure 1 of the accompanying map in which a number of wells obtain water at depths of 80 to 140 feet below the surface, or at elevations of 1,830 to 1,880 feet above sea-level. The aquifer appears to be fairly continuous and it is probable that other wells sunk within this area would encounter the same horizon. The water is hard and under low hydrostatic pressure. In a few wells the water is so highly charged with mineral salts in solution that it can be used only for stock. This same water-bearing horizon appears to be present to the east of Arm river as wells in that district obtain water

from an elevation of 1,830 feet. The water from these wells is also hard, but it is being used for all purposes. In the SE. $\frac{1}{4}$, section 3, in the Arm River valley, a well is obtaining an abundant supply of hard, usable water from a quicksand bed at a depth of 145 feet below the surface. The areal extent of this aquifer has not been defined.

One well located on the NW. $\frac{1}{4}$, section 31, encounters a water-bearing horizon at a depth of 180 feet below the surface, or at an elevation of 1,840 feet above sea-level. As the surface elevation in this section is greater than in those to the south, it is possible that the well has encountered the same aquifer as that encountered by the wells within the "B" line.

Township 26, Range 29

This fractional township, except where cut by the valley of Squaw creek, is gently undulating, and is mantled by boulder clay or glacial till.

In a few very isolated areas small supplies of water are being obtained from wells tapping scattered sand or gravel pockets in the upper or weathered zone of the glacial clay. There is no appearance of continuity in these pockets and they can hardly be considered as forming a water-bearing horizon.

The first definite water-bearing horizon is encountered at depths of 90 to 130 feet below the surface, or at elevations of 1,920 to 1,890 feet above sea-level. A number of wells sunk to slightly different depths are considered to be deriving their supply from the same aquifer. This water-bearing horizon appears to be continuous throughout the area outlined by the "B" line on Figure 1 of the accompanying map, but may be more extensive. The yield from these wells is more than sufficient for local needs. The water is under only small pressure, and it does not rise many feet above the bottom of the well. The water is hard, and it contains iron and

other mineral salts in solution; in some water the salts are present in such concentration as to render it objectionable for drinking. Little trouble should be experienced in obtaining a satisfactory supply of water at depths of 90 to 130 feet.

On the SW. $\frac{1}{4}$, section 1, a well drilled to a depth of 631 feet encountered an aquifer in the bedrock at an elevation of 1,379 feet above sea-level. The yield is abundant, but the water is too salty to be used for drinking. The extent of this horizon is not known, but it seems probable that it would be encountered in the vicinity of the above-mentioned well.

Township 27, Range 27

The relief in this township is approximately 250 feet the elevation rising from 1,975 feet in the southwestern corner to approximately 2,225 feet just east of the centre part at the north boundary line. The eastern part of the township is mantled by moraine and the western part is mainly covered by boulder clay or till, a small area of glacial outwash sands and gravels occurs in sections 19 and 20.

There are a number of wells in this township obtaining fair supplies of usable water from scattered gravel pockets that occur within the upper 50 feet of the glacial drift. Although these pockets do not appear to be continuous they are more numerous than in any of the other townships of this municipality. In a few wells the supply from these pockets is oversufficient for local needs, but in most wells it is just sufficient for farm requirements. The water varies from comparatively soft to medium hard and is not highly mineralized.

Four wells on sections 22, 23, and 26 appear to tap the same general water-bearing horizon. These wells vary from 65 to 90 feet in depth and the aquifer lies at an elevation of 2,010 to 2,035 feet above sea-level. This aquifer may extend over a larger area

than indicated but it does not extend far to the south as dry holes up to 95 feet in depth have been drilled there. This small group of wells is non-artesian in character. The water is hard and can be used for all purposes.

On sections 5, 6, and 7, three wells drilled to depths of 120, 110, and 163 feet encounter aquifers at elevations of 1,855, 1,806, and 1,839 feet, respectively, above sea-level. It is probable that these aquifers may be the same and extend over a considerable area outside the sections mentioned. These wells yield a supply of water that is more than sufficient for local needs and it is under sufficient pressure to rise to a point 40 feet below the surface. The water is hard, contains iron and other salts in solution, but is being used for domestic as well as stock requirements.

One well located on the E. $\frac{1}{2}$, section 30, is obtaining a large supply of hard water from an aquifer in the bedrock at an elevation of 1,710 feet above sea-level. This well is 340 feet deep and bedrock was encountered at approximately 240 feet below the surface. The areal extent of the water-bearing horizon is not outlined, but it is probable that it would be tapped by wells drilled in the immediate vicinity. Information as to the quality of the water and its uses are lacking.

Township 27, Range 28

This township is drained by Arm river, which flows in a southerly direction through the central part, and by Squaw creek, which has its headwaters in the southwestern part. Glacial lake claysmantle a large area in the central part of this township, with glacial till occurring along the eastern edge and in the southwestern corner. Glacial outwash sands and gravels occur in parts of sections 22, 27, 28, 33, and 34.

Supplies of water, generally sufficient for local needs, are being obtained from shallow wells tapping scattered pockets of sand and gravel within 30 feet of the surface. These pockets form the first water-bearing horizon in the glacial drift and although they do not appear to be continuous they form

a good source of supply in certain small areas. The wells are non-artesian in type and the water varies from moderately soft to medium hard. It contains only small quantities of mineral salts in solution and most of it is used for all farm requirements.

On the west half of section 12, two wells drilled to depths of 122 and 132 feet below the surface encounter an aquifer at elevations of 1,848 and 1,818 feet above sea-level. This aquifer may extend over a small area in this vicinity. The supply is more than sufficient for local needs and the water can be used for domestic purposes as well as for stock.

On the SE. $\frac{1}{4}$, section 19, and the SW. $\frac{1}{4}$, section 20, two wells drilled to depths of 178 and 160 feet encountered an aquifer at elevations of 1,852 and 1,870 feet above sea-level, respectively. The first well is reported to have encountered bedrock at an elevation of 1,857 feet above sea-level, but it is thought that the water is being derived from deposits of sand and gravel immediately overlying the bedrock, rather than from the bedrock itself. This horizon may extend over a considerable area in this particular locality. The water rises to a point 30 feet below the surface in one well and 60 feet below the surface in the other. The water is hard and contains salts in solution in sufficient concentration to render it objectionable for drinking.

