CANADA

DEPARTMENT OF MINES

AND

TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

WATER SUPPLY PAPER No. 5

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF ARGYLE NO. 1 SASKATCHEWAN

By

B. R. MacKay and H. N. Hainstock

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BUREAU OF ECONOMIC GEOLOGY

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF ARGYLE, NO. 1 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, comprisig 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, Wickendon, Russell, and others of the Geological Survey. The Department of Natural Resources of Saskatchewan and local well drillers assisted considerable 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 Argyle is an area of 216 square miles in the southeastern corner of the province of Saskatchewan, consisting of six townships described as townships 1, 2, and 3 in ranges 30 and 31, west of the 1st or principal meridian.

The whole of the municipality is covered by a thick mantle of unconsolidated glacial drift. Recent deposits of alluvium or stream gravels occur along the flood-plain of Antler river. The glacial drift varies from 200 to 400 feet in thickness. This variation in thickness of the glacial drift is due largely to the uneven pre-glacial bedrock land-surface upon which it was deposited.

The upper 10- to 30-foot zone of the glacial drift is composed mainly of unstratified, yellow boulder clay, but it varies somewhat in composition throughout the municipality. In the northern part, south as far as Carievale and Gainsborough, it consists chiefly of yellow clay which contains pockets of sand and gravels. In two localities these deposits are in the form of terminal moraines of small relief, the surfaces of which are quite undulating and contain numerous undrained depressions. South of Carievale and Gainsborough the glacial deposits of sand and gravel are very extensive, and the yellow clay occurs as small, isolated patches, or as a thin veneer over the sand and gravel pockets.

This upper 30-foot zone of the drift is underlain by a fine, compact, impervious, blue to grey clay, which varies from 200 to 350 feet in thickness. A few pockets and thin beds of sand and gravel occur within this thick deposit of blue clay.

A zone of sand and gravel, in many places attaining a thickness of 20 feet, underlies the blue clay and overlies the bedrock in parts of the municipality. This material has apparently been deposited in a large depression in the pre-glacial bedrock land surface.

Water-bearing Horizons in the Unconsolidated Deposits

The sand and gravel deposits that occur within the upper 30-foot zone of the glacial drift, and the deposits of alluvium along the flood-plain of Antler river, constitute the uppermost water-bearing horizon. The water resulting from rainfall, and the melting of the snow, seeps downward into these deposits of sand and gravel and is retained there, being prevented from migrating farther by the impervious nature of the blue clay. The top of the zone of saturation thus formed occurs at a depth of from 10 to 30 feet, but is not continuous throughout the municipality. It is from this horizon that all the shallow wells of the municipality derive their supply of water. The water is suitable for domestic and stock use, and is fairly abundant in quantity.

The pockets of sand and gravel that occur within the blue clay form a second water-bearing horizon in the glacial drift. The water that is derived from this horizon is usually small in quantity and its mineral salt content, as a rule, is so high that it is unfit for domestic purposes.

The deposits of sand and gravel that occur between the blue clay and the bedrock form a third water-bearing horizon. This horizon is one of the most important water-bearing horizons known to occur in either the glacial drift or the bedrock of the municipality. Wells that tap this horizon yield an abundant supply of water that is usually hard in character and contains a relatively high mineral salt content. The hydrostatic pressure is sufficient to cause the water to rise to within a few feet of the land surface or to flow above it.

Water-bearing Horizons in the Bedrock

Throughout the municipality the glacial drift is underlain by a series of sandstone, shale, and sandy shale beds which contain one or more small seams of lignite coal. This series of consolidated sediments is locally designated the "Ranvenscrag

formation". The sandstone and the sandy shale beds form two fairly continous water-bearing horizons. The uppermost horizon is formed by a sandy shale bed, and it is encountered at depths of 360 to 390 feet. The second horizon is formed by a sandy bed, and it is encountered at a depth of 440 to 460 feet. The water from these horizons is soft in character, being high in sodium salts. It usually has a salty taste; it is satisfactory for stock requirements and unless it is too salty it can be used for domestic purposes.

The water contained in these horizons is under considerable pressure and rises to within 30 feet of the surface or flows above the surface level. The area in which flowing artesian wells occur, or might be expected to occur, is shown on the accompanying map. This area includes flowing wells from both the bedrock and the glacial deposits. The artesian conditions that exist in this area may be due to the fact that a highland area, Moose mountain, lies to the northwest. The highland area contains numerous lakes, and forms a good collecting ground for rainfall, part of which may pass down into the sandy beds of the Ravenscrag formation, which also underlies the highland area. This water would be under considerable pressure, due to the head produced by the difference of elevation of the water-bearing horizons, and when there water-bearing horizons are tapped, the water rises to near the surface or flows above it. The type of well thus obtained depends upon the porosity of the water-bearing horizon and its distance from the intake area. When the sandy beds of the Ravenscrag formation are small and at considerable distance from the intake area, such as in the southern part of the municipality, the wells would be sub-artesian in character. Similar wells also occur within the area of flowing artesian wells and in such instances the water-bearing horizons are more impervious than those that produce the flowing-artesian wells.

WATER CONDITIONS BY TOWNSHIPS

Township 1, Range 30

One water-bearing horizon is known to occur in the glacial drift of this township. This horizon is formed by the extensive deposits of glacial sand and gravel that occur in the zone of glacial drift immediately overlying the blue clay, and by the stream gravels (alluvium) that occur along the flood-plain of Antler river. A fairly abundant supply of water can be obtained from these deposits at shallow depths, or at an elevation varying from 1,565 feet in the south and southeastern part of the township, to 1,590 feet in the northwestern part, the rise corresponding to the rise in surface elevation. In certain sections of the township, however, the blue clay comes very close to the surface and the sand and gravel deposits in the yellow clay are limited both in number and extent. In such locations several wells may have to be dug before a pocket of sand or gravel is encountered and an adequate supply of water obtained. This was the case in parts of sections 3, 9, 16, and 27 and similar conditions may exist elsewhere in the township. In years of normal rainfall the supply of water from the shallow wells tapping this horizon is sufficient for local needs and even during the drought period of 1931 to 1935, although the supply diminished and some wells went completely dry, there was no shortage of water in the majority of wells.

As an abundant supply of usable water is obtainable at shallow depths throughout the municipality, it has not been necessary to drill deep wells into the Ravenscrag formation. The possibilities of obtaining an abundant supply of water from the Ravenscrag formation are excellent Non-flowing artesian wells yielding soft, salty water are to be expected, rather than flowing artesian wells.

