CANADA
DEPARTMENT OF MINES

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BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF CHESTER No. 125 SASKATCHEWAN

BY

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

Water Supply Paper No. 71

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF CHESTER, NO. 125 SASKATCHEWAN

INTRODUCTION

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

Publication of Results

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

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

How to Use the Report

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

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

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

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

GLOSSARY OF TERMS USED

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 rest upon the Ravenscrag or older formations. The formation is 30 to 125 feet thick.

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

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

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

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

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

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

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Chester is an area of 324 square miles in the southeastern part of Saskatchewan. It consists of nine townships, described as townships 13, 14 and 15, ranges 7, 8, and 9, W. 2nd mer. The centre of the municipality is situated approximately 54 miles northeast of the city of Weyburn. The towns of Glenavon and Windthorst lie within the borders of the municipality, and the village of Peebles is the junction point for two branches of the Canadian National railway and one branch of the Canadian Pacific railway.

The ground surface of the municipality is broken by two valleys occupied by Moose Mountain creek and an intermittent tributary called Wolf creek. Moose Mountain creek runs southeast across the southwestern corner of the municipality. The tributary runs south and joins the main stream in sec. 5, tp. 13, range 8. Stone lake is at their junction. Following the recession of the ice-sheet these two valleys acted as drainage channels for the water coming from the melting ice front, with the result that they are wide and deep and entirely out of proportion to their present small, intermittent streams. The flat valley of Moose Mountain creek is approximately $\frac{1}{4}$ mile wide and the banks, which are 75 to 100 feet high, rise abruptly to the plain level. Wolf Creek valley is deeply cut in the lower part of its course, but towards the northern part of the municipality the valley is shallow. Its bed is characterized by a series of marshes, and long, narrow creek and slough basins. The valleys are very stony, treeless, and uncultivated. These two valleys lie in glacial till. The remainder of the municipality, with the exception of three small areas covered by glacial outwash sands and gravels, is mantled by a moraine. The moraine topography is characterized by a series of knolls and undrained depressions, and the general elevation of the area is greater than in areas covered by glacial till. In this municipality the moraine-covered country is more thickly wooded with poplar, and its top soil is of a heavier loamy texture than the soil in the area covered by glacial till. Numerous springs are located in the valleys, the most notable being Duncan's spring in SE.$\frac{1}{4}$, sec. 28, tp. 15, range 9. Stone lake, and a few small lakes in the northern part of the municipality, are permanent bodies of water that are fed by springs.

The thickness of the glacial drift in this municipality varies between 200 and 300 feet. The elevation of bedrock, the Marine Shale series, is between 1,900 and 2,000 feet above sea-level. The glacial drift is composed largely of clays. Yellow clay, which is oxidized blue clay, is usually found beneath the top soil to depths of 10 to 35 feet. Blue clay extends from the yellow clay to the bedrock. Beds of sand and gravel may be found at any depth within the clay of the glacial drift.

Water-bearing Horizons in the Unconsolidated Deposits

The most general and widely tapped water-bearing horizon is formed by the sand or gravel beds in the glacial drift above the blue clay. Since the blue clay is found within 35 feet of the surface anywhere in the municipality, these sand beds are conveniently and cheaply tapped by hand dug wells. In township 15, range 7, however, the sand beds are not struck until 15 or 20 feet of blue clay has been penetrated. The occurrence of the sand and gravel beds is more widespread in the eastern part of the municipality than in the western part, with the result that well water conditions in general are better in the eastern townships than they are in the western townships. The water supply contained in the sand and gravel beds that overlie the blue clay, depends entirely on rainfall seepage and on the extent and thickness of the sand or gravel lens. The water is hard and slightly "alkaline", and is being used for domestic purposes as well as for stock. During the drought of 1930 to 1934 the majority of the farmers who depended on shallow wells for a water supply were extremely short of water for stock purposes. The farms in the three western townships were especially deficient in a water supply and many of the farmers have been forced to haul water continuously during drought years. Drilled wells, springs, and small permanent lakes have been the source of the water when the shallow wells became dry.

It is almost certain that water can be obtained anywhere in the municipality by drilling to a depth of at least 150 feet from the surface. There are records of many dry holes being dug or bored to a maximum depth of 125 feet, but very few of the holes that are deeper than 125 feet are dry. Numerous wells scattered throughout the municipality have obtained abundant quantities of water at depths of 100 to 300 feet, in the glacial drift. There are many bored wells that tap a sand or gravel aquifer 80 to 150 feet below the surface. It has generally been found that the water from these wells is hard and strongly "alkaline". It is not suitable for drinking because of its laxative effects, but it is suitable for stock. The supply is abundant and it is little affected by variations in rainfall. There is sufficient hydrostatic pressure to raise the water about half way up the well. The waters from these wells are suitable for stock, but are not considered suitable for domestic purposes or for irrigation on account of the high dissolved mineral salt content.

In drilling a well in this municipality it is recommended that it be drilled to a depth of at least 150 feet. The water obtained from this depth is hard and has an iron content, but it is not so highly mineralized with the laxative producing salts as the water from the 80- to 150-foot wells. The hydrostatic pressure will raise the water to a point 50 to 100 feet below the surface and the supply is abundant, and little affected by drought conditions. Apparently there is a fairly general water-bearing horizon located immediately above the bedrock Marine Shale series. Several wells were reported to have been drilled just to the top of the shale and at that point the water rose under great pressure. The water is not highly mineralized and it is being used successfully for domestic, irrigation, and stock purposes. If, however, a well is drilled into the shale, the water if found, will probably be very salty and unfit for farm requirements. It is, therefore, advised that drilling be confined to the glacial deposit, preferably in that part that lies between 150 feet from the ground surface and the bedrock. Perhaps the main difficulty that will be encountered in deep drilled wells is the problem of the fine sand of the aquifers plugging the screens.

In the small areas that are mantled by glacial outwash sands and gravels thick beds of sand and gravel occur beneath the top soil and extend to the blue clay. These sand beds act as large reservoirs for the storage of seepage water that may be conveniently tapped by sand-points. The water is hard and slightly mineralized, and is generally suitable for both stock and domestic use.

The undulating topography of the moraine-covered country presents numerous locations for the excavation of large, deep dugouts. In many districts in southern Saskatchewan these dugouts have proved very satisfactory as a means of collecting and storing a supply of water for stock. There are not many farmers in this district who have attempted this mode of securing water. Most of the farmers who excavate dugouts do not make them sufficiently deep; they should be at least 12 feet in depth. In order to reduce evaporation during the hot season to a minimum, it is advisable to make the dugouts deep and small, rather than shallow and large.

The towns of Windthorst and Glenavon derive their water supply from shallow wells, and Glenavon was very short of water during the years 1930 to 1935. Wells were bored in Windthorst, but the water was too highly mineralized for drinking purposes. Shallow well water is more readily located in Windthorst than in Glenavon.

Water-bearing Horizons in the Bedrock

Four wells in the municipality have been drilled to the bedrock of the Marine Shale series. The first well is 330 feet deep, located in SE.$\frac{1}{4}$, sec. 3, tp. 13, range 8. The well was drilled 6 feet into the shale, and, although the supply of water is abundant, its highly mineralized quality prohibits its use for any farm purposes.