A 600-foot drilled well, located on the NW. $\frac{1}{4}$, section 9, obtains an abundant supply of soft water from an aquifer in the bedrock, at an elevation of 1,400 feet above sea-level. Due to lack of information the areal extent of this horizon is unknown. The hydrostatic pressure is sufficient to raise the water to a point 200 feet below the surface. The water is used only for stock as it contains a large amount of mineral salts in solution.

A well on the NW. $\frac{1}{4}$, section 19, is drilled to a depth of 1,050 feet and obtains an abundant supply of water from another aquifer in the bedrock at an elevation of 945 feet above sea-level.

This aquifer may underlie most of the township. The water is soft, salty, and tastes of soda, and rises to a point 50 feet below the surface. It is used only for stock.

Township 27, Range 29

This fractional township is an area of approximately 15 square miles. The surface is comparatively flat to gently undulating. The township is largely mantled by boulder clay or glacial till, a small, flat marshy area in the northeastern corner being covered by glacial lake clays.

A few wells have tapped scattered pockets of sand at shallow depths, but the supply of water obtained is insufficient for local needs.

Most of the wells in this township are from 55 to 80 feet in depth, and have encountered a water-bearing horizon at an elevation of 1,950 to 1,975 feet above sea-level. The wells tapping this aquifer are mainly along the western border of the township. It is possible that this horizon can be encountered throughout the greater part of the township. The yield from these wells is adequate for farm needs. The water is under some pressure and although it is hard, it is not highly charged with mineral salts in solution and can be used for all purposes.

Two wells, located on sections 2 and 12, probably derive their supply from the same aquifer as outlined by the "B" line on the accompanying map (Figure 1). They are drilled to depths of 120 feet below the surface and encounter the water-bearing horizon at 1,910 feet above sea-level. The water is under hydrostatic pressure, and rises to a point 60 feet below the top of the well. In both wells the water is hard, but in only one well is it being used for drinking.

A well on the NW. $\frac{1}{4}$, section 24, encountered a water-bearing horizon at a depth of 200 feet, or an elevation of 1,800 feet above sea-level. It is probable that other wells drilled in

this vicinity will encounter the same aquifer, but possibly the horizon is formed by a local pocket of sand or gravel. The supply is abundant and the water is under sufficient hydrostatic pressure to raise it to a point 25 feet below the top of the well. The water is hard and contains iron and small quantities of other mineral salts in solution, but is being used for drinking as well as stock.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF ARM RIVER, NO. 252, SASKATCHEWAN

West of 2nd meridian — Township	25	25	25	26	26	26	27	27	27	Total No. in Municipality
West of 2nd meridian — Range	27	28	29	27	28	29	27	28	29	
Total No. of Wells in Township	34	58	22	32	18	31	40	31	15	281
No. of wells in bedrock	11	3	2	1	0	1	1	2	0	21
No. of wells in glacial drift	23	55	20	31	18	30	39	29	15	260
No. of wells in alluvium	0	0	0	0	0	0	0	0	0	0
Permanency of Water Supply										
No. with permanent supply	32	51	20	28	18	27	34	30	15	255
No. with intermittent supply	2	2	0	3	0	0	1	0	0	8
No. dry holes	6	5	2	1	0	4	5	1	0	18
Types of Wells										
No. of flowing artesian wells	0	0	0	0	0	0	0	0	0	0
No. of non-flowing artesian wells	13	22	11	17	11	18	8	9	7	116
No. of non-artesian wells	21	31	9	14	7	9	27	21	8	147
Quality of Water										
No. with hard water	25	48	18	25	17	26	27	22	14	222
No. with soft water	9	5	2	6	1	1	8	8	1	41
No. with salty water	8	3	2	0	1	1	0	1	0	16
No. with "alkaline" water	4	18	6	3	6	17	2	2	7	65
Depths of Wells										
No. from 0 to 50 feet deep	20	29	6	16	3	9	27	19	4	133
No. from 51 to 100 feet deep	3	20	6	12	8	14	8	2	8	81
No. from 101 to 150 feet deep	0	6	7	3	6	7	3	3	2	37
No. from 151 to 200 feet deep	0	0	2	1	1	0	1	3	1	9
No. from 201 to 500 feet deep	3	0	0	0	0	0	1	2	0	6
No. from 501 to 1,000 feet deep	8	3	1	0	0	1	0	1	0	14
No. over 1,000 feet deep	0	0	0	0	0	0	0	1	0	1
How the Water is Used										
No. usable for domestic purposes	23	37	13	28	14	20	31	21	14	201
No. not usable for domestic purposes	11	16	7	3	4	7	4	9	1	62
No. usable for stock	34	52	19	31	18	27	35	30	15	261
No. not usable for stock	0	1	1	0	0	0	0	0	0	2
Sufficiency of Water Supply										
No. sufficient for domestic needs	31	50	20	28	18	27	33	30	15	252
No. insufficient for domestic needs	3	3	0	3	0	0	2	0	0	11
No. sufficient for stock needs	19	25	14	21	15	23	24	19	12	172
No. insufficient for stock needs	15	28	6	10	3	4	11	11	3	91

ANALYSES AND QUALITY OF WATER

General Statement

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

Total Dissolved Mineral Solids

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

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

Mineral Substances Present

Calcium and Magnesium

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

Sodium

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

Sulphates

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

Chlorides

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

Iron

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

Hardness

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

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

Analyses of Water Samples from the Municipality of Arm River, No. 252, Saskatchewan.

LOCATION						Depth of Well, Ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS									Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alka-linity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCl_2$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	$CaCl_2$	
1.	SW.	16	25	28	2	579	6,334													(4)		(3)		(1)	(2)	* 2
		33	26	28	2	85	2,466												(2)		(3)	(4)	(1)	(5)		* 1

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

Water from the Unconsolidated Deposits

Only one analysis of water from the glacial drift in the municipality of Arm River is available and, therefore, this account is based to a large extent on the properties of the water as observed in the field, and on the analyses of water from a few wells of similar type in other municipalities.