Township 1, Range 31

Two water-bearing horizons occur in the glacial drift of this township. The principal horizon is formed by the river gravels or alluvium, and by the deposits of glacial sand and gravel that occur at depths of 10 to 15 feet immediately overlying the blue clay. The average elevation of this aquifer varies from 1,600 feet in the eastern parts of the township to 1,640 feet in the western and northwestern parts. In the south-eastern portion of the township the sand and gravel deposits are numerous and the water-bearing horizon is fairly continuous, but elsewhere the gravel is in the form of pockets, and numerous dry holes are often dug into the yellow and blue clays without locating water. This was the case in sections 4, 9, 20, and 30. The supply of water from wells tapping these gravel pockets depends upon the size of the pocket encountered and upon the amount of annual precipitation. The water supply from the majority of the shallow wells decreased during the drought period, but only one instance was noted where water had to be hauled for stock use. During the extremely cold winter months the upper part of the water-bearing horizon often becomes frozen, causing a decrease in the water supply. In some areas as in the NE. $\frac{1}{4}$, section 19, SE. $\frac{1}{4}$, section 28, and the NW. $\frac{1}{4}$, section 32, where the gravel layers are narrow, the wells have been dug a few feet into the blue clay to form a reservoir for the water coming from the overlying gravel. In each instance the water was slightly alkaline in character, and it is believed that the fresh water from the gravel aquifer was contaminated by alkaline salts dissolved out of the blue clay.

A second water-bearing horizon in the glacial drift is encountered by a well located in the NW. $\frac{1}{4}$, section 15. This horizon is formed by a sand layer in the blue clay at a depth of 80 feet. It is not very likely that this sand bed is continuous over a large area and it is probably only a pocket within the

blue clay. The water was quite "alkaline" in character and of small quantity.

Two water-bearing horizons are known to occur in the Ravenscrag formation that underlies the glacial drift. The uppermost of these horizons is formed by sandy shale beds, and it is encountered at a depth of approximately 365 feet. This horizon yields an abundant supply of soft to medium hard, salty water that is suitable for stock use but usually unsatisfactory for domestic purposes. The hydrostatic pressure is sufficient to cause the water to rise to within 17 feet of the surface. The lower horizon is formed by a black, sandy bed and it occurs at a depth of approximately 450 feet. It also yields an abundant supply of medium soft, salty water, that is high in sodium salts. The pressure is sufficient to cause the water to rise to within 30 feet of the surface. Should other wells be drilled into these water-bearing horizons an abundant supply of water is to be expected.

Township 2, Range 30

The glacial drift of township 2, range 30, contains two water-bearing horizons. The upper horizon is composed of the sand and gravel deposits that occur in the zone of drift lying immediately above the blue clay, and it is encountered at depths of 4 to 10 feet below the surface. The deposits of sand and gravel are extensive in the vicinity of Gainsborough, and in the southeastern corner of the township, where practically nine sections are covered with glacial or lake sands. In these areas an abundant supply of hard, potable water can be obtained by driving sandpoints into the deposits. Elsewhere in the township the sand and gravel deposits are not extensive and they occur as scattered pockets within the yellow clay. A few dry holes may be dug before a pocket is located,

but as a rule little trouble is experienced in locating a suitable supply of water. In general the elevation of the top of the aquifer varies from 1,550 feet in the eastern and southeastern parts of the township, to 1,600 feet in the western and northwestern parts, the rise corresponding to the rise in the surface elevation.

The second water-bearing horizon in the glacial drift is formed by the deposits of sand and gravel that occur between the blue clay and the Ravenscrag formation. This horizon appears to be fairly continuous throughout the township, but as it has been tapped by only three wells, its exact areal distribution is not definitely known. As these deposits occur in depressions in the pre-glacial bedrock land surface, the depth of the wells vary from 250 to 400 feet. In the SW. ¼, section 34, the water rises to a distance of 10 feet above the surface, but in the other two wells the pressure is not sufficient to cause the water to flow, although it rises to within a few feet of the surface. The water from this horizon is hard and contains a noticeable amount of iron. It is usable for both humans and stock, and is abundant in quantity. In the northwestern corner of the township, the possibilities of obtaining flowing artesian wells from this horizon are fair, but elsewhere sub-artesian wells are to be expected.

One well, located in the NW. ¼, section 28, is drilled into the Ravenscrag formation. It is producing an abundant supply of soft, salty water from a sandy shale bed occurring at a depth of 390 feet. The water is under pressure and rises to within 80 feet of the surface. Undoubtedly more wells of this type will be obtained upon further drilling in other locations.

Township 2, Range 31

Two water-bearing horizons also occur in the glacial drift of this township. The uppermost horizon is formed by

the deposits of sand and gravel that occur in the zone of drift immediately overlying the blue clay. These deposits are fairly extensive, and it is not difficult to obtain an abundant supply of usable water from them by wells averaging 10 to 15 feet in depth.

The second water-bearing horizon is formed by the sand and gravel that lie immediately below the blue clay and above the bedrock. In two wells the sand deposit that forms the horizon is reported as underlying shale, but both the character of the water obtained from it and the elevation of the horizon compare with other wells definitely known to be obtaining their water from the deposits lying between the blue clay and the bedrock. The water is hard, slightly yellow in colour, high in iron, corrodes the well casings, and is accompanied by small flows of inflammable gas, and differs greatly from the soft, salty water definitely known to come from the bedrock, the Ravenscrag formation. It is possible, however, that some of the water is being derived from the upper part of the Ravenscrag formation. The water from this horizon is under considerable pressure and flows above the surface level in the nine wells that have tapped the horizon. The maximum height to which the water will rise above the land surface is reported as being 100 feet.

Two water-bearing horizons are encountered in the Ravenscrag formation. The uppermost is formed by sandy shale beds, and it is encountered by two wells at a depth of 360 feet. The water is soft and salty in character and flows from 3 to 12 feet above the surface. The second horizon is also formed by sandy beds, and it is encountered by one well at a depth of 460 feet. The water flows above the land surface, and is soft and salty in character. These horizons will doubtless occur throughout the township, and will yield an abundant supply of water that is suitable for stock requirements, should they be tapped by other wells.

Township 3, Range 30

Two water-bearing horizons are known to occur in the glacial drift that mantles this township. The uppermost horizon is formed by the deposits of sand and gravel that occur in the zone of drift overlying the blue clay. This horizon is not continuous. In sections 2 and 3, and parts of 26, 27, 34, and 36, the deposits of glacial sand and gravel are fairly extensive, and an abundant supply of potable water can be obtained from them. Sandpoints are commonly used in these areas. Throughout the remainder of the township, the gravel and sands occur as small pockets within the yellow clay overlying the blue clay. In many cases several wells are dug before a gravel pocket is located, and as a rule they yield only a small supply of water that is often alkaline in character. This is particularly true in sections 6, 12, 14, 15, and 21, and farmers residing on the following locations: SE.$\frac{1}{4}$, section 4; SW. $\frac{1}{4}$, section 6; SE. $\frac{1}{4}$, section 12; SE. $\frac{1}{4}$, section 15; SE. $\frac{1}{4}$, section 16; and the NW. $\frac{1}{4}$, section 21, have had to haul water at various times, for stock or domestic use, or for both, on account of the poor supply of water obtained, or of its highly mineralized character.

Sand deposits occurring at the base of the blue clay form a second water-bearing horizon. The areal distribution of this horizon is not definitely known as it had been encountered by only two wells. These wells are located in section 5, and the NE. $\frac{1}{4}$, section 22 and are 289 and 281 feet in depth, respectively. The water is medium hard in character and rises to within 10 feet of the surface or flows above it. This horizon will probably occur at other localities, and the possibility of obtaining flowing wells from it, is excellent.