The second well is 320 feet deep, and is in SE.$\frac{1}{4}$, sec.30, tp. 13, range 9. No information could be obtained as to the quantity of the water obtained, but it is very highly mineralized and the well is not in use.

The third well is in SW.$\frac{1}{4}$, sec. 11, tp. 14, range 8. The shale was encountered at a depth of 200 feet from the surface, and the shale was penetrated to a depth of 100 feet without striking a water-bearing horizon.

The fourth well is in NW.$\frac{1}{4}$, sec. 10, tp. 15, range 9. The shale was struck at a depth of 333 feet below the surface, but the drill did not penetrate the formation. The abundant quantity of water that is being supplied from this well is believed to be coming from a sand or gravel aquifer located immediately above the shale and not from the shale itself. The water from this well is not highly mineralized.

Of these four wells, one is a dry hole, two are delivering water that is unfit for any farm use, and the remaining well is believed to be deriving its water wholly from the glacial drift. Reports of wells drilled into the Marine Shale bedrock in other municipalities in this part of the province have been very unsatisfactory. Usually the result of drilling to the Marine Shale bedrock is a dry hole, and on the rare occasions when water has been obtained, the water is so highly mineralized with salts that it cannot be used for farm purposes.

Farmers and well drillers prospecting for water in this municipality are advised to confine their efforts to the glacial drift, and to refrain from drilling into the shale bedrock or "soapstone", as it is sometimes termed.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 13, Range 7

The township is almost entirely mantled with glacial moraine. A small area of glacial till occurs in the western parts of sections 6 and 7, and a deposit of glacial outwash sands and gravels occurs in sections 13 and 14. The moraine is part of the Moose Mountain terminal moraine. The ground surface in the southeast corner of the township rises rather abruptly from an elevation of 2,200 feet to 2,260 feet above sea-level. The ground surface of the central part of the township remains fairly constant at an approximate elevation of 2,200 feet and then it gradually rises to an elevation of 2,250 feet at the northwest corner. The ground surface is more undulating in the southern half of the township than in the northern half, and this condition results in the presence of many undrained depressions or sloughs. Two sloughs that cover an area of approximately 40 acres occur in sections 9 and 13. In years of average rainfall these depressions will hold 3 to 6 feet of water, but during the drought years 1930 to 1934 they were dry. The glacial drift in this township is 250 to 300 feet thick and is largely composed of blue clay. The blue clay is generally overlain by 20 to 30 feet of yellow clay, sand, gravel, and boulders. In some localities, as in sections 13 and 14 and in parts of sections 16, 17, 18, and 19, the yellow clay is usually absent and beds of sand and gravel form the uppermost 20 to 30 feet of glacial covering.

There are at least three possible water-bearing horizons that occur in the glacial drift of this township. The uppermost water-bearing horizon consists of beds of sand or gravel that occur within 30 feet of the surface. This sand and gravel is generally deposited in layers 1 to 5 feet thick, between the yellow and blue clay. The farmers do not experience great difficulty in striking sand or gravel aquifers above the blue clay, and in years of average rainfall the supply of water from this source is sufficient to meet their requirements. Periods of prolonged drought deplete the water to such an extent that usually only 10 to 15 head of stock can be watered at an individual well. The water is hard and does not contain an excessive amount of dissolved salts, so that shallow well water is generally suitable for drinking. Sand-points are used to advantage in the areas where thick beds of sand and gravel occur beneath the top soil.

The second water-bearing horizon consists of a bed of sand that is at least 6 feet thick. This aquifer lies within the blue clay at depths of 65 to 135 feet. The water is hard and contains iron. This water contains a high proportion of dissolved mineral solids whose laxative properties prevent its use as a drinking water for humans. The hydrostatic pressure will usually raise the water to a level 40 feet below the ground surface, and the drought of 1930 to 1934 has had no apparent effect on the supply. Since the supply of water is abundant and dependable, these wells are good sources of water for stock.

The third water-bearing horizon has been located by three drilled wells in the northern part of the township, at a depth of approximately 200 feet from the surface. One of these wells in NE.$\frac{1}{4}$, section 26, has been rendered useless by fine sand clogging the casings. In the other two wells, the hydrostatic pressure raises the water to levels of 60 and 100 feet below the surface, and rainfall conditions have very little effect on the abundant supply of water obtained. Although the water is mineralized it is being used for domestic, stock, and irrigation purposes without any injurious effects.

The water situation of this township did not become critical during the drought. Small quantities of water can be obtained at shallow depths and farmers who do not have deep wells usually have more than one shallow well, and by using them all they can usually obtain sufficient water to meet all their requirements. It is believed that by drilling to depths in excess of 100 feet a permanent and abundant supply of mineralized water that is suitable for stock could be obtained. The undulating nature of the ground surface offers numerous locations for the excavation of deep dugouts.

Township 13, Range 8

Stone lake, located in SW.$\frac{1}{4}$, section 5, is a small, permanent, spring-fed body of water approximately 8 feet deep. Moose Mountain creek flows into it from the northwest and Wolf creek, an intermittent stream, flows into it from the north. The valleys through which these two streams flow are very wide and deep in proportion to the size of the present streams. A marsh, having an extent of approximately 130 acres, is located in Wolf Creek valley in section 26. In years of average rainfall this marsh contains 2 or 3 feet of water, but it has been dry from 1929 to 1935. The slightly undulating plain is devoid of tree growth except in the northwestern part. The banks and floors of the valleys are neither wooded nor cultivated to any extent, and they are quite stony.

A small part of the Moose Mountain moraine occurs in the northeastern part of the township and a small area of glacial outwash sands and gravels occurs in the western part of section 31. The remainder of the township is mantled with glacial till. A well drilled in SE.$\frac{1}{4}$, section 3, has definitely established the contact between the glacial drift and the bedrock of the Marine Shale series. The thickness of the drift at this point is 324 feet.

Yellow clay, 10 to 30 feet thick, usually underlies the top soil and is separated from the blue clay by a 2-foot layer of sand. The blue clay extends to the bedrock and beds of sand or gravel may be encountered at any depth in the blue clay deposit.

Most of the wells in this township have been dug to the sand aquifer that lies at the contact of the yellow clay and the underlying blue clay. The water supply yielded by these wells fluctuates greatly with the amount of precipitation, with the result that at least 50 per cent of the farmers possessing such wells were forced to tank water during the drought period of 1930 to 1934. There are approximately ten shallow wells, 12 to 30 feet deep, scattered throughout the township which deliver a large supply of water. They tap large pockets of sand and gravel that act as storage basins for seepage water and hence the supply of water is not so variable as it is in the majority of the remaining shallow wells that tap only small lenses of sand. Wells located in SE.$\frac{1}{4}$, section 1, and in NE.$\frac{1}{4}$, section 20, are good examples of shallow wells that yield a fairly abundant supply of water. Well water that is derived from sand aquifers lying above the blue clay is hard and not excessively mineralized, and is being used for domestic purposes as well as for stock.

Although several dry holes have been sunk to a depth of 120 feet, two farmers have obtained abundant water supplies in wells 66 feet and 124 feet deep. These wells have tapped sand pockets that lie within the blue clay. The water is hard and highly mineralized, and it rises under pressure to points 40 to 50 feet below the surface. The supply is not generally affected by rainfall conditions.