The water from the shallower wells in the glacial drift varies from soft to very hard. The "total dissolved solid" content is generally less than that of the water from deeper wells in the drift. The harmful salts present in solution are the laxative producing sulphates of magnesium and sodium. These harmful salts are, however, not usually concentrated and the water can be used for drinking. The water from the deeper wells in the drift has a greater total hardness, and a higher concentration of mineral salts in solution. The sample analysed contains 2,466 parts per million of total dissolved solids. The water is apt to have a laxative effect on those not accustomed to its use, but it can almost invariably be used for stock. Iron is found in solution in the water from many of the wells, but this salt can be largely removed by the simple expedient of letting the water stand in contact with the air for a considerable time before using. The iron will settle as a reddish-brown precipitate which can be removed by filtering the water through a sand filter.

Water from the Bedrock

One sample of water from the bedrock was analysed by the Saskatchewan Provincial Analyst and the results are listed in the accompanying table. It is probable that the "total dissolved solid" content of the waters from this depth in the bedrock will be high as the sample analysed contains 6,334 parts per million of dissolved solids. If the waters are soft it is probable that the salts of sodium are predominant, whereas if the waters are hard the carbonates and sulphates of calcium and magnesium are more concentrated than the

sodium salts. Many of the soft waters have a soda taste due to the large amount of sodium salts present. Common salt, NaCl, occurs in fairly abundant quantities and the water has a very salty taste. In the sample analysed, NaCl or common salt is the most abundant mineral salt present. Sodium carbonate (Na_2CO_3, black alkali) occurs in sufficient concentration to render the water unsuitable for irrigation. In general the water from the bedrock in this municipality is too salty for drinking, but is suitable for stock. "Sulphur" (sulphuretted hydrogen) was reported to occur in the water from one well tapping a bedrock aquifer.