Two water-bearing horizons are known to occur in the Ravenscrag formation. The uppermost of these is the sandy shale beds that occur at the top of the formation, at depths

of 300 to 320 feet. The water from this horizon is medium hard and slightly salty in character and is under sufficient pressure to flow above the ground surface. The second water-bearing horizon is tapped by one well located in section 4, and it is formed by a sandy shale bed at a depth of 390 feet. The water from this horizon is also medium hard and salty in character and flows 5 feet above the surface. Throughout the township, an abundant supply of usable water is obtainable from the Ravenscrag formation, and in the southwestern part. flowing-artesian wells will possibly occur.

Township 3, Range 31

The glacial drift of this township contains two water-bearing horizons. The uppermost horizon is formed by the deposits of glacial sand and gravel that occur in the zone immediately overlying the blue clay, and it is the source of water for all of the shallow wells in the township. Surface sand and gravel deposits cover most of the southwestern corner of the township, and occur in bands up to a quarter of a mile in width along two ravines that run in a north-south direction along the eastern edge and west-central portion of the township. The best supply of water, both from the standpoint of quality and quantity, is found in the gravels along the ravines where the ground water appears to follow definite channels, and in the deposits that occur in the southwestern corner of the township. Elsewhere, the sand and gravel deposits occur as scattered pockets within the yellow clay, and several dry holes are generally dug before a pocket of gravel is located. The wells that tap these gravel pockets, however, produce adequate supplies of usable water.

The water-bearing horizon that is formed by the sand deposits that occur at the contact of the blue clay and the bedrock, is tapped at a depth of 255 feet by a well located in the SE. $\frac{1}{4}$, section 7, and at a depth of 250 feet in section 8. These wells are producing an abundant supply of hard, usable

water. The hydrostatic pressure is sufficient to cause the water to flow to a height of 20 feet above the surface. The areal extent of this horizon is not definitely known, but it is probable that similar wells can be obtained in the western part of the township.

An abundant supply of soft, slightly salty water is being obtained from two water-bearing horizons in the Ravenscrag formation. The uppermost horizon is formed by sandy beds, and it is encountered at a depth of 298 feet by a well located in section 18. The lower horizon is encountered by a well located in section 29, and it is also formed by sandy, shale beds which occur at a depth of 440 feet. The water from both these wells is under sufficient pressure to flow. In section 1, holes were drilled to a depth of 520 feet without obtaining water, and the same condition occurred in section 20. In these instances either the Ravenscrag formation is composed of non-water-bearing material, or the water-bearing horizons, if present, were passed through unnoticed by the driller, and the water shut off by the casings. As the general rule little difficulty should be encountered in obtaining adequate supplies of usable water from the Ravenscrag formation.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF ARGYLE, NO. 1, SASKATCHEWAN

Township	1	1	2	2	3	3		Total No. in municipality
West of 1st mer. Range	30	31	30	31	30	31		
Total No. of Wells in Township	56	98	35	61	96	77		423
No. of wells in bedrock	0	4	34	4	1	13		56
No. of wells in glacial drift	53	94	1	57	95	64		364
No. of wells in alluvium	3	0	0	0	0	0		3
Permanency of Water Supply								
No. with permanent supply	27	44	29	36	52	58		246
No. with intermittent supply	3	5	0	0	7	0		15
No. dry holes	26	49	6	25	37	19		162
Types of Wells								
No. of flowing artesian wells	0	0	1	13	1	2		17
No. of non-flowing artesian wells	0	4	2	0	1	1		8
No. of non-artesian wells	30	45	26	23	57	55		236
Quality of Water								
No. with hard water	30	45	28	35	59	57		254
No. with soft water	0	4	1	1	0	1		7
No. with salty water	0	4	1	2	2	1		10
No. with alkaline water	1	2	0	0	4	0		7
Depths of wells								
No. from 0 to 50 feet deep	56	88	32	48	92	62		378
No. from 51 to 100 feet deep	0	6			2			8
No. from 101 to 150 feet deep	0					1		1
No. from 151 to 200 feet deep	0							
No. from 201 to 500 feet deep	0	4	2	13	2	13		34
No. from 501 to 1000 feet deep	0		1			1		2
No. over 1000 feet deep	0							
How the Water is used								
No. usable for domestic purposes	27	44	28	35	53	57		244
No. not usable for domestic purposes	3	5	1	1	6	1		17
No. usable for stock	30	48	29	36	59	58		260
No. not usable for stock	0	1	0	0	0	0		1
Sufficiency of Water Supply								
No. sufficient for domestic needs	30	49	29	36	59	58		261
No. insufficient for domestic needs	0	0	0	0	0	0		
No. sufficient for stock needs	27	39	28	35	47	46		222
No. insufficient for stock needs	3	10	1	1	12	12		39

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 Argyle, No. 1, Saskatchewan.

LOCATION						Depth of Well, Ft.	Total dis'vd Solids	Cl.	HARDNESS			CONSTITUENTS AS ANALYSED					CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS								Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.				Total	Perm.	Temp.	Alkalinity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	Fe	
1.	NW.	4	1	30	1	11	600	27	540	360	180	335	140	140	94	38	577	251		71	179		31	45		x 1
2.	NE.	19	1	30	1	20	2,560	11	1,400	1,400		290	290	410	356	188	2,380	290	603		1,061		408	183		x 1
3.	NE.	8	1	31	1	21	1,500	125	1,300	750	550	750	750	250	238	181	1,416	448		225	343		164	206		x 1
4.	NE.	8	1	31	1	455	2,620	1250	25	not	det.	445	445	10	11	1345	2,534	18		23		424	6	2063	1	x 2
5	NE.	20	1	31	1	20	2,340	148	1,600	1,600	200	390	390	260	295	n.d.	anom-alous	390						244		x 1
6	NE.	36	2	31	1	360	1,500	186	540	140	400	1,025	1025	20	86	647	1,351	36		180		822	6	314	20	x 2

Water samples indicated thus, x 1, are from glacial drift.
Water samples indicated thus, x 2, are from bedrock, Ravenscrag formation.
Analyses are reported in parts per million.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).

For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

Four samples of water from the glacial drift of this municipality were anlaysed and the mineral constituents, as determined and calculated, are listed in the accompanying table. In the municipality of Argyle the deposits of glacial sand and gravel are fairly extensive and the quality of the water derived from them is relatively good, but the water derived from the clays alone is poor.

The total dissolved solid content of the waters analysed ranges from 600 to 2,560 parts per million. This solid content is not high for the waters of the glacial drift in the Prairie Provinces, as many of them have a total dissolved solid content averaging 3,000 parts per million. All of the samples analysed are excessively hard.

All of the samples analysed contain sodium sulphate, (Glauber's Salt) and magnesium sulphate (Epsom Salts), but with the exception of No. 2, they will not have a laxative effect upon persons accustomed to their use.

No samples of water that is being derived from the sand deposits occurring at the contact of the drift and the bedrock were taken for analyses.