Two drilled wells, located in NE.$\frac{1}{4}$, section 16, and SW.$\frac{1}{4}$, section 36, 200 feet and 232 feet deep, have struck a sand aquifer that apparently is located at the contact between the glacial drift and the bedrock Marine Shale series. The water is hard and not highly mineralized, and the hydrostatic pressure raises the water to points 100 and 62 feet, respectively, below the surface. The supply is so great that this level cannot be lowered by continuous pumping. Since the quality of the water is good and the quantity large, these two wells are considered to be the best in the township. A third drilled well located in SE.$\frac{1}{4}$, section 3, penetrated the shale for a depth of 8 feet. This well was drilled in 1920 and for six years it delivered an abundant supply of soft, salty water. In 1924 the water became so highly mineralized it could not be used even for stock.

There are then at least three different types of water that have been obtained by drilling methods in this township. Hard, highly mineralized water, suitable for stock, is obtained from sand pockets that lie within the blue clay. Water that is not so highly mineralized, and which is suitable for general use, is obtained from a sand aquifer located at the contact between the glacial drift and the bedrock, and soft, salty water has been located within the upper 10 feet of the bedrock. Drilling into the Marine Shale bedrock is not recommended since water is seldom found in this series, and on the rare occasions when it was found it was too salty to be used for general farm purposes.

Township 13, Range 9

Moose Mountain creek occupies a wide, deep valley that runs in a southeast direction across the township. The flat valley floor is approximately $\frac{1}{4}$ to $\frac{1}{2}$ mile wide, and 80 to 100 feet deep, and the banks of the valley rise very abruptly to the plain level. In years of average rainfall the creek flows steadily and it is about 10 feet wide and 4 feet or less deep. During the drought of 1930 to 1934, however, the flow of the creek has been intermittent and small open patches of water occur only where there is a spring. An intermittent tributary of Moose Mountain creek, located 2 miles to the southwest of Moose Mountain valley, flows through a gully 15 feet deep, and joins Moose Mountain creek in township 12, range 9.

The northeastern half of the township is mantled with boulder clay or glacial till, and the ground surface of this area is slightly undulating. The southwestern half of the township is covered by moraine, the ground surface of which is rough and hilly. Patches of small poplar bush occur throughout the township, but Moose Mountain valley is bare and uncultivated.

The depth of the glacial drift is not accurately known, but it is probable that it does not exceed 250 feet. Yellow clay, approximately 20 feet thick, usually underlies the top soil and is followed by blue clay that extends to the bedrock of the Marine Shale series. In the moraine-covered area pockets of sand and gravel, 10 to 20 feet thick, in some places overlie the blue clay, but, as a rule, the occurrence of sand and gravel between the top soil and the blue clay is very rare in this township. As a result, shallow well digging has not proved successful in securing a satisfactory supply of water. There are not more than four shallow wells in the township that are dependable, and these are located in the moraine-covered country where pockets of sand and gravel are most apt to occur. The remainder of the shallow wells are dug to small deposits of sand and gravel that depend entirely on rainfall seepage for their supply. Consequently, the drought of 1930 to 1934 resulted in an extreme shortage of well water and many farmers were forced to haul water during the winter and summer in order to meet their stock requirements.

Abundant supplies of water are only assured by drilling to depths in excess of 150 feet. Five wells are located in the eastern part of the township that strike a sand or gravel aquifer at an approximate depth of 175 feet from the surface. The four deepest wells yield hard water that contains iron. The hydrostatic pressure raises the water to a level 20 to 70 feet below the surface, and 100 head of stock can be watered at an individual well. These four wells apparently are deriving their water from the same aquifer and it is probable that this aquifer lies very near the contact of the glacial deposit and the bedrock. The fifth well is 145 feet deep and the water delivered is hard and highly mineralized, and not suitable for drinking. The hydrostatic pressure is not so great as it is in the other four wells, and the fine sand plugs the pipes. The difference in quality and the pressure of the water in this well as compared with the four deeper wells, suggest that a different aquifer has been tapped.

A well 320 feet deep was drilled in section 30. The water could not be used on account of its quality. Although no information could be obtained as to the location of the water-bearing horizon, it is believed that the aquifer lies in the Marine Shale series. Numerous dry holes have been bored in the drift to a maximum depth of 140 feet. It appears probable that abundant supplies of suitable water can only be assured by drilling in the glacial drift in this township to a depth greater than 150 feet. Water can probably be obtained from the Marine Shale bedrock, but its poor quality will prevent its use for any farm purpose.

Springs issuing from the gravel bed of Moose Mountain Creek valley are the source from which many farmers, who do not own producing drilled wells, have been hauling water during drought periods. The undulating nature of the ground surface provides many suitable locations for the excavation of deep dugouts.

Township 14, Range 7

The entire township is covered by moraine. The ground surface is undulating and the elevation decreases gradually from 2,265 feet at the western boundary to approximately 2,210 feet at the eastern boundary. Numerous undrained depressions occur throughout the township, the largest being a slough that covers 40 to 50 acres in NE.$\frac{1}{4}$, section 21. Normally, this slough contains 6 feet of water, but from 1929 to 1934 it was dry. The growth of poplar bush is quite heavy in this township, especially in the northern sections.

All wells in the township are in glacial drift and, therefore, no definite information is available as to the total thickness of this deposit. From data obtained from deeper wells in adjacent townships, it is probable that the bedrock lies 250 feet to 300 feet below the ground surface. The glacial drift is composed mainly of clay. Yellow clay usually underlies the top soil to a depth of 10 to 20 feet, and it in turn is underlain by blue clay which extends presumably to bedrock. Pockets and layers of sand and gravel occur within these clays.

There are three general water-bearing horizons in the glacial drift that have been tapped by wells in this township. The uppermost water-bearing horizon consists of pockets of sand or gravel that overlie the blue clay. Wells that tap these pockets are shallow and the supply of water derived from them is very unsatisfactory. The ground water contained in the sand or gravel is dependant on local rainfall seepage, with the result that periods of prolonged drought have a great effect on the supply of water from these shallow wells. The water is hard, slightly mineralized, and is being used for domestic purposes.

The second water-bearing horizon consists of a thick bed of coarse sand or gravel 100 to 150 feet below the surface, or at an elevation of approximately 2,100 feet. The majority of the drilled wells in the township tap this aquifer. The water rises under hydrostatic pressure to a maximum height of 50 feet below the surface, and the abundant supply is not affected to any great extent by drought conditions. The quality of the water is such that it can usually be used for domestic purposes as well as for stock. It is hard, and slightly mineralized. Individual wells can water 60 head of stock.

The third water-bearing horizon consists of a bed of fine sand or quicksand that is located at a depth of 200 to 250 feet below the surface. The quality of the water is similar to that obtained from the second water-bearing horizon, and the supply is just as abundant. The disadvantage of these wells is that the casings are liable to become clogged with fine sand, thus rendering the wells useless.

It is possible that a fourth water-bearing horizon exists at the contact of the glacial drift and the bedrock, although there are no wells in the township to confirm this assumption.