WELL RECORDS—Rural Municipality of ARM RIVER NO. 252, 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	NW.	3	25	27	2	Drilled	517	1,910	-121	1,789			Marine Shale	Soft, soda, clear		S	Oversufficient for local needs; also 21-foot well.
2	SE.	4	"	"	"	Drilled	530	1,925	-130	1,795			Marine Shale	Soft, salty, clear		S	Yields 10 barrels a day; also seepage well for house.
3	SW.	4	"	"	"	Dug	16	1,910	- 7	1,903			Glacial gravel and clay	Hard, clear, "alkaline"		S	Intermittent supply.
4	NW.	4	"	"	"	Drilled	545	1,910	-110	1,800			Marine Shale	Soft, salty, soda, clear		D, S	Oversufficient for local needs.
5	NE.	5	"	"	"	Drilled	512	1,925	- 80	1,845			Marine Shale	Hard, clear, salty		S	Yields 4 tanks a day; also a seepage well for house.
6	NW.	8	"	"	"	Drilled	500	1,925	-100	1,825			Marine Shale	Hard, clear, salty		S	Yields 6 barrels a day.
7	NW.	8	"	"	"	Bored	40	1,925	- 15	1,910	40	1,885	Glacial sand	Hard, clear, iron		D	Yields 1 barrel a day.
8	NW.	9	"	"	"	Drilled	555	1,925	-100	1,825			Marine Shale	Soft, soda, salty, clear		S	Sufficient for local needs; a shallow seepage well is used for house.
9	SW.	10	"	"	"	Drilled	600	1,920	- 50	1,870			Marine Shale	Salty, clear, soda, soft		S	Also a 14-foot seepage well.
10	NE.	14	"	"	"	Drilled	1,000	1,940	- 30	1,910			Marine Shale	Soft, salty, soda, clear, sulphur		D, S	Oversufficient for local needs.
11	SW.	15	"	"	"	Dug	16	1,925	- 12	1,913			Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs; also an 18-foot seepage well with soft water.
12	SW.	16	"	"	"	Drilled	518	1,938	-110	1,828			Marine Shale	Hard			
13	NW.	18	"	"	"	Bored	58	1,925	- 50	1,875	58	1,867	Glacial gravel	Hard, clear, "alkaline"		D, S	Intermittent supply; varies with rainfall; also a 60-foot well with poor water; 20-foot well, good water.
14	NE.	19	"	"	"	Bored	43	1,930	- 40	1,890			Glacial drift	Hard, cloudy, iron, "alkaline"		S	Sufficient for local stock needs; water hauled for drinking.
15	SW.	24	"	"	"	Drilled	495	1,950	- 30	1,920			Marine Shale	Soft, soda, salty, clear		D, S	Sufficient for local needs; laxative.
16	SE.	27	"	"	"	Drilled	500	1,955	- 80	1,875			Marine Shale	Soft, clear, salty, soda		D, S	Oversufficient for local needs.
17	SW.	28	"	"	"	Bored	60	1,950	- 59	1,891	60	1,890	Glacial sand	Hard, clear		S	Insufficient for local needs; partly filled with quicksand.
18	SE.	32	"	"	"	Dug	15	1,950	- 11	1,939	15	1,935	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
19	NE.	32	"	"	"	Dug	17	1,960	- 14	1,946	15	1,945	Glacial sand	Hard, clear		D, S	Sufficient small supply; also two other well
20	SE.	34	"	"	"	Dug	12	1,960	- 10	1,950	10	1,950	Glacial gravel	Hard, clear		D	Sufficient for local needs; also similar well
21	NW.	34	"	"	"	Dug	24	1,960	- 21	1,939	24	1,936	Glacial gravel	Hard, clear		D, S	Sufficient for local needs; also a similar well.
22	NE.	34	"	"	"	Dug	20	1,960	- 5	1,955			Glacial drift	Hard, clear		D, S	Insufficient for local needs; also a similar well.
1	NW.	3	25	28	2	Bored	40	1,890	- 37	1,853			Glacial drift	Hard		D, S	Insufficient for local needs.
2	NW.	3	"	"	"	Bored	16	1,820	- 8	1,812	16	1,804	Glacial sand	Hard, "alkaline"		S	Sufficient for 14 head stock.
3	NE.	4	"	"	"	Bored	20	1,940	- 16	1,924	20	1,920	Glacial clay	Hard, clear, soda		D, S	Almost dry in winter; also 80-foot well, small supply.
4	NE.	4	"	"	"	Bored	80	1,940	- 70	1,870	80	1,860	Glacial clay	Hard			Intermittent 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 ARM RIVER NO.252, 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	NE.	5	25	28	2	Bored	48	1,935	- 28	1,907	48	1,887	Glacial drift	Hard,clear		D	Sufficient for local needs.
6	NE.	5	"	"	"	Bored	90	1,935	- 55	1,880	90	1,845	Glacial drift	Hard,clear, iron		D, S	Sufficient for local needs.
7	SE.	6	"	"	"	Dug	52	1,980	- 37	1,943	52	1,928	Glacial sand	Hard,clear, iron,"alka-line"		D, S	Sufficient for local needs.
8	SW.	6	"	"	"	Bored	60	2,010	- 55	1,955	60	1,950	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for 9 head stock; also 5 dry hole 60 to 70 feet deep.
9	NW.	8	"	"	"	Drilled	70	1,945	- 30	1,915	70	1,875	Glacial sand	Hard,clear, "alkaline"		D, S	Oversufficient for 12 head stock.
10	SE.	11	"	"	"	Dug	12	1,900	- 4	1,896	4	1,896	Glacial sand	Hard,clear		D	Sufficient for local needs; also a similar well.
11	SE.	11	"	"	"	Bored	65	1,900	- 45	1,855	65	1,835	Glacial sand	Hard,cloudy, "alkaline"		S	Insufficient for local needs.
12	NW.	12	"	"	"	Bored	30	1,900			15	1,885	Glacial sand	Hard		N	Was sufficient for local needs; now deserted
13	NW.	14	"	"	"	Bored	40	1,910	- 22	1,888	40	1,870	Glacial gravel	Soft,clear		D, S	Sufficient for 44 head stock; also shallow well for house use.
14	SE.	16	"	"	"	Dug	30	1,910	- 10	1,900	30	1,880	Glacial gravel	Hard,clear, "alkaline"		S	Sufficient for 50 head stock in wet years; similar well used for house.
15	SW.	16	"	"	"	Drilled	579	1,910	-120	1,790			Marine Shale	Hard,salty, clear		S	Sufficient for local needs; also two wells 24 feet deep,small supply. #
16	NW.	16	"	"	"	Bored	80	1,910	- 74	1,836	74	1,836	Glacial sand	Hard,clear, iron,"alka-line"		S	Insufficient for local stock needs; hauls water.
17	SW.	17	"	"	"	Drilled	140	1,945	-134	1,811	140	1,805	Glacial sand	Soft,cloudy, iron		N	Very poor supply.
18	SW.	17	"	"	"	Bored	80	1,945	- 8	1,937	80	1,865	Glacial clay	Hard,clear, iron		S	Sufficient for local needs.
19	NW.	18	"	"	"	Drilled	700	1,965	- 25	1,940	700	1,265	Marine Shale	Salty,soda, clear		S	Oversufficient for local needs; shallow seepage well for house use.
20	NW.	19	"	"	"	Drilled	116	1,975	- 50	1,925	116	1,859	Glacial sand	Hard,clear, "alkaline"		D, S	Oversufficient for 16 head stock.
21	NW.	20	"	"	"	Bored	84	1,945	- 40	1,905	84	1,861	Glacial gravel	Hard,clear, iron,"alka-line"		S	Sufficient for local needs; also a shallow well for house use.
22	NW.	21	"	"	"	Dug	26	1,930	- 11	1,919	26	1,904	Glacial gravel	Hard,clear		D, S	Sufficient for local needs.
23	NW.	21	"	"	"	Drilled	786	1,941	-140	1,801	686	1,255	Marine Shale	Soft,clear, salty		S	Sufficient for local needs.
24	NW.	23	"	"	"	Dug	60	1,910	- 55	1,855	60	1,850	Glacial drift	Hard,clear		D	Sufficient for local needs.
25	NW.	27	"	"	"	Dug	8	1,920	- 5	1,915	5	1,9	Glacial sand	Hard,clear		D, S	Sufficient for local needs; also a similar well.
26	SW.	28	"	"	"	Bored	0	1,925	- 60	1,865	80	1	Glacial drift	ard,clear, alkaline"		S	Sufficient for local stock needs; haul d inking water.
27	SW.	29	"	"	"	Drilled	0	1,945	- 50	1,895	90	1	Glacial sand	ard,clear, alkaline"		S	Sufficient for local stock needs; has a shallow, soft water well.
28	SW.	30	"	"	"	Bored	17	1,975	- 50	1,925	147		Glacial drift	Hard,clear, "alkaline"			Sufficient for local stock needs; another 20 foot well supplies house.
29	NE.	31	"	"	"	Bored	17	1,975	- 60	1,915	117		Glacial drift	Hard,iron, red,"alka-line"		D, S	Oversufficient for local needs; has several other seepage wells.