Water from the Bedrock

Two samples of water from the Ravenscrag formation were analysed, and the results are listed in the accompanying table. The waters sampled are derived from two water-bearing horizons occurring at depths of 360 and 455 feet. The total dissolved solid content of the waters is 1,500 and 2,620 parts per million, the water from the lower depth being higher in dissolved mineral salts. The water from the upper horizon is hard in character, whereas that from the lower horizon is extremely soft. The sodium salt content of the waters from the Ravenscrag formation is high. In the two samples analysed the sodium carbonate (black

alkali) content is 424 and 822 parts per million respectively. The water from the lower horizon contains a large amount of sodium chloride (common salt), and it is too salty for drinking but can be used for stock. The iron content of the waters from the Ravenscrag formation in this municipality is very high. Upon exposure to the air, the iron is oxidized and settles out as a red precipitate. It is not advisable to use for drinking, those waters that have a high iron content unless the iron has been largely removed by aeration of the water. Waters that are high in iron should be allowed to stand in large tanks for a considerable length of time before being used, as by so doing some of the iron in solution is precipitated. Aeration of the water is also helpful in removing the iron, and it can be effected by causing the water to flow over cascades of corrugated iron, to fall freely from perforated plates, or to be thrown into the air as a fine spray. The water should also be filtered through a fine sand filter. In general the waters from the Ravenscrag formation are suitable for stock, and unless the sodium chloride (common salt) content and iron contents are very high, they can be used for drinking, although they are apt to be unpalatable. They are unsatisfactory for irrigation purposes.

WELL RECORDS—Rural Municipality of ARGYLE NO. 1.

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.	2	1	30	1	Dug	12	1,575	- 8	1,567	8	1,567	Glacial, sand	Hard, clear	52	D. S.	Sufficient for local needs.
2	NE.	3	"	"	"	"	12	1,570	- 7	1,563	7	1,563	" " "	" "	50	N.	18 dry holes dug close to this well.
3	NW.	3	"	"	"	"	14	1,575	- 8	1,567	9	1,567	" " "	" "	45	D. S.	Sufficient for local needs.
4	NE.	4	"	"	"	"	10	1,575	- 5	1,570	10	1,565	" " "	" "	52	D. S.	Sufficient supply water came in from NW.
5	NW.	4	"	"	"	"	12	1,585	- 8	1,577	8	1,577	" " "	" iron		D. S.	Sufficient for local needs. Water analysed.
6	SE.	9	"	"	"	"	16	1,575	- 12	1,563	12	1,563	" " "	" clear	44	D. S.	Sufficient for local needs. Four dry holes dug.
7	NE.	10	"	"	"	"	15	1,550	- 11	1,539	15	1,535	" " gravel	" "	45	N.	
8	NE.	12	"	"	"	"	12	1,550	- 5	1,545	12	1,538	River, "	" "	50	D. S.	Sufficient for local needs. Decreased in drought period.
9	SW.	16	"	"	"	"	10	1,550	- 4	1,546	4	1,546	Soil	" "	50	D. S.	No water on N. side of creek. Well dry during drought period.
10	SE.	17	"	"	"	"	13	1,560	- 7	1,553	12	1,548	River, sand	" "	42	D. S.	Cannot be pumped dry.
11	SW.	17	"	"	"	Sand point	12	1,600	- 5	1,595	5	1,595	Glacial, sand	" "	42	D. S.	Sufficient for local needs.
12	SE.	18	"	"	"	Sand point	6	1,600	- 4	1,596	4	1,596	" " "	" "	45	D.	Sufficient for domestic use. Stock watered in creek.
13	NW.	18	"	"	"	Sand point	16	1,550	- 12	1,538	12	1,538	River, gravel	" "	44	D. S.	Sufficient for local needs.
14	SE.	19	"	"	"	Dug	27	1,610	- 2	1,608	22	1,588	Glacial, gravel	" "	42	N.	Sufficient for local needs. Water analysed.
15	NE.	19	"	"	"	"	20	1,590	- 13	1,577	13	1,577	" sand, gravel	" cloudy	48	S.	Steady supply during drought. Water analysed. Turns clothes red.
16	NE.	20	"	"	"	"	18	1,595					Glacial, sand	" clear	45	D. S.	Sufficient for local needs.
17	NW.	21	"	"	"	"	10	1,575	- 6	1,569	6	1,569	" sandy clay	" cloudy		S.	Sufficient for local needs.
18	SE.	22	"	"	"	"	15	1,570	- 8	1,562	8	1,562	Glacial, sand	" muddy		S.	Sufficient for local needs.
19	NW.	26	"	"	"	"	9	1,560	- 7	1,553	7	1,553	Glacial, gravel	" clear	52	D. S.	Sufficient for local needs.
20	SE.	27	"	"	"	"	16	1,560	- 14	1,546	14	1,546	" "	" "	48	D. S.	Sufficient for local needs. Several dry holes dug.
21	SW.	27	"	"	"	"	18	1,525	- 14	1,511	14	1,511	" "	" "	48	D. S.	Sufficient for local needs.
22	NW.	28	"	"	"	"	11	1,600	- 4	1,596	8	1,592	" "	" "	50	D. S.	Sufficient supply for 80 head of stock.
23	NE.	29	"	"	"	"	15	1,595	- 10	1,585	10	1,585	" "	" "	50	D. S.	Sufficient for local needs.
24	NE.	30	"	"	"	Sand point	20	1,610	- 20	1,590	20	1,590	" sand	" "	50	D.	Poor supply.
25	SW.	33	"	"	"	Dug	18	1,600	- 14	1,586	14	1,586	" " gravel	" "	48	D. S.	Poor supply. Dry holes in clay.
26	NE.	34	"	"	"	Dug	11	1,575	- 7	1,568	7	1,568	" " "	" "	56	D. S.	

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 ARGYLE NO. 1.