The village of Peebles has made four attempts to locate water at shallow depth, and holes have been made to a maximum depth of 50 feet without obtaining a supply. It is possible that the above-mentioned second water-bearing horizon can be tapped anywhere in the township by drilling operations. Financial reasons often prevent the use of drilling machines as a means of obtaining water. In such cases, the excavation of dugouts is advised rather than to attempt to secure a large supply of water by hand digging methods. If digging or testing by augers is undertaken in a search for water, efforts should be confined to the drift zone lying above the blue clay.

Township 14, Range 8

A gently sloping valley, approximately ½ mile wide, passes southward through the western part of this township. In sections 20 and 29, this valley contains a long, narrow lake that in years of average rainfall holds 6 feet of water. Wolf creek, a very small stream, flows intermittently through the valley. In the vicinity of the valley the ground surface is stony, exceedingly undulating, and broken. Eastward from the valley the ground surface gradually becomes less undulating as the elevation rises. Undrained depressions as large as 4 acres in extent are not uncommon, but, like the lake, they have been dry during the drought years 1930 to 1934. The northern 2 miles of the township is thickly bushed with poplar and scattered patches of poplar growth are found in the southern sections.

The eastern $2\frac{1}{2}$ miles to 3 miles of the township, and the extreme western part, are mantled by glacial moraine. These two moraine-covered areas are separated by a belt of glacial till approximately $2\frac{1}{2}$ miles in width, and it is through this area of glacial till that Wolf Creek valley passes.

The well data of the township show that there are at least four possible water-bearing horizons in the glacial drift. The uppermost water-bearing horizon is composed of gravel or sand that occur in isolated patches beneath the yellow clay. In Wolf Creek valley, and in its vicinity, gravel is sometimes found beneath a thin covering of soil without the occurrence of yellow clay. In both instances the water-bearing horizon is solely dependant upon local precipitation for its source of water. Therefore, the supply in shallow wells fluctuates with seasonal precipitation, and for this reason they are a poor type of well for stock use. Approximately twenty-two farmers in the township depend on shallow wells for their water supplies, so that the drought of 1930 to 1934 affected the water situation to a considerable extent. There is only one shallow well, located in the ravine in NW.$\frac{1}{4}$, section 16, that yields an abundant supply of water, and this well will water 100 head of stock at any time. During 1930 to 1934 the remaining shallow wells either became dry or the supply was depleted to such an extent that not more than 10 head of stock could be watered at an individual well.

In sections 2, 10, 11, 12, 14, and 15, there are seven bored wells that tap an aquifer within the blue clay, at a depth of 60 to 100 feet below the surface. The supply of water from these wells is quite variable. A 60-foot well in NE.$\frac{1}{4}$, section 15, yields an abundant supply of hard, mineralized water which is under pressure, whereas another 60-foot well in NE.$\frac{1}{4}$, section 2, yields only sufficient water for 20 head of stock. Rainfall conditions have little or no effect on the supply. The water has a laxative effect on humans who are not accustomed to its use. A drilled well in the NW.$\frac{1}{4}$, section 22, located a third water-bearing horizon at a depth of 175 feet. The water was hard and contained iron and magnesium. It rose under hydrostatic pressure to a level 35 feet below the surface before the fine sand particles that compose the aquifer plugged the sand screen and rendered the well useless.

One of the best wells in the township is located in SE.$\frac{1}{4}$, section 12. It is drilled to a gravel aquifer, 290 feet from the surface, and the water rises to a level 111 feet below the surface. The water is hard and contains iron, but is being used for domestic purposes as well as for stock. This well has never been pumped dry. It is believed that the aquifer lies very near the contact of the glacial deposit and the bedrock.

Several dry holes have been bored and drilled to a maximum depth of 300 feet, proving that the water-bearing horizons referred to above do not extend as continuous aquifers throughout the township. In this township abundant or satisfactory supplies of ground water can be obtained only in deep wells. The undulating ground surface gives rise to many ideal locations for dugouts and the excavation of these reservoirs is advised as an alternative to drilling or boring. In years of average rainfall this township has an abundance of surface water in sloughs and in Wolf Creek valley. Deep dugout excavation seems to be the most certain and least costly procedure for obtaining a permanent supply of water.

Township 14, Range 9

The valley of Moose Mountain creek cuts through the south-western corner of the township. Two large, deep coulées, one in section 4 and the other in section 7, act as drainage channels in freshet times, the water flowing southward into Moose Mountain creek. With the exceptions of sections 29 and 30, the ground surface over the entire township is undulating in character, especially in sections 4, 5, 6, 7, 18, and 19. A large, flat hay meadow is located in sections 29 and 30, and in wet seasons it becomes a marsh. Large, deep sloughs are of frequent occurrence and the township is sparsely wooded with poplar bush. Most of the northern part of the township is covered by moraine, and the remainder of the township is mantled by glacial till or boulder clay. The difference between these two forms of glacial deposits is in the manner of their deposition, and the material that composes them is essentially the same. Yellow clay, 10 to 30 feet thick, usually underlies the top soil and is followed by a small layer of gravel or sand. This is underlain in turn by blue clay which invariably is located within 30 feet of the surface. It is probable that this thick blue clay layer extends to the bedrock formation. A bed of fine sand, 10 feet thick, underlain by 10 feet of gravel, occurs in places in the blue clay at a depth of 150 feet below the surface. This bed of sand and gravel has been tapped by two wells, one in SE.$\frac{1}{4}$, section 4, and the other in the NW.$\frac{1}{4}$, section 22. A second sand bed of unknown thickness was struck in a well drilled in NW.$\frac{1}{4}$, section 25, at a depth of 233 feet. The Marine Shale bedrock is believed to lie approximately 300 feet below the surface. Except for the three drilled wells mentioned above, the remainder of the producing wells in the township are less than 35 feet in depth, and they have been dug or bored only to the first water-bearing horizon which usually underlies the yellow clay. There are only four farmers in the township who derive a dependable and abundant supply of water from this source, due to the fact that weather conditions affect the supply of water to a great extent. The four shallow dependable wells are located in SE.$\frac{1}{4}$, section 1, NE.$\frac{1}{4}$, section 2, SE.$\frac{1}{4}$, section 26, and SE.$\frac{1}{4}$, section 31. The water from the shallow wells is hard and slightly mineralized and is suitable for all farm purposes. Shallow well water conditions in this township are very similar to those in township 14, range 8. Prolonged drought periods have caused an extreme shortage of water in these townships, because the majority of the farmers have shallow wells and do not possess dugouts.

The three drilled wells produce very hard water that contains iron. The water in the well located in NW.$\frac{1}{4}$, section 22, does not rise above the aquifer and the supply, though constant, is not abundant. The other two drilled wells have never been pumped dry. If drilling operations are contemplated farmers should be prepared to drill to a depth in excess of 150 feet. Drilling to depths over 300 feet is not advisable since the Marine Shale bedrock, which seldom contains water-bearing horizons, lies approximately at that depth. The Marine Shale bedrock is sometimes termed "soapstone" and it is often confused with blue clay. Farmers who cannot finance drilling operations are advised to excavate deep dugouts, since the topography of the township is very favourable for this means of collecting and conserving surface water.