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 ARM RIVER NO. 252, 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
30	SE.	32	25	28	2	Drilled	60	1,950	- 40	1,910	60	1,890	Glacial drift	Hard, clear, iron, "alkaline"		S	Sufficient for local needs; water is hauled fo household use.
31	SW.	33	"	"	"	Bored	145	1,960			145	1,815	Glacial drift	Hard, clear, "alkaline"		S	Oversufficient for local stock needs; uses intermittent well for the house.
32	NW.	33	"	"	"	Bored	118	1,960	- 60	1,900	100	1,840	Glacial sand	Hard, yellow, iron, "alkaline"		S	Sufficient for local stock needs; other shallow wells in draw nearby.
33	SW.	34	"	"	"	Dug	16	1,950	- 10	1,940	10	1,940	Glacial sand	Hard, clear		D, S	Large supply.
34	NW.	34	"	"	"	Bored	60	1,950	- 30	1,920	50	1,900	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for 14 head stock.
35	SW.	35	"	"	"	Dug	8	1,900	- 4	1,896	8	1,892	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
1	NW.	1	25	29	2	Dug	32	2,020	- 24	1,996	24	1,996	Glacial gravel	Hard, clear		D, S	Sufficient for local needs; also a 60-foot well, small quantity water.
2	NW.	9	"	"	"	Bored	90	2,060	- 86	1,974	86	1,974	Glacial gravel	Hard, clear, iron		D, S	Sufficient for local needs; also a 125-foot dry hole.
3	NE.	11	"	"	"	Drilled	145	2,010	-100	1,910	145	1,865	Glacial drift	Hard, iron, red colour		D, S	Oversufficient for local needs.
4	SE.	12	"	"	"	Drilled	750	1,990	- 80	1,910	750	1,240	Marine Shale	Soft, clear, salty		S	Oversufficient for local needs; shallow seepage well for house.
5	NE.	22	"	"	"	Bored	100	2,010					Glacial drift	Hard, clear, "alkaline"		N	Water is of very poor quality; also another well; no information.
6	SE.	23	"	"	"	Drilled	163	2,000	- 63	1,937	163	1,837	Glacial sand	Hard, clear, iron, "alkaline"		S	Oversufficient for local needs; also a dugout here.
7	NE.	23	"	"	"	Drilled	160	2,010	- 45	1,965	160	1,850	Marine Shale	Soft, soda, cloudy		S	Sufficient for local stock needs.
8		23	"	"	"		113	2,150	- 20	2,130	113	2,037	Glacial drift	Hard			
9	SE.	25	"	"	"	Drilled	138	1,975	-118	1,857	138	1,837	Glacial sand	Hard, "alkaline"		D, S	Oversufficient for local needs.
10	SE.	25	"	"	"	Bored	120	1,975	- 20	1,955	120	1,855	Glacial sand	Hard, clear, salty, "alkaline"		S	Sufficient for local needs; also a 70-foot drilled dry hole.
11	NE.	26	"	"	"	Drilled	115	2,000	- 12	1,988	115	1,885	Glacial sand	Hard, clear, iron, "alkaline"		S	Sufficient for local stock needs; shallow seepage well used for house.
12	SW.	27	"	"	"	Bored	90	1,960	- 45	1,915	90	1,870	Glacial drift	Hard, clear, iron		D, S	Oversufficient for local needs.
13	SW.	28	"	"	"	Bored	60	2,010	- 45	1,965	60	1,950	Glacial drift	Hard, clear		D, S	Sufficient for local needs.
14	SE.	34	"	"	"	Dug	21	2,020	- 10	2,010	21	1,999	Glacial sand	Hard, clear, iron		D, S	Oversufficient for local needs.
15	SE.	35	"	"	"	Drilled	130	2,005	- 70	1,935	130	1,875	Glacial sand	Hard, salty, Glauber salt, Epsom salts		S	Sufficient for local needs; shallow well for house use.
1	NE.	2	26	27	2	Dug	30	1,980	- 20	1,960	28	1,952	Glacial sand	Hard, clear		D, S	Oversufficient for local needs.
2	NW.	4	"	"	"	Drilled	75	1,940	- 25	1,915	75	1,865	Glacial gravel	Soft, clear		D, S	Sufficient for local needs.
3	SW.	5	"	"	"	Dug	20	1,960	- 12	1,948	20	1,940	Glacial sand	Soft, clear		D, S	Sufficient for 10 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 ARM RIVER NO. 252, 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	SW.	5	26	27	2	Drilled	105	1,960	- 45	1,915	105	1,855	Glacial gravel	Hard, clear, iron, "alkaline"		S	Sufficient for 17 head stock.
5	SW.	6	"	"	"	Bored	60	1,950	- 39	1,911	39	1,911	Glacial gravel	Hard, clear, iron		D, S	Sufficient for local needs; also a 90-foot well, small quantity water.
6	NE.	8	"	"	"	Bored	75	1,950	- 25	1,925	75	1,875	Glacial sand	Hard, iron		D, S	Oversufficient for local needs.
7	SW.	10	"	"	"	Bored	86	1,960	- 76	1,884	86	1,874	Glacial gravel	Hard, clear, iron		D, S	Sufficient for local needs.
8	NW.	10	"	"	"	Drilled	101	1,960	71	1,889	101	1,859	Glacial gravel	Hard, iron		D, S	
9	SW.	12	"	"	"	Dug	10	1,980	- 8	1,972	8	1,972	Glacial gravel	Soft, clear		D, S	Very large supply; also an intermittent well.
10	SW.	13	"	"	"	Dug	20	1,990	- 14	1,976	20	1,970	Glacial sand	Hard, clear		D, S	Sufficient for local needs but requires frequent deepening; also a dry hole.
11	NE.	14	"	"	"	Drilled	125	2,000			125	1,875	Glacial drift	Hard, clear, iron		D, S	Sufficient for local needs.
12	SW.	14	"	"	"	Dug	30	2,000	- 25	1,975	30	1,970	Glacial drift	Hard, clear		D, S	Insufficient for local needs; also another seepage well.
13	NE.	16	"	"	"	Drilled	96	1,975	- 80	1,895	93	1,882	Glacial gravel	Hard, iron		D, S	Oversufficient for 12 head stock; also another shallow well.
14	SW.	16	"	"	"	Drilled	85	1,960	- 73	1,887	85	1,875	Glacial gravel	Hard, clear, iron		D, S	Sufficient for local needs.
15	SW.	17	"	"	"	Dug	85	1,950	- 65	1,885	85	1,865	Glacial gravel	Hard, clear, iron		D, S	Good supply of water; place unoccupied.