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	NE.	2	1	31	1	Dug	13	1,615	- 9	1,606	9	1,606	Glacial, sand	Hard, clear	45	N.	
2	NW.	3	"	"	"	"	16	1,625	- 10	1,615	10	1,615	Glacial, sand, gravel	" "	48	D. S.	Sufficient supply for local needs.
3	SE.	4	"	"	"	"	14	1,630	- 9	1,621	9	1,621	Glacial, gravel	Soft, "	44	D. S.	45 bbls. per day.
4	SW.	5	"	"	"	"	12	1,610	- 5	1,605	8	1,602	" "	Hard, clear	50	D. S.	Watered 40 head during drought.
5	SW.	6	"	"	"	"	11	1,640	- 6	1,634	11	1,629	" "	" "	52	S.	Sufficient for local needs.
6	NW.	6	"	"	"	"	15	1,645	- 11	1,634	11	1,634	" "	" "	44	D. S.	Sufficient in years of normal rainfall.
7	SW.	7	"	"	"	"	9	1,650	- 8	1,642	9	1,641	" sand	" "	50	S.	Supply intermittent and insufficient.
8	NW.	7	"	"	"	"	13	1,650	- 8	1,642	8	1,642	" sandy clay	" "	45	D. S.	Sufficient for local needs.
9	NE.	8	"	"	"	"	24	1,630	- 22	1,608	24	1,606	Glacial, gravel	" "	45	D. S.	Insufficient supply.
10	NE.	8	"	"	"	Drilled	455	1,630	- 30	1,600	455	1,175	Ravenscrag, sand	Salty, soft	45	S.	Sufficient for local needs.#
11	NE.	9	"	"	"	Dug	9	1,625	- 5	1,620	5	1,620	Glacial, sand	Soft, clear	45	D. S.	Has never been dry.
12	NE.	10	"	"	"	"	10	1,610	- 7	1,603	7	1,603	Glacial, sandy clay	Hard, "	44	S.	Decreases in winter but sufficient.
13	SE.	10	"	"	"	"	12	1,615	- 10	1,605	10	1,605	Glacial, sand	Hard, "	45	D. S.	Sufficient for local needs.
14	SE.	11	"	"	"	"	17	1,615	- 14	1,601	14	1,601	" "	" "	48	D. S.	Sufficient for local needs.
15	NW.	14	"	"	"	"	12	1,575					" gravel	" "		D. S.	Sufficient for local needs.
16	NW.	15	"	"	"	Bored	80	1,605	- 79	1,526	80	1,525	" blue clay	" alkaline		N.	
17	NW.	15	"	"	"	Dug	10	1,605	- 9	1,596	9	1,596	Glacial, gravel	Soft, clear	45	D. S.	Sufficient for 40 head stock.
18	NE.	16	"	"	"	"	16	1,600	- 10	1,590	10	1,590	" sand	Hard, "	48	D. S.	Not sufficient, intermittent supply.
19	NW.	16	"	"	"	Drilled	348	1,620	- 18	1,602	348	1,272	Ravenscrag, sandy shale	Hard, " salty	46	S.	Too salty for domestic use.
20	NW.	18	"	"	"	"	370	1,650	- 17	1,633	365	1,285	?	Soft, " salty	52	D. S.	Amply supply for stock. Cannot be pumped dry.
21	NW.	18	"	"	"	Dug	15	1,650	- 12	1,638	12	1,638	Glacial, sandy clay	Hard, "	46	D. S.	Sufficient for local needs.
22	SW.	19	"	"	"	"	16	1,650	- 8	1,642	8	1,642	Glacial, sand	Hard, "	50	D. S.	Sufficient in years of normal rainfall.
23	NE.	19	"	"	"	Bored	20	1,650	- 19	1,631	20	1,630	Glacial, blue clay	Hard, " alkaline		N.	Hauled water in 1934. Not sufficient.
24	SW.	20	"	"	"	Drilled	445	1,645	- 13	1,632	445	1,200	Ravenscrag, sand	Soft, salty greenish	48	S.	Ample supply. Too saline for domestic use.
25	SW.	20	"	"	"	Bored	33	1,645	- 3	1,642	16	1,629	Glacial, gravel	Hard, clear	44	D. S.	Not sufficient.
26	SE.	20	"	"	"	Dug	12	1,625	- 7	1,618	7	1,618	Glacial, gravel	Hard, "	50	D. S.	Supplies enough for house use only.
27	NE.	20	"	"	"	"	20	1,625	- 15	1,610	10	1,615	Glacial, gravel	Hard, "	50	D. S.	Sufficient supply.# ~~30-40 dry holes dug near here.~~

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

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

B 4-4
R. 7526

WELL RECORDS—Rural Municipality of ARGYLE NO.1

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
28	SW.	22	1	31	1	Dug	8	1,600	- 4	1,596	7	1,593	Glacial,sand gravel	Hard,clear	52	D.	Some dry holes. Sufficient supply.
29	NW.	22	"	"	"	"	17	1,600	- 15	1,585	16	1,584	Glacial,gravel sand	" "	48	D.	Sufficient for house use.
30	SE.	24	"	"	"	"	8	1,600	- 7	1,593	7	1,593	Glacial,gravel sand	Soft, "	50	D.	Good supply.
31	NE.	25	"	"	"	"	20	1,610	- 5	1,605	5	1,605	Glacial,sandy clay	Hard, "	50	D.	Small supply.
32	SE.	28	"	"	"	"	11	1,600	- 9	1,591	9	1,591	Glacial,sandy clay	" "	50	D.	Sufficient for house only. Other wells dug were alkaline.
33	NE.	30	"	"	"	"	13	1,650	- 8	1,642	8	1,642	Glacial,sand gravel	" "	48	S.	Not a good supply.
34	SE.	30	"	"	"	"	15	1,650	- 11	1,639	7	1,643	Glacial,sand gravel	" " sulphur	46	S.	Sufficient supply. Use similar well for house Several dry holes dug.
35	NW.	30	"	"	"	"	8	1,650	- 6	1,644	6	1,644	Glacial,sand gravel	Hard,clear	46	D. S.	Sufficient for local needs.
36	NW.	31	"	"	"	"	18	1,645	- 16	1,629	16	1,629	Glacial,gravel	" " alkaline	46	D. S.	Sufficient in years of normal rainfall.
37	SE.	32	"	"	"	"	14	1,610	- 7	1,603	7	1,603	Glacial,sand gravel	Hard,clear	48	D. S.	Very good supply.
38	SW.	34	"	"	"	"	9	1,610	- 5	1,605	5	1,605	Glacial,gravel	" "	..	D. S.	Sufficient for local needs.
39	SE.	36	"	"	"	"	10	1,603	- 7	1,596	7	1,596	Glacial,gravel	Soft, "	48	D. S.	Sufficient for local needs.
1	NW.	1	2	30	1	Sand point	14	1,550	- 14	1,536	14	1,536	Glacial,sand	Hard,clear		D. S.	Sufficient for local needs.
2	SE.	2	"	"	"	"	10	1,560	- 8	1,552	10	1,550	Glacial,sand	" "		D. S.	Constant supply. Use flowing spring by creek.
3	NW.	3	"	"	"	"	8	1,560	- 8	1,552	8	1,552	Glacial,sand	" "	54	D.	Sufficient for house use.
4	NE.	4	"	"	"	Drilled	103	1,600	- 18	1,582	103	1,497	Glacial,sand	" "		N.	Abundant water for 5 years, then.
5	SE.	6	"	"	"	Dug	18	1,550	- 14	1,536	15	1,535	Glacial,gravel	" "			well went dry. Good supply. Not used at present.
6	NE.	10	"	"	"	"	12	1,530	- 11	1,519	11	1,519	Glacial,gravel	" "		D.	Was dry in 1933, 1934. Fair supply in 1935.
7	SE.	10	"	"	"	"	7	1,580	- 5	1,575	7	1,573	Glacial,sand	" milky		D. S.	Abundant supply, water comes in quickly.
8	NE.	11	"	"	"	"	14	1,565	- 11	1,554	11	1,554	Glacial,gravel	" clear		D. S.	Will water 300 head of stock.
9	NE.	12	"	"	"	Drilled	400	1,575					Sand at base of blue clay.				Yielded 6 bbls. per day and then went dry.
10	SE.	12	"	"	"	Dug	15	1,550	- 14	1,536	14	1,536	Glacial,gravel	Hard,clear		D. S.	Sufficient for local needs.
11	NW.	12	"	"	"	"	12	1,550	- 9	1,541	9	1,541	Glacial,gravel	" "	48	D. S.	Not sufficient supply in winter.
12	SE.	14	"	"	"	"	12	1,585	- 9	1,576	9	1,576	Glacial,gravel	" "	50	D. S.	Dry in 1933, 1934. Abundant water in 1935.
13	SW.	14	"	"	"	"	14	1,540	- 12	1,528	12	1,528	Glacial,sand	" "		D. S.	Constant supply.
14	NW.	16	"	"	"	"	20	1,600	- 15	1,585	15	1,585	Glacial,sandy clay	" "		D. S.	Small 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 ARGYLE NO. 1