Township 15, Range 7

With the exception of the north-central sections, which are mantled with glacial till, this township is covered by part of the Moose Mountain glacial moraine. The elevation of the ground surface decreases from 2,260 feet at the southwestern corner to an elevation of 2,170 feet at the northeastern corner of the township. The topography is typical of moraine country, knolls and depressions being common, and the township is densely wooded with poplar. Three small permanent bodies of water are located in sections 26 and 35, the main source of this water being springs. Farmers in the northern parts of the township who have been short of water during the drought of 1930 to 1934 used these small lakes as a source of water for stock.

The small beds of sand or gravel that usually occur separating the yellow clay from the blue clay in deposits of both glacial till and moraine, are practically non-existent in this township. The uppermost water-bearing horizon of sand or gravel is not generally found until a depth of 30 to 50 feet is reached. When a well is made the following deposits will probably be penetrated; 16 feet of yellow clay, 25 feet of blue clay, and then 2 to 4 feet of gravel or sand. The water obtained is hard and "alkaline", but farmers use it for domestic purposes as well as for stock. It is under little or no pressure and prolonged drought periods affect the supply, although 25 head of stock can usually be watered at an individual well. The quantity of water from different wells of the same depth, and which apparently strike the same aquifer, is variable. For instance, a 45-foot well in NE.$\frac{1}{4}$, section 28, yields an abundant supply of water at any time, whereas another 45-foot well in SW.$\frac{1}{4}$, section 16, yields only a small supply of water.

A second water-bearing sand horizon was tapped by a well in SE.$\frac{1}{4}$, section 12, at a depth of 80 feet. The water does not rise above the top of the aquifer and is hard, and highly mineralized. It is similar to water from the 45-foot wells, but weather conditions have little effect on the supply, which is sufficient for 25 head of stock throughout the year.

A well 145 feet deep was drilled in NW.$\frac{1}{4}$, section 4, and delivers a water of better quality than that derived from the shallower wells. It is hard and contains iron, but the dissolved mineral solids content is relatively low. The supply is abundant and almost totally unaffected by weather conditions.

Water can generally be found at depths of less than 50 feet in this township, but the supply is not always sufficient for the farmers' needs, especially in dry years. Dugouts could be made that would act as reserve supplies for the wells, when drilling operations cannot be financed. It is very probable that drilling to a depth in excess of 140 feet anywhere in the township will result in a permanent supply of good water.

There is a spring near the lake in SW.$\frac{1}{4}$, section 35, which supplies an abundant and constant supply of good drinking water.

Township 15, Range 8

The elevation of the township decreases in a northerly direction from 2,250 feet to an approximate elevation of 2,200 feet. A strip of low-lying flat country occurs in sections 1, 11, 15, 22, 27, and 34, and another in sections 1, 12, 13, 24, 25, and 36. The ground surface is otherwise undulating, and many large, shallow, undrained depressions are common. The southwestern corner of the township is mantled by glacial till and the remainder of the township is covered by part of the Moose Mountain moraine.

The thickness of the glacial drift varies from 200 to 300 feet and it is largely composed of impervious blue clay. The uppermost 15 to 30 feet of the drift is yellow clay. In the till-covered area, sand beds, 1 to 12 feet thick, underlie the yellow clay and are underlain by blue clay. In the moraine-covered part of the township sand layers between the yellow and blue clay are not of common occurrence, and blue clay directly underlies the yellow clay.

There are two main water-bearing horizons in the glacial drift from which all the wells in the township are deriving their water supply. The uppermost horizon occurs within 35 feet of the surface and is composed either of sand or quicksand. The supply of water obtained from wells that tap this aquifer fluctuates greatly with the amount of rainfall, and in dry seasons or prolonged drought periods, they cannot be depended upon for supplying sufficient water for stock. The water is hard and suitable for drinking.

The second water-bearing horizon delivers an abundant supply of water that is affected only slightly by seasonal precipitation. At least fourteen wells in the township have been bored to this horizon. It is composed of fine sand, and lies at depths of 65 to 110 feet from the surface. The hydrostatic pressure is usually sufficient to raise it half way to the surface. The water is hard, contains iron, and is mineralized to varying degrees. The water from a well in NE.$\frac{1}{4}$, section 35, is not suitable for drinking but it is being used for stock, whereas water from wells in SW.$\frac{1}{4}$, section 6, and SW.$\frac{1}{4}$, section 14, is being used for both domestic and stock use. Some of these wells yield an abundant supply of water and the level cannot be lowered by continuous pumping, whereas others can be pumped dry and they refill slowly. This condition suggests that the sand forming the aquifer is in the form of pockets.

A third horizon was encountered in a drilled well in SE.$\frac{1}{4}$, section 1, at 217 feet from the surface, but the pressure of the water was so great that 60 feet of the hole was filled with sand and gravel after the aquifer had been tapped. In drilling this well, sand beds were penetrated at depths of 44 feet, 75 feet, 135 feet, and 175 feet, before the aquifer at 217 feet was encountered. Permanent water supplies can be obtained in this township by boring or drilling to a depth of at least 75 feet from the surface.

Township 15, Range 9

A wide, shallow valley cuts through the eastern part of this township and the height of land occurs in section 23, dividing the drainage to the north from that flowing south into this valley. This valley carries the spring run-off water and contains no permanent stream. Two large undrained depressions occur in section 1, and section 13, and in years of average rainfall they hold from 5 to 7 feet of water. For a distance of 1 to $1\frac{1}{2}$ miles on each side of the valley the ground surface is undulating and broken by small ravines. The remainder of the township is slightly undulating. Poplars grow throughout the township and are more dense in the northeastern part.

The eastern and northeastern parts of the township are mantled by glacial till, and the remainder of the township is covered by moraine.

Water in large quantities is difficult to obtain at shallow depths in this township. The initial 20 to 40 feet of glacial covering is composed of yellow clay, sand, and gravel. Usually the sand or gravel beds occur beneath the yellow clay and separate it from the blue clay, but in some places the yellow clay is absent and the sand and gravel occur as a thick bed extending from the surface to the blue clay.

Wells that have been dug to these sand and gravel beds do not usually yield a constant or large supply of water. The fluctuation of the quantity of water, due to variation in rainfall and prolonged drought periods, makes these wells unsatisfactory for stock. The water is hard and is not too highly mineralized to be used for drinking. There are a few shallow wells in the township that yield an abundant supply of water and these have probably tapped large sand pockets in which large quantities of rainfall seepage have been stored. Consequently, the drought of 1930 to 1934 has had only a small effect on the supply in these wells. These wells occur in the SE.$\frac{1}{4}$, section 5, SE.$\frac{1}{4}$, section 14, NE.$\frac{1}{4}$, section 14, SW.$\frac{1}{4}$, section 17, NW.$\frac{1}{4}$, section 18, SE.$\frac{1}{4}$, section 24, NE.$\frac{1}{4}$, section 25, NE.$\frac{1}{4}$, section 26, and SE.$\frac{1}{4}$, section 33. Many farmers have been forced to haul water, not only in the drought period, but some of them continuously because of the difficulty in locating water at shallow depths. The chief source from which the water is drawn is a spring located in a valley in SE.$\frac{1}{4}$, section 28. This spring is known as Duncan's spring and it was first discovered in 1884 when the buffalo used to drink from it. The farmers of the district have cribbed the spring and built a road into it. Although many farmers hauled from this spring continuously winter and summer from 1930 to 1934, the supply of water did not decrease in the slightest. A spring in NE.$\frac{1}{4}$, section 2, has also been used by farmers as a source of water. The water is medium hard and is suitable for drinking.