16	NW.	17	"	"	"	Bored	80	1,960	- 65	1,895	80	1,880	Glacial drift	Hard, clear, "alkaline"		D, S	Sufficient for local needs.
17	SE.	18	"	"	"	Drilled	75	1,950	- 74	1,876	75	1,875	Glacial sand	Soft		D, S	Very poor supply; place unoccupied.
18	SE.	19	"	"	"	Drilled	156	1,960	- 60	1,900	156	1,804	Marine Shale ?	Hard, clear		D, S	Sufficient for 28 head stock.
19	NE.	20	"	"	"	Dug	40	1,980	- 25	1,955	40	1,940	Glacial sandy clay	Hard, clear		S	Intermittent well, poor supply.
20	SW.	28	"	"	"	Bored	55	1,965	- 25	1,940	55	1,910	Glacial gravel	Hard, iron, red colour		D, S	Sufficient for local needs; also a 10-foot seepage well.
21	NE.	32	"	"	"	Bored	50	2,000	- 35	1,965	50	1,950	Glacial drift	Hard, clear		D, S	Sufficient for local needs.
22	SW.	33	"	"	"	Bored	55	2,010	- 35	1,975	55	1,955	Glacial gravel	Hard, clear		D, S	Oversufficient for local needs; also a 16-foot seepage well.
23	NE.	33	"	"	"	Bored	45	2,020	- 25	1,995	43	1,977	Glacial gravel	Hard, clear		D, S	Oversufficient for 100 head stock; also a 60-foot well, good supply.
24	NE.	33	"	"	"	Dug	20	2,020	- 10	2,010	14	2,006	Glacial gravel	Soft, clear		D, S	Sufficient for local needs; largely seepage.
1	SW.	2	26	28	2	Bored	64	1,910	- 52	1,858			Glacial drift	Hard, clear		D, S	Sufficient for local needs.
2	SE.	3	"	"	"	Drilled	145	1,900			145	1,755	Glacial sand	Hard, clear, iron		D, S	Sufficient for 50 head stock.
3	SW.	4	"	"	"	Bored	95	1,970					Glacial drift	Hard, clear, iron		D, S	Oversufficient for 50 head stock.
4	SE.	5	"	"	"	Bored	82	1,970	- 75	1,895			Glacial drift	Hard, clear, "alkaline"		S	Sufficient for local needs.
5	SE.	8	"	"	"	Bored	130	1,970	- 90	1,880	130	1,840	Glacial sandy clay	Hard, clear, salty, iron		S	Sufficient for local needs.
6	SW.	9	"	"	"	Bored	14	1,970	-115	1,855	140	1,830	Glacial sand	Hard, clear		D, S	Sufficient for 20 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 ASH RIVER NO. 252, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
7	SW.	9	26	28	2	Bored	21	1,970	- 18	1,952			Glacial drift	Hard,clear		D	Sufficient for domestic needs.
8	NW.	16	"	"	"	Bored	84	1,950	- 80	1,870			Glacial drift	Hard,clear, iron,"alkaline"		D, S	Sufficient for local needs.
9	NE.	18	"	"	"	Bored	60	1,980	- 15	1,965	60	1,920	Glacial gravel	Hard,clear, Magnesium sulphate		D, S	Oversufficient for local needs.
10	NW.	19	"	"	"	Drilled	110	2,020	-100	1,920	110	1,910	Glacial sand	Hard,clear, iron,"alkaline"		D, S	Sufficient for 20 head stock.
11	SW.	20	"	"	"	Bored	90	1,975	- 70	1,905			Glacial drift	Hard,iron, "alkaline"		D, S	Sufficient for local needs.
12	SW.	25	"	"	"	Drilled	140	1,965	-100	1,865			Glacial drift	Hard,clear, iron,"alkaline"		D, S	Oversufficient for 50 head stock.
13	SW.	26	"	"	"	Dug	12	1,950	- 2	1,948			Glacial sand	Soft,clear		D, S	Sufficient for local needs.
14	SW.	28	"	"	"	Drilled	80	1,960	- 70	1,890			Glacial sand	Hard,iron, cloudy		S	Sufficient for 20 head stock; also a 20-foot well by dugout.
15	NW.	31	"	"	"	Bored	180	2,020					Glacial sand	Hard,blue colour		N	Water is hauled forall local needs.
16		33	"	"	"	Drilled	85	2,030	- 65	1,965	85	1,945	Glacial drift	Hard,cloudy		D, S	Sufficient for local needs. #
17	NE.	34	"	"	"	Drilled	127	1,955	-121	1,834	127	1,828	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
1	SE.	1	26	29	2	Bored	90	1,990	- 65	1,925	90	1,900	Glacial sand	Hard,clear, "alkaline"		S	Sufficient for local needs; water from seepage well for house.
2	SW.	1	"	"	"	Drilled	631	2,010	- 80	1,930	631	1,379	Marine Shale	Hard,clear, salty		S	Oversufficient for 12 head stock; 12-foot seepage well for house.
3	NE.	2	"	"	"	Bored	77	2,000	- 57	1,943	62	1,938	Glacial clay	Hard,clear, "alkaline"		N	Very poor supply; seepage well for local nee
4	SW.	10	"	"	"	Bored	100	1,990	- 20	1,970	100	1,890	Glacial gravel	Hard,iron, clear,"alkaline"		D, S	
5	NW.	10	"	"	"	Bored	25	1,990	- 23	1,967	25	1,965	Glacial sand	Hard		D	Sufficient for domestic needs.
6	NW.	10	"	"	"	Drilled	130	1,990	- 2	1,988	130	1,860	Glacial gravel	Hard,cloudy, iron,"alkaline"		S	Oversufficient for local needs.
7	SE.	12	"	"	"	Bored	100	1,990	- 75	1,915	100	1,890	Glacial sand	Hard,"alkaline"sediment		S	Oversufficient for 25 head stock; also a shallow seepage well.
8	SE.	13	"	"	"	Bored	60	1,990	- 38	1,952	60	1,930	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
9	NW.	15	"	"	"	Bored	106	2,000	- 60	1,940	106	1,894	Glacial drift	Hard,clear, "alkaline"		D, S	Sufficient for local needs.
10	NW.	21	"	"	"	Bored	104	2,010	- 74	1,936	104	1,906	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for local needs; several dry hole to a bed of stones.
11	NE.	21	"	"	"	Drilled	145	2,010	- 10	2,000	140	1,870	Glacial gravel	Hard,clear, iron,"alkaline"		D, S	Oversufficient for 12 head stock; also 100-foot dry hole and several shallow wells.
12	NW.	22	"	"	"	Drilled	120	2,020			120	1,900	Glacial drift	Hard,clear, "alkaline"		N	Large supply but not usable.