B 4-4
1860—10,000

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in°F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
15	NE.	18	2	30	1	Dug	12	1,585	- 4	1,581	8	1,577	Glacial, gravel	Hard, clear	50	D. S.	Fair supply.
16	NW.	20	"	"	"	"	20	1,600	- 12	1,588	12	1,588	" "	" "	48	D. S.	Sufficient for local needs.
17	SE.	20	"	"	"	"	40	1,600	- 4	1,596	4	1,596	" "	" "		D. S.	36' reservoir in blue clay. Use it at times for stock, and also well on road allowance.
18	NW.	21	"	"	"	"	12	1,600	- 7	1,593	7	1,593	" sand, gravel	" "	48	S.	Sufficient for local needs. Some dry holes dug, use 2 seepage wells.
19	NE.	22	"	"	"	Drilled	250	1,610			250	1,360	Sand, gravel, above bedrock	" "		D. S.	Abundant supply.
20	NW.	24	"	"	"	Dug											Dry hole.
21	NE.	26	"	"	"	"								" "			No information.
22	SW.	27	"	"	"	"								" "			No information.
23	NW.	28	"	"	"	Drilled	555	1,610	- 80	1,530	390	1,220	Ravenscrag Dark shale	Soft, salty clear		S.	Abundant supply.
24	NW.	29	"	"	"	Dug	16	1,600	- 13	1,587	13	1,587	Glacial, sand	Hard, clear	55	D. S.	Fair supply, several dry holes dug.
25	NW.	30	"	"	"	"	20	1,590	- 18	1,572	18	1,572	Glacial, clay	Hard, clear		D.	Not a good supply.
26	NE.	31	"	"	"	"	14	1,610	- 5	1,605	10	1,600	Glacial, gravel	" "	45	D. S.	An abundant supply.
27	SW.	32	"	"	"	Sand point	4	1,600	- 4	1,596	4	1,596	Glacial, sand	" "	45	D. S.	Sufficient for local needs.
28	NW.	33	"	"	"	"	10	1,609	- 9	1,600	9	1,600	" "	" "		D. S. M.	Several such wells supply town of Gainsborough
29	SW.	34	"	"	"	Drilled	340	1,609	+ 20	1,629	320	1,289	" gravel	" iron greenish		D. S.	Excellent supply. Flows.
1	SE.	2	2	31	1	Dug	15	1,610	- 8	1,602	10	1,600	Glacial, gravel, sand	Hard, clear	45	D. S.	Waters 130 head of stock.
2	NW.	2	"	"	"	"	9	1,610	- 6	1,604	9	1,601	" "	" "	50	D. S.	10 bbls. per hour.
3	SE.	3	"	"	"	"	8	1,608	- 4	1,604	4	1,604	" "	" "	46	D. S.	Constant supply.
4	NE.	3	"	"	"	"	14	1,625	- 9	1,616	12	1,613	"	" "	48	D. S.	Sufficient for local needs. Use similar well.
5	NW.	3	"	"	"	"	8	1,615	- 3	1,612	5	1,610	" gravel	" alkaline	52	S.	Waters 30 head of stock.
6	NE.	4	"	"	"	"	8	1,630	- 6	1,624	6	1,624	" sand	Soft, clear	46	D. S.	12 bbls. a hour.
7	S..	5	"	"	"	"	10	1,640	- 5	1,635	4	1,636	" " gravel	Hard, "	48	D.	3 bbls. day. Dug some dry holes. Uses similar well for stock.
8	S..	6	"	"	"	"	12	1,645	- 8	1,637	8	1,637	Glacial, gravel	" "	46	D. S.	House use and 30 head stock.
9	SW.	11	"	"	"	Sand point	19	1,620					" gravel	" "	45	D.	Small supply, drilled 340ft. dry holes. 20 seepage wells, only small supply.
10	NW.	12	"	"	"	Dug	10	1,620	- 10	1,610	13	1,607	" sand	" "	46	D. S.	Sufficient for 60-70 head stock.
11	SE.	14	"	"	"	Drilled	273	1,640	+ 3	1,643	273	1,367	Blue sand at base of glacial	" brownish	45	D. S.	Flows ¾" stream.