Numerous attempts have been made to secure a permanent supply of water by boring or digging to depths up to 100 feet, but only four farmers have been successful. The water is hard and suitable for drinking, but the supply is not abundant and the water is under very little or no pressure.

A bored well, 117 feet deep, in NE.$\frac{1}{4}$, section 20, struck a bed of gravel that yields a supply of water, that upon being analysed was found to be highly mineralized with magnesium sulphate. This salt prohibits its use for drinking, but it may be used for stock. The water rises only 12 feet above the top of the aquifer, but the level has remained constant since the well was made and the supply was abundant until the flow was diminished by clay which was washed into the well. A 216-foot well was drilled in SW.$\frac{1}{4}$, section 35, and it yields an abundant supply of water that is under pressure. The water is hard and contains iron, but it is suitable for drinking as well as for stock.

The Marine Shale bedrock was encountered at a depth of 332 feet below the surface in a well drilled in NW.$\frac{1}{4}$, section 10. The water is derived from an aquifer that lies at the base of the glacial drift, and it is hard and suitable for stock use. It may be used for drinking without any laxative effect, but the water possesses a peculiar taste, due to its iron content. The water rises under hydrostatic pressure to a level 90 feet below the surface and continual pumping will not lower this level. It appears certain that an abundant supply of drinkable water may be obtained by drilling to depths of 200 feet or more.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF CHESTER, NO. 125, SASKATCHEWAN

Township	13	13	13	14	14	14	15	15	15	Total No. in Municipality
West of 2nd mer. Range	7	8	9	7	8	9	7	8	9	
Total No. of Wells in township	144	158	128	155	168	136	64	129	235	1317
No. of wells in bedrock	0	1	1	0	1	0	0	0	1	4
No. of wells in glacial drift	144	157	127	155	167	136	64	129	234	1313
No. of wells in alluvium	0	0	0	0	0	0	0	0	0	0
Permanency of Water Supply										
No. with permanent supply	51	31	41	37	31	29	20	37	41	318
No. with intermittent supply	5	6	30	26	16	24	7	5	20	139
No. dry holes	88	121	57	92	121	83	37	87	174	860
Types of Wells										
No. of flowing artesian wells	0	0	0	0	0	0	0	0	0	0
No. of non-flowing artesian wells	11	5	5	14	7	4	3	14	7	70
No. of non-artesian wells	45	32	66	49	40	49	24	28	54	387
Quality of Water										
No. with hard water	49	36	66	58	46	49	27	40	56	427
No. with soft water	7	1	5	5	1	4	0	2	5	30
No. with salty water	0	1	0	0	0	0	0	4	0	5
No. with "alkaline" water	14	6	10	14	10	17	13	11	9	104
Depths of Wells										
No. from 0 to 50 feet deep	99	103	108	112	116	114	46	54	150	902
No. from 51 to 100 feet deep	25	21	14	27	38	16	9	24	58	232
No. from 101 to 150 feet deep	12	31	1	13	6	3	5	8	22	101
No. from 151 to 200 feet deep	7	1	3	2	2	2	4	42	3	66
No. from 201 to 500 feet deep	1	2	2	1	6	1	0	1	2	16
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	0	0	0	0
How the Water is Used										
No. usable for domestic purposes	44	33	57	55	41	46	23	30	51	380
No. not usable for domestic purposes	12	4	14	8	6	7	4	12	10	77
No. usable for stock	54	36	69	58	46	53	27	36	56	435
No. not usable for stock	2	1	2	5	1	0	0	6	5	22
Sufficiency of Water Supply										
No. sufficient for domestic needs	54	32	44	58	44	50	27	39	56	404
No. insufficient for domestic needs	2	5	27	5	3	3	0	3	5	53
No. sufficient for stock needs	39	18	29	22	19	19	13	24	25	208
No. insufficient for stock needs	17	19	42	41	28	34	14	18	36	249

ANALYSES AND QUALITY OF WATER

General Statement

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

Total Dissolved Mineral Solids

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

Mineral Substances Present

Calcium and Magnesium

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

Sodium

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

Sulphates

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

Chlorides

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

Iron

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

Hardness

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

Analyses of Water Samples from the Municipality of Chester, No. 125, 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	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	$CaCl_2$	
1	SE.	25	13	7	2	14	366											(1)	(3)	(2)					(4)	ϰl
2	NE.	26	13	7	2	210	1,686														(1)					ϰl
3	NW	3	13	8	2	32	523											(3)	(1)		(2)			(4)		ϰl
4	NE.	17	13	9	2	6	1,240	700	700	-	85	95	160	122	517	90	919	95	260		364		60	140		ϰl
5	NE.	33	15	8	2	75	1,580	800	700	100	31	95	120	155	718	177	1,114	95	163		462		343	51		ϰl
6	NW.	10	15	9	2	333	1,160	550	500	50	19	115	80	108	496	159	836	115	39		322		329	31		ϰl
7	SE.	28	15	9	2	Spring	360	270	210	60	10	145	30	65	86	43	301	54		96	57		77	17		ϰl

Water samples indicated thus, ϰl, are from glacial drift or other unconsolidated deposits.
Analyses are reported in parts per million; where numbers (1), (2), (3), and (4) are used instead of parts per million, they represent the relative amounts in which the five main constituents are present in the water.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
Analyses Nos. 2 and 3, by Provincial Analyst, Regina; Analysis No. 1, by F.G. McGill, M.D.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

Generally speaking, the well waters in this municipality are not excessively mineralized. Persons accustomed to drinking water with a low mineral content would find the water unpalatable and laxative, but continual use of the water will overcome this unpleasantness. The residents of the municipality do not as a rule experience much difficulty in obtaining suitable drinking water, and very few wells yield water that is harmful to stock. Usually water from the deeper bored and drilled wells contains more mineral salts in solution than does the water from the shallow, hand dug wells.

The results of analyses of the water from seven wells in the municipality are given in the accompanying table. All these wells are deriving their water supply from an aquifer in the glacial drift, and Sample No. 6 comes from immediately above the Marine Shale bedrock. Sample No. 2 possesses the highest mineral content of 1,686 parts per million, and it is the only water of the seven samples listed that was termed "alkaline" by the owner of the well. The water from any one of these seven wells if used by the average person habitually would not produce any harmful results so far as the mineral content is concerned. None of the samples has been examined for bacteria content.

It will be noticed that the dissolved solid content of the majority of the samples is mainly composed of the sulphates of magnesium, sodium, and calcium. The former two salts are the most undesirable of the mineral salts in drinking water because of their laxative qualities. The water from Duncan's spring is the best of these samples as a drinking water because of its comparatively low content of Epsom salts and Glauber's salt. Few wells in Saskatchewan will yield better water than this spring. The water from any one of these wells is quite suitable for stock purposes.

Small irrigation projects, such as watering gardens, would be benefited by these wells provided that the water is not too cold when applied. Due to the mineral salt content the water will not be as beneficial as rain, but sodium carbonate or black alkali, the most harmful salt on plants, is absent from these samples.