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 ARM RIVER No. 252, SASKATCHEWAN

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
13	NE.	23	26	29	2	Drilled	100	2,000	- 80	1,920	100	1,900	Glacial drift	Hard, clear, iron, "alkaline"		D, S	Sufficient for local needs.
14	NE.	24	"	"	"	Drilled	132	2,020	-102	1,918	132	1,888	Glacial drift	Hard, clear, iron, "alkaline"		D, S	Sufficient for local needs.
15	SW.	25	"	"	"	Bored	85	2,020			85	1,935	Glacial drift	Hard, cloudy, "alkaline"		D, S	Sufficient for 8 head stock.
16	SW.	26	"	"	"	Bored	70	2,000			70	1,930	Glacial gravel	Hard, clear, "alkaline"		D, S	Oversufficient for 14 head stock.
17	NE.	28	"	"	"	Bored	80	2,010	- 50	1,960	80	1,930	Glacial drift	Hard, clear, iron, "alkaline"		D, S	Sufficient for local needs; also a drilled well on SE. quarter.
18	SW.	34	"	"	"	Drilled	100	2,010	- 40	1,970	100	1,910	Glacial sand	Hard, clear, iron, "alkaline"		D, S	Oversufficient for 15 head stock.
19	NW.	35	"	"	"	Drilled	100	2,015	- 50	1,965	100	1,915	Glacial drift	Hard, clear, "alkaline"		S	Oversufficient for local needs; water for house use is hauled.
20	NE.	36	"	"	"	Dug	13	1,970	- 6	1,964	13	1,957	Glacial sand	Hard, clear, iron		D, S	Sufficient for local needs; there are several other wells here.
1	NW.	2	27	27	2	Bored	50	2,050	- 15	2,035	50	2,000	Glacial gravel	Hard, clear		N	Good supply, good quality water but place is not occupied.
2	NE.	3	"	"	"	Bored	42	2,040	- 18	2,022	42	1,998	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
3	SW.	5	"	"	"	Drilled	120	1,975			120	1,855	Glacial sand	Hard, clear, iron		D, S	Oversufficient for 30 head stock.
4	SE.	6	"	"	"	Bored	110	1,975	- 40	1,935	110	1,865	Glacial drift	Hard, clear, iron		D, S	Sufficient for local needs.
5	W½	7	"	"	"	Drilled	163	2,000	- 80	1,920	163	1,837	Glacial gravel	Hard, clear, iron		D, S	Sufficient for local needs.
6	NW.	14	"	"	"	Bored	20	2,060	- 10	2,050	20	2,040	Glacial clay	Hard, clear		D	Sufficient for domestic needs; two dry holes 95 and 85 feet deep, also 18-foot well.
7	NW.	16	"	"	"	Bored	32	2,040	- 20	2,020	32	2,008	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
8	SE.	20	"	"	"	Dug	12	2,050	- 7	2,043	12	2,038	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
9	SE.	20	"	"	"	Dug	14	2,050	- 6	2,044	14	2,036	Glacial gravel	Soft, clear		D, S	Oversufficient for local needs.
10	SW.	21	"	"	"	Dug	16	2,060	- 6	2,054	16	2,044	Glacial gravel	Soft, clear		S	Used for pigs only now, was used for domestic purposes and stock; several similar wells.
11	SE.	22	"	"	"	Bored	65	2,075	- 61	2,014	65	2,010	Glacial gravel	Hard, clear		D, S	Oversufficient for 25 head stock; also a shallow seepage well.
12	NW.	22	"	"	"	Bored	65	2,090	- 60	2,030	65	2,025	Glacial gravel	Hard, clear, iron		D, S	Sufficient for 40 head stock; also a 30-foot well, small supply.
13	SE.	23	"	"	"	Dug	8	2,100	- 4	2,096	6	2,094	Glacial gravel	Soft, clear		S	Sufficient for 30 head stock; not used for house because not near.
14	NE.	23	"	"	"	Bored	65	2,100	- 63	2,037	65	2,035	Glacial gravel	Hard, clear		D	Sufficient for domestic needs.
15	SE.	24	"	"	"	Dug	12	2,075	- 8	2,067	12	2,063	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
16	NW.	24	"	"	"	Dug	20	2,100	- 10	2,090	20	2,080	Glacial gravel	Soft, clear		D, S	Sufficient for local needs; also a 20-foot well with good yields.
17	NW.	25	"	"	"	Dug	14	2,100	- 8	2,092	14	2,086	Glacial gravel	Soft, clear		D, S	Sufficient for local needs; also has an intermittent well.