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 ARGYLE NO.1

B 4-4
R. 7526

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE: Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED: Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
12	NE.	14	2	31	1	Drilled	320	1,644	+ 3	1,647	320	1,324	Blue sand at base of glacial.	Hard, brownish iron	45	D. S.	Small flow, blocked in 1935.
13	NW.	14	"	"	"	"	275	1,645	+ 3	1,648	270	1,375	Blue sand at base of glacial.	Hard, " iron	45	D. S.	Flows 1½inch stream.
14	NE.	16	"	"	"	Dug	25	1,645	- 8	1,637	8	1,637	Glacial, sandy, clay	Hard, clear	48	D. S.	Poor supply. Uses 12 foot well. 36 head of st
15	NW.	22	"	"	"	Drilled	285	1,655	+ 3	1,658	281	1,374	Blue sand at base of glacial.	" "	45	D. S.	Drilled to 515. Some water at 350ft. Flows 5bbls. a hour. Combustible gas flow.
16	NW.	22	"	"	"	Dug	14	1,653	- 10	1,643	10	1,643	Sandy clay,	" "	45	D. S.	Waters 40 head of stock.
17	SE.	25	"	"	"	Dug	10	1,615	- 5	1,610	6	1,609	Glacial, sand	" "	50	. S.	Fair supply.
18	SW.	25	"	"	"	Drilled	340	1,630	+ 3	1,633	340	1,290	?	" brownish		D. S.	2 bbls. a hour. Flows.
19	SW.	25	"	"	"	Dug	10	1,615	- 3	1,612	6	1,609	Glacial, sand	" clear	50	D. S.	Sufficient in 1935.
20	SE.	27	"	"	"	Drilled	239	1,645			239	1,406	Sand above bed-rock,	" "		D. S.	Flowing well.
21	SE.	28	"	"	"	"	319	1,650	+ 3	1,653	315	1,335	Glacial, blue sand	" "	45	D. S.	Waters 100 head of stock. Flowing well,
22	NE.	28	"	"	"	"	239?	1,655	+ 3	1,658	239	1,416	Glacial, fine sand	" iron, brownish	45	D. S.	12 bbls. a day flows. Somo gas flow.
23		30	"	"	"	"	251										Flowing well.
24	SW.	31	"	"	"	"	252	1,667	+ 30	1,697	252	1,415	Glacial, fine sand	Hard, iron	46	D. S.	Flows ¾" stream.
25	NW.	31	"	"	"	"	251	1,679	+ 50	1,729	248	1,431	Ravenscrag, sand	Hard, brownish iron	45	D. S. M.	Flowing well. Supplies town of Carievale.
26	NW.	32	"	"	"	"	293	1,670	+ 60	1,730	292	1,378	Glacial, sand, gravel	Hard, iron, yellowish	45	D. S.	Flows 60 bbls. a hour. Some gas.
27	SW.	32	"	"	"	"	463	1,680	?	?	460	1,220	Ravenscrag, sandy shale	Soft, salty	5	D. S.	Flowing well.
28	SE.	32	"	"	"	"	260	1,680	?	?	252	1,428	Gravel above bedrock	Hard		D. S.	" "
29	NE.	33	"	"	"	"	463	1,660	+ 12	1,672	460	1,200	Ravenscrag, sandy shale	Soft, salty, clear	45	D. S.	" "
30	NE.	34	"	"	"	Dug	14	1,653	- 4	1,649	8	1,645	Glacial, sand	Hard, clear	50	D. S.	Sufficient for local needs.
31	NE.	35	"	"	"	Dug	10	1,635	- 7	1,628	10	1,625	Glacial, sand	" "	43	D. S. I.	Sufficient supply.
32	NE.	36	"	"	"	Drilled	360	1,625	+ 12	1,637	356	1,269	Ravenscrag, sandy shale	" salty	46	S.	24 bbls. a day for 6 years, then stopped. Gas flow stopped before water.#
1	SW.	2	3	30	1	Sand point	12	1,605	- 10	1,595	12	1,593	Glacial, gravel	Hard, clear	47	D. S.	Pump steadily.
2	NW.	2	"	"	"	"	8	1,605	- 6	1,599	6	1,599	" "	" "	45	D. S. I.	Waters 100 head of stock.
3	S½.	3	"	"	"	"	12	1,609	- 6	1,603	10	1,599	" sand	" "	46	D. S. I.	At least 12 similar wells in town of Gainsborough.
4	NW.	3	"	"	"	Dug	12	1,625	- 8	1,617	8	1,617	" gravel	" "	46	D. S. M	
5	SE.	3	"	"	"	Dug	13	1,645	- 10	1,635	10	1,635	" "	" "		D. S.	Waters " " " ".

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 ARGYLE NO.1

B 4-4
1860—10,000

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
6	SE.	4	3	30	1	Drilled	395	1,625	+ 5	1,630	345	1,280	Ravenscrag,sand	Hard,salty	50	D. S.	Kills plants. Flows 1 pail a minute.Many dry holes dug.
7	NE.	5	"	"	"	Dug	9	1,645	- 5	1,640	9	1,636	Glacial,sand	" clear	47	D. S.	Waters 60 head of stock.
8		5	"	"	"	Drilled	289	1,650			285	1,365	" "	Soft,		D. S.	Flows.
9		5	"	"	"	"	301	1,650			301	1,349	Ravenscrag,sandy shale	Hard,		D. S.	Flows.
10	SW.	6	"	"	"	Dug	24	1,620	- 6	1,614	6	1,614	Glacial,clay	Hard, alkaline	40	S.	3 pails a day during drought.
11		7	"	"	"	Drilled	312	1,650			300	1,350	Ravenscrag,sand	Soft,		D. S.	Flows.
12	SW.	8	"	"	"	Dug	8	1,655	- 6	1,649	8	1,647	Glacial,gravel	Hard,clear	46	D. S.	Waters 50 head of stock.
13	SE.	12	"	"	"	Dug	16	1,625	- 12	1,613	14	1,611	Glacial,sand	" "	46	D. I.	Hard water for stock.Alkaline water in 3 wells. Sufficient for house use only.
14	SE.	13	"	"	"	Dug	15	1,630	- 10	1,620	15	1,615	" "	" "	46	D. I.	Waters 30 head of stock.
15	NE.	14	"	"	"	Dug	11	1,620	- 7	1,613	8	1,612	" gravel	" "	47	D. S.	Waters 15 head of stock. 5 dry holes dug.
16	SE.	14	"	"	"	Dug	18	1,620	- 7	1,613	8	1,612	" sand	" alkaline,clear	46	D. S.	Waters 10 head of stock.Good well in pasture for stock.
17	SE.	15	"	"	"	Dug	15	1,625	- 5	1,620	4	1,621	" gravel	Soft,clear	48	S.	Not sufficient. Hauls water for house and stock. Dug 10 dry holes.
18	SW.	16	"	"	"	Sand point	12	1,625	- 12	1,613	12	1,613	" "	Hard,clear	47	D. I.	Sufficient. Never been dry.
19	SE.	16	"	"	"	Dug	35	1,630	- 5	1,625	?	?	?	" alkaline		S.	Sufficient for 30 head of stock.Hauls drinking water.
20	NE.	18	"	"	"	Dug	15	1,650	- 8	1,642	9	1,641	Glacial,sand	Soft,clear	46	D. S. I.	Waters 25 head of stock.
21	SE.	19	"	"	"	Dug	12	1,645	- 6	1,639	9	1,636	" gravel	Hard "		D. S.	Small, constant supply.
22	NW.	19	"	"	"	Dug	4	1,645	0	1,645	4	1,641	" "	" "	45	D. S.	Will water 100head of stock.
23	NE.	20	"	"	"	Dug	5	1,655	- 3	1,652	5	1,650	" " sand	" "	45	D. S.	Constant and abundant supply.
24	SW.	20	"	"	"	Dug	10	1,640	- 6	1,634	6	1,634	Glacial,gravel	" "	45	D. S.	Abundant supply for past 25 years.
25	NW.	21	"	"	"	Dug	12	1,650	8	1,642	8	1,642	" "	" alkaline	50	D. S.	Small supply.Hauls water for stock,20 dry holes dug.
26	NE.	22	"	"	"	Drilled	281	1,625	+ 10	1,635	280	1,345	Gravel,above bedrock	Hard,salty, cloudy	49	S.	Dry now,sand plugged casings. Use 10ft. well for stock.
27	NW.	24	"	"	"	Dug	8	1,620	- 5	1,615	7	1,613	Glacial,gravel	Hard,clear	47	S.	Waters 30 head of stock.
28	SW.	26	"	"	"	Dug	15	1,625	- 9	1,616	9	1,616	" "	" "	48	S.	Waters 45 head of stock. Unpleasant taste.
29	SE.	27	"	"	"	Dug	14	1,625	- 11	1,614	13	1,612	" "	" "		D. S.	Waters 60 head of stock.
30	NE.	30	"	"	"	Dug	14	1,650	- 8	1,642	8	1,642	" "	" "	45	D. S. I.	Waters 40 head of stock.
31	NW.	34	"	"	"	Dug	14	1,660	- 9	1,651	14	1,646	" "	" "	46	D. S.	Waters 6 head of stock. Only small pockets of gravel.
32	NE.	34	"	"	"	Dug	12	1,645	- 9	1,636	9	1,636	" "	" "		D. S. I.	Sufficient for local needs. Uses 11 ft. well, in sand. Waters 100 head of 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 ARGYLE NO.1