Water from the Bedrock

It is believed that there are only two wells in the municipality that are producing water from the Marine Shale bedrock. They are located in SE.$\frac{1}{4}$, sec. 3, tp. 13, range 8, and SE.$\frac{1}{4}$, sec. 30, tp. 13, range 9. The water from these wells cannot be used for farm purposes because of their high mineral salt content. The water that is obtained in a few places from beds of the Marine Shale series is practically certain to be much too highly mineralized with common salt, magnesium sulphate, and sodium sulphate to serve any useful purpose on a farm. Farmers and well drillers are strongly advised to refrain from drilling into this formation.

WELL RECORDS—Rural Municipality of CHESTER NO. 125, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	HEIGHT TO WHICH WATER WILL RISE Elev.	PRINCIPAL WATER-BEARING BED Depth	PRINCIPAL WATER-BEARING BED Elev.	PRINCIPAL WATER-BEARING BED Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
1	NE.	1	13	7	2	Bored	30	2,250	- 28	2,222	28	2,222	Glacial gravel	Hard, iron		D, S	Insufficient for 15 head stock.
2	SE.	2	"	"	"	"	38	2,260	- 30	2,230			" sand	Hard, iron, "alkaline		D, S	Sufficient for house only in dry years.
3	NE.	3	"	"	"	Drilled	135	2,200	- 13	2,187			"				
4	SE.	4	"	"	"	Bored	86	2,260					"	Hard, iron, "alkaline"		D, S	Sufficient for 50 head stock; water has laxative effect on man.
5	NE.	4	"	"	"	Drilled	118	2,230	- 53	2,177	98	2,132	" sand	Hard, "alkaline"		S	Sufficient for 50 head stock; trouble with sand clogging.
6	SW.	12	"	"	"	Bored	32	2,250					" fine sand	Hard, iron, "alkaline"		D, S	Insufficient for 20 head stock.
7	SE.	13	"	"	"	"	90	2,220	- 40	2,180	84	2,136	" sand	Hard, iron, "alkaline"		D, S	Abundant supply; laxative effect on man.
8	NE.	13	"	"	"	"	78	2,205	- 25	2,180			" "	Hard, iron		D, S	Abundant supply.
9	SW.	13	"	"	"	Dug	17	2,195	- 14	2,181	0	2,195	" gravel	Hard		S	Sufficient for 35 head stock at least.
10	SE.	14	"	"	"	Sand-point	17	2,200	- 15	2,185	14	2,186	" "	Hard, little iron		D, S	Sufficient for 100 head stock; well cannot be pumped dry.
11	NW.	15	"	"	"	Dug	14	2,195	- 11	2,184	11	2,184	" "	Hard		D, S	Good supply, fast seepage.
12	SE.	16	"	"	"	"	30	2,195	- 2	2,193			" sand	Hard, iron, "alkaline"		D	Well dug near a slough.
13	NW.	16	"	"	"	"	8	2,185	- 6	2,179	1	2,184	" "	Soft		S	Insufficient for 25 head stock.
14	NE.	17	"	"	"	"	14	2,200	- 6	2,194	0	2,200	" "	Hard		D, S	Sufficient for 15 head stock.
15	NW.	19	"	"	"	"	22	2,225	- 20	2,205			" quicksand	"		D, S	Good supply, fast seepage.
16	NE.	19	"	"	"	"	16	2,225	- 8	2,217	0	2,225	" sand	Soft		D, S	Sufficient for 30 head stock at least.
17	NE.	20	"	"	"	"	15	2,205	- 13	2,192	12	2,193	" "	Hard, "alkaline"		D, S	Insufficient for 25 head stock.
18	NE.	23	"	"	"	Bored	75	2,195	- 25	2,170			" gravel	Hard, "alkaline" bad odour		S	Supplies 2 barrels a day.
19	NE.	24	"	"	"	Dug	21	2,195	- 13	2,182	18	2,177	" sand and gravel	Soft		D, S	Poor supply; one other 7 foot well cannot be pumped dry.
20	SE.	25	"	"	"	"	14	2,195	- 7	2,188	12	2,183	Glacial gravel	Hard, slight yellow colour		D	Well in village of Windthorst; sufficient for the population, 220. #
21	SW.	25	"	"	"	Drilled	121	2,205	- 5	2,200	108	2,097	Glacial	Hard, "alkaline"			
22	SE.	26	"	"	"	"	110	2,195	- 35	2,160	110	2,085	Glacial coarse white sand	Hard, iron, slight odour		D, S, I	Abundant supply for 30 head stock; high mineral content.
23	NE.	26	"	"	"	"	210	2,200	- 30	2,170			Glacial sand	Hard, iron, "alkaline"		D, S	Sufficient for 35 head stock when not clogged with sand. #
24	SE.	28	"	"	"	Bored	22	2,200	- 17	2,183	0	2,200	" sand and gravel	Soft		D, S	Intermittent supply.
25	NE.	28	"	"	"	Dug	18	2,215	- 16	2,199	1	2,214	Glacial sandy gravel	Hard		S	Sufficient for 30 head stock.
26	SE.	30	"	"	"	"	40	2,230	- 35	2,195	22	2,208	Glacial quicksand	Hard, iron, "alkaline"		D, S	Sufficient for 35 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 CHESTER NO. 125, 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
27	NW.	30	13	7	2	Drilled	193	2,240	- 93	2,147			Glacial sand	Hard, iron		D, S	Sufficient for 35 head stock at least.
28	NE.	31	"	"	"	Dug	30						"				Dry hole.
29	NE.	33	"	"	"	Drilled	110	2,225					" quicksand			N	Stock refuse to drink the water.
30	SW.	34	"	"	"	Dug	14	2,210	- 8	2,202	13	2,197	" sand	Soft		S	Poor supply, varies with rainfall; located in a ravine.
31	NE.	34	"	"	"	Drilled	106	2,225	- 52	2,173			"	Hard, iron, bad taste		N	Water is unfit for any use.
32	NW.	35	"	"	"	"	200	2,210	- 60	2,150	195	2,015	" gravel	Hard, iron		D, S, I	Abundant supply; neighbours tank from this well.
1	SE.	1	"	8	"	Dug	12	2,175	- 11	2,164	11	2,164	Glacial sand	Hard, iron		D, S, I	Sufficient for 50 head stock; well cannot be pumped dry.
2	NE.	2	"	"	"		35	2,200	- 14	2,186			" gravel	Hard, "alkaline"		D, S	Insufficient for 10 head stock.
3	SE.	3	"	"	"	Drilled	330	2,195	-130	2,065	324	1,871	Bedrock marine shale	Soft, salty		N	Abundant supply; but water has been unfit for use since 1926.
4	NW.	3	"	"	"	Bored	32	2,210	- 10	2,200	30	2,180	Glacial sand and gravel	Hard		D, S	Sufficient for house. #
5	NE.	4	"	"	"	Dug	30	2,210	- 28	2,182			Glacial sand	Hard, iron		D, S	Sufficient for 30 head stock.
6	NW.	6	"	"	"	"	14	2,150	- 2	2,148	12	2,138	" sandy clay clay	"		D	Fair supply.
7	SW.	7	"	"	"	Bored	21	2,160	- 3	2,157	19	2,141	Glacial sand	"		D	Sufficient for household and 6 head stock.
8	NW.	11	"	"	"	Dug	66	2,200	- 39	2,161			" gravel	" iron		D, S	" " 70 head stock.
9	NW.	13	"	"	"	Bored	24	2,215	- 22	2,193	16	2,199	" fine sand	Very hard, "alkaline"		D, S, I	Insufficient for 30 head stock.
10	NE.	14	"	"	"	"	124	2,225	- 59	2,166	124	2,101	" sand	Hard, iron, "alkaline"		D, S, I	Abundant supply; neighbours tank from this well.
11	SW.	15	"	"	"	Dug	18	2,225	- 6	2,219	14	2,211	" gravel	Hard		D, S	Very poor supply in dry seasons.
12	SE.	16	"	"	"	"	42	2,220	- 38	2,182	28	2,192	" sand	Hard, iron		D, S	Very slow seepage.
13	NE.	16	"	"	"	Drilled	200	2,220	-100	2,120	198	2,022	" "	Hard, iron		D, S	Well cannot be pumped dry.
14	SW.	18	"	"	"	Bored	21	2,170	- 18	2,152	19	2,151	" quicksand	" "alkaline"		D, S	Sufficient for 70 head stock.
15	NW.	19	"	"	"	Dug	22	2,205	- 18	2,187			" sand	Hard		D	Insufficient for 10 head stock.
16	SE.	20	"	"	"	"	12	2,135	0	2,135	2	2,133	" gravel	"		S	Sufficient for 20 head stock.
17	NE.	20	"	"	"	"	15	2,150	- 11	2,139	13	2,137	" sand	"		D, S	" " 40 " " .
18	NW.	23	"	"	"	Bored	35	2,230					"	"		D	" " house use only.
19	NW.	24	"	"	"	Dug	30	2,225	- 22	2,203	29	2,196	Glacial sand	Hard, iron		D, S	Very poor supply.
20	NE.	28	"	"	"	Bored	30	2,255	- 10	2,245			"	Hard, "alkaline"		S	Seepage water from a dugout.
21	SE.	30	"	"	"	Test	30	2,160									Dry hole.