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

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

WELL RECORDS—Rural Municipality of ARM RIVER NO.252, 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
18	NE.	26	27	27	2	Bored	90	2,125	- 84	2,041	90	2,035	Glacial gravel	Hard,clear		N	Good supply but hard to pump; also 17-foot well, small supply and two 85-foot dry holes.
19	NW.	28	"	"	"	Dug	14	2,100	0	2,100	14	2,086	Glacial gravel	Hard,clear, iron		S	Sufficient for local needs; situated in pond, fills from it.
20	NE.	28	"	"	"	Dug	13	2,140	- 9	2,131	13	2,127	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for local needs; similar 13-foot well and 115-foot dry hole.
21	E½	30	"	"	"	Drilled	340	2,050	-140	1,910			Marine Shale	Hard			
22	NW.	36	"	"	"	Dug	16	2,150	- 12	2,138	16	2,134	Glacial sand	Soft,clear		D, S	Sufficient for local needs; several similar wells.
1	SW.	2	27	28	2	Dug	8	1,940	- 5	1,935	8	1,932	Glacial gravel	Hard,clear		D, S	Oversufficient for local needs.
2	SW.	5	"	"	"	Dug	10	2,000	- 8	1,992	10	1,990	Glacial sand	Hard,cloudy		S	Sufficient for local needs; also an 180-foot well with small supply.
3	SW.	6	"	"	"	Drilled	120	2,020	- 30	1,990	30	1,990	Glacial clay	Hard,clear, iron,"alkaline"		S	Insufficient for local needs.
4	NW.	6	"	"	"	Dug	26	2,000	- 20	1,980	26	1,974	Glacial clay	Hard,clear		S	Insufficient for local needs; also a seepage well for house.
5	NE.	6	"	"	"	Bored	10	2,000	- 7	1,993	10	1,990	Glacial sand	Hard,clear, iron		D, S	Sufficient for local needs.
6	SE.	8	"	"	"	Dug	8	2,000	- 6	1,994	8	1,992	Glacial gravel	Soft,clear		D, S	Sufficient for local needs; other wells 225 feet could not keep out sand.
7	SW.	8	"	"	"	Dug	12	2,000	- 9	1,991	12	1,988	Glacial gravel	Soft,clear		D, S	Sufficient for local needs.
8	NW.	9	"	"	"	Drilled	600	2,000	-200	1,800	600	1,400	Marine Shale	Soft,clear, soda		S	Sufficient for local needs; also a scopago well for house use.
9	SE.	10	"	"	"	Dug	12	1,960	- 9	1,951	12	1,948	Glacial gravel	Hard,clear		S	Sufficient for local stock needs; also a 12-foot sand-point for house.
10	SW.	12	"	"	"	Drilled	122	1,970	- 90	1,880	122	1,848	Glacial sand	Hard,clear		D, S	Sufficient for local needs.
11	NW.	12	"	"	"	Drilled	132	1,950	- 72	1,878	132	1,818	Glacial sand	Hard,clear, iron		D, S	Sufficient for local needs.
12	SE.	14	"	"	"	Dug	12	1,950	- 8	1,942	12	1,938	Glacial gravel	Soft,clear		D, S	Sufficient for local needs.
13	SE.	19	"	"	"	Drilled	178	2,030	- 60	1,970	178	1,852	Glacial sand	Hard,clear		S	Oversufficient for local needs; also a shallo well for house use.
14	SE.	19	"	"	"	Bored	19	2,030	- 10	2,020	19	2,011	Glacial sand	Soft,clear		D	Sufficient for domestic needs; also a 100-foot dry hole.
15	NW.	19	"	"	"	Drilled	1,055	2,000	- 50	1,950	1,055	945	Marine Shale	Soft,soda, salty,clear		S	Oversufficient for local needs; also a 12-foo well for domestic use.
16	SE.	20	"	"	"	Dug	9	2,000	- 5	1,995	9	1,991	Glacial sand	Soft,clear		D, S	Cannot be pumped dry.
17	SW.	20	"	"	"	Drilled	160	2,030	- 60	1,970	160	1,870	Glacial sand	Hard,clear, iron,"alkaline"		S	Sufficient for local needs.
18	NW.	20	"	"	"	Dug	14	2,030	- 4	2,026	14	2,016	Glacial gravelly clay	Hard,clear		D, S	Sufficient for local needs.
19	NE.	35	"	"	"	Dug	15	1,990	- 11	1,979	15	1,975	Glacial sand	Hard,clear		D, S	Sufficient for local needs; also a 70-foot well with small supply.
20	SW.	36	"	"	"	Bored	24	2,010	- 16	1,994	24	1,986	Glacial sand	Hard,clear		D, S	Oversufficient for local needs.
21	NW.	36	"	"	"	Dug	8	2,020	- 4	2,016	8	2,012	Glacial sand	Hard,clear	46	D, S	Sufficient for local needs.

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 ARM RIVER NO.252, 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.	1	27	29	2	Dug	72	2,040	- 57	1,983	72	1,968	Glacial gravel	Hard,clear, "alkaline"		D, S	Oversufficient for local needs.
2	SW.	2	"	"	"	Bored	120	2,030			120	1,910	Glacial gravel	Hard,clear, "alkaline"		D, S	Oversufficient for 20 head stock.
3	SE.	10	"	"	"	Dug	63	2,030	- 24	2,006	63	1,967	Glacial gravel	Hard,clear, "alkaline"		D, S	Oversufficient for local needs.
4	SW.	11	"	"	"	Bored	79	2,030	- 59	1,971	79	1,951	Glacial gravel	Hard,clear		D, S	Sufficient for local needs.
5	SW.	12	"	"	"	Drilled	120	2,030	- 60	1,970	120	1,910	Glacial sand	Hard,clear, iron		S	Sufficient for local stock needs; water is hauled for domestic use.
6	SW.	14	"	"	"	Bored	68	2,025	- 60	1,965	68	1,957	Glacial sand	Hard,clear, "alkaline"		D, S	Sufficient for 25 head stock.
7	SE.	22	"	"	"	Bored	55	2,025	- 49	1,976	55	1,970	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for 15 head stock.
8	NE.	22	"	"	"	Bored	80	2,030	- 50	1,980	80	1,950	Glacial drift	Hard,clear		D, S	Sufficient for local needs.
9	NE.	23	"	"	"	Dug	16	2,000	- 13	1,987	16	1,984	Glacial sand	Hard,clear		D, S	Insufficient for local needs.
10	NW.	24	"	"	"	Drilled	200	2,000	- 25	1,975	200	1,800	Glacial drift	Hard,clear, iron		D, S	Oversufficient for local needs.
11	SE.	26	"	"	"	Dug	13	2,000	- 11	1,989	13	1,987	Glacial sand	Hard,clear		D, S	Insufficient for 25 head stock; also an 8-foot well with good supply.
12	NE.	27	"	"	"	Bored	57	2,030	- 47	1,983	47	1,983	Glacial sand	Hard,clear, iron, "alkaline"		D, S	Sufficient for 50 head stock.
13	NE.	34	"	"	"	Dug	13	2,020	- 8	2,012	13	2,007	Glacial sand	Soft,clear		D, S	Sufficient for local needs.
14	SE.	34	"	"	"	Dug	52	2,020	- 47	1,973	52	1,968	Glacial gravel	Hard,clear, "alkaline"		D, S	Sufficient for local needs.

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.