B 4-4
1860—10,000

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in°F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
33	SE.	36	3	30	1	Dug	12	1,630	- 10	1,620	12	1,618	Glacial,gravel	Hard,clear	46	S..	Waters 20 head of stock.
1		1	3	31	1	Drilled	420	1,650	- 40	1,610			Bedrock ?	Hard			
2		1	"	"	"	"	520	1,650					"				Dry hole.
3	NE.	1	"	"	"	Dug	14	1,652	- 6	1,646	10	1,642	Glacial,sand	Hard,clear	46	D. S.	Not used at present. Waters 10 head of stock.
4	SE.	2	"	"	"	"	10	1,685					" "	" "	50	D. S.	Fair supply.
5	SE.	2	"	"	"	"	8	1,650	- 4	1,646	7	1,643	" gravel	" "	45	D. S.	Waters 22 head of stock.
6	NE.	2	"	"	"	"	9	1,658	- 6	1,652	8	1,650	" sand	" "	50	D. S.	Waters 30 head of stock.
7	NE.	2	"	"	"	"	10	1,660	- 5	1,655	5	1,655	" gravel	" "	51	D. S.	Sufficient for local needs.
8	SW.	3	"	"	"	"	14	1,665	- 9	1,656	9	1,656	" "	" "	46	D. S.	Sufficient for local needs. Water comes from NW.
9	SW.	4	"	"	"	"	15	1,679	- 5	1,674	5	1,674	"	" "		D. S.	Sufficient for local needs.
10	NE.	5	"	"	"	"	12	1,675	- 6	1,669	8	1,667	" sand	" "	46	D. S.	Sufficient supply with 2 othor similar wells.
11	SW.	6	"	"	"	"	20	1,685	- 15	1,670			" clay	" "		D.	Sufficient for domestic use only.
12	SE.	7	"	"	"	Drilled	255	1,680	+ 20	1,700	255	1,425	Gravel above bedrock	" "	44	D. S.	Flows. Flow decreasing for last 18 years.
13		8	"	"	"	"	270	1,680			250	1,430	Sand, gravel above bedrock			D. S.	Flows.
14	NE.	8	"	"	"	Dug	12	1,680	- 6	1,674	11	1,669	Glacial, sand	" clear	46	D. S.	Waters 70 head of stock.
15	SE.	9	"	"	"	"	12	1,670	- 3	1,667	8	1,662	" "	" "	50	D. S.	Waters 7 head of stock. Good supply west of ravine.
16	SW.	9	"	"	"	"	12	1,680	- 8	1,672	8	1,672	" gravel	" "	45	D. S.	Sufficient for local needs.
17	NE.	11	"	"	"	"	11	1,665	- 8	1,657	9	1,656	" "	" "	50	D. S.	Waters 35 head of stock.
18	NW.	16	"	"	"	"	12	1,676	- 8	1,668	9	1,667	" black sand	" "	50	S.	Waters 20 head of stock.
19	SE.	17	"	"	"	"	25	1,685					Glacial,gravel	" "		D. S.	Waters 20 head of stock.
20	SE.	18	"	"	"	"	15	1,690	- 10	1,680	15	1,675	" "	" "		D. S. I.	Water comes from N.W.
21	SW.	18	"	"	"	Drilled	303	1,700	+ 20	1,720	298	1,402	Ravenscrag, sand stone	Soft, soda, clear	48	I. S.	Flows 72 bbls. a day. 306ft. dry hole 100ft. to east.
22	NW.	18	"	"	"	Dug	14	1,700	- 11	1,689	11	1,689	Glacial,sand	Hard,soda	45	D. S.	Poor supply.
23	SW.	20	"	"	"	Drilled	311	1,690					Ravenscrag?				Dry hole. 3 other dry holes drilled to depth of 438 feet.
24	NW.	20	"	"	"	"	530	1,685	-150	1,535			"	Hard, salty		S.	Decreased to ½ bbl. a day. 7 dry holes drilled.
25	SW.	21	"	"	"	Dug	12	1,685	- 7	1,678	7	1,678	Glacial, gravel	" clear	48	D. S.	Waters 50 head of stock.
26	SE.	22	"	"	"	"	10	1,675	- 1	1,674	9	1,666	" "	" "	45	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 ARGYLE NO.1

B 4-4
1860—10,000

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
27	SW.	23	3	31	1	Dug	14	1,650	- 10	1,640	10	1,640	Glacial, gravel	Hard, reddish	40	D. S.	Dry during drought.
28	NW.	23	"	"	"	"	13	1,675	- 3	1,672	10	1,665	" "	" clear		D. S.	Excellent supply.
29	NW.	26	"	"	"	"	8	1,665	- 6	1,659	6	1,659	" sand	" "	50	D. S.	Poor supply. Waters 8 head of stock. 6ft. well waters 100 head of stock.
30	NE.	29	"	"	"	"	10	1,685	- 5	1,680	5	1,680	" "	" "	46	D. S.	Waters 35 head of stock. Water came in from N.
31	SW.	29	"	"	"	Drilled							Ravenscrag	" salty		D. S.	Flowing.
32	SW.	30	"	"	"	Dug	14	1,700	- 9	1,691	9	1,691	Glacial, sand	" clear		D. S.	Sufficient for local needs.
33	NE.	30	"	"	"	"	32	1,700	- 29	1,671	29	1,671	" "	" "	45	D. S.	Poor supply. Rises dugout for stock.
34	NE.	31	"	"	"	"	13	1,700					" gravel	" "		D.	
35	SW.	32	"	"	"	"	10	1,690	- 17	1,673	7	1,683	" "	" "	45	D. S.	Poor supply. Also 2 similar wells.
36	NW.	32	"	"	"	"	7	1,700	- 3	1,697	3	1,697	" "	" "	50	D. S.	Sufficient for local needs.
37	NW.	33	"	"	"	"	15	1,690	- 13	1,677	15	1,675	" "	" "	45	D. S.	Poor supply. Also use 2 similar wells.
38	SW.	34	"	"	"	"	20	1,680			10	1,670	" "	" "	45	D. S.	Sufficient for local needs.
39	SW.	34	"	"	"	"	15	1,685	- 10	1,675	10	1,675	" sand	" "	45	D. S.	Small supply.
40	SE.	36	"	"	"	"	12	1,655	- 7	1,648	7	1,648	" gravel	" "	46	D. S.	Sufficient for local needs.
41	NW.	36	"	"	"	"	10	1,660	- 6	1,654	6	1,654	" "	" "	45	D. S.	Waters 100 head of stock. Also use 2 similar wells.
42	NE.	36	"	"	"	"	12	1,630	- 7	1,623	11	1,619	" "	" "	51	D. S.	Waters 75 head of stock. Also use 2 similar 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.