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

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

WELL RECORDS—Rural Municipality of CHESTER NO.125, 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
22	NW.	30	13	8	2	Dug	12	2,205	- 10	2,195	0	2,205	Glacial gravel	Hard, iron		D, S	Sufficient for 50 head stock.
23	SW.	32	"	"	"	"	19	2,150	- 16	2,134	17	2,133	" sand	"		D, S	Good supply; rapid seepage.
24	SW.	34	"	"	"	"	20	2,245	- 18	2,227	8	2,237	" "	"		D	Intermittent supply.
25	SW.	36	"	"	"	Drilled	232	2,250	- 62	2,188	232	2,018	" gravel	" iron		D, S	Abundant supply for 40 head stock.
1	SE.	2	13	9	2	Dug	25	2,160	- 15	2,145	0	2,160	Glacial sand	Hard		D, S, I	Insufficient for 25 head stock.
2	NE.	2	"	"	"	Bored	50	2,160	- 35	2,125			" "	" "alkaline"		S	Poor supply; stock do not like this water.
3	SW.	2	"	"	"	Dug	50	2,150	- 47	2,103	25	2,125	" "	Hard, "alkaline"		S	Insufficient for 20 head stock.
4	SE.	4	"	"	"	"	24	2,100	- 9	2,091			"	Hard, "alkaline"		S	Intermittent supply; slough seepage.
5	SW.	4	"	"	"	"	15	2,115	- 5	2,110			"	Hard		D, S	Slough seepage; not dependable.
6	SW.	6	"	"	"	"	20	2,130	- 14	2,116	0	2,130	" gravel	Hard		D, S	Sufficient for 30 head stock; good supply.
7	NE.	7	"	"	"	"	25	2,1[illegible]	- 22	2,118	22	2,118	" "	Soft		D, S	Intermittent supply.
8	NW.	8	"	"	"	"	20	2,140	- 12	2,128	0	2,140	" sand	Hard		D	" " .
9	NW.	9	"	"	"	"	25	2,155	- 21	2,134			" "	" "alkaline"		S	" " .
10	SE.	9	"	"	"	"	6	2,140	- 4	2,136	1	2,139	" gravel	Soft		D, S, I	Abundant supply for 40 head stock.
11	SE.	12	"	"	"	Bored	140	2,160					" sand				Very poor supply and caved in.
12	NE.	13	"	"	"	Drilled	170	2,210					" "	Hard, iron		D, S	Abundant supply for 30 head stock.
13	SE.	14	"	"	"	"	208	2,205					" gravel	" "		D, S	" " " 60 " " .
14	NW.	15	"	"	"	Dug	35	2,160	- 20	2,140			"	" " "alkaline"		D, S	Intermittent supply.
15	NE.	17	"	"	"	"	6	2,135	- 3	2,132	2	2,133	" sand	Soft		D, S, I	Well cannot be pumped dry. #
16	NE.	18	"	"	"	"	18	2,160	- 14	2,146	15	2,145	" "	Hard		D, S	Intermittent supply; slough seepage.
17	NW.	18	"	"	"	"	12	2,150	- 9	2,141	2	2,148	" gravel	Soft		D, S	Abundant supply for 20 head stock.
18	NW.	20	"	"	"	"	10	2,155	- 5	2,150	0	2,155	" sand	Hard		S	Sufficient for 50 head stock.
19	SW.	24	"	"	"	Drilled	170	2,215	- 70	2,145			" "	" iron		S, I	Abundant supply for 50 head stock.
20	SW.	25	"	"	"	"	145	2,215	-110	2,105			" "	" "alkaline"		S	Good supply, but troubled with sand plugging.
21	NE.	26	"	"	"	Dug	15	2,185	- 5	2,180	0	2,185	" gravel	Hard, iron		D, S	Insufficient for 5 head stock.
22	NW.	27	"	"	"	"	14	2,155	- 12	2,143	0	2,155	" "	Soft		D, S	Sufficient for 50 head stock.
23	SE.	30	"	"	"	Drilled	320	2,175					Bedrock	Heavily "alkaline"		N	Water could not be used.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of CHESTER NO.125, 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
24	NE.	30	13	9	2	Dug	15	2,175					Glacial				Dry hole.
25	SW.	30	"	"	"	"	45	2,165	- 20	2,145	42	2,123	" gravel	Hard		D, S	Supply is not dependable.
26	SW.	31	"	"	"	Bored	80	2,140					"	" iron, "alkaline"		N	Water condemned by the analyst.
27	NE.	31	"	"	"	Dug	32	2,205	- 4	2,201			"	Hard, "alka-line"		D, S	Well has not been used since 1931, intermittent supply.
28	SW.	34	"	"	"	"	16	2,200	- 11	2,189			"	Hard		D, S	Slough seepage.
29	NW.	34	"	"	"	"	20	2,190					"				Dry hole.
30	SW.	35	"	"	"	Bored	22	2,210	- 14	2,196			"	Hard		D, S	Very poor supply at any time.
31	NW.	36	"	"	"	Drilled	180	2,225	- 20	2,205	160	2,065	" gravel	Hard, iron		D, S, I	Abundant supply for 20 head stock.
1	SW.	1	14	7	2	Dug	16	2,195	- 12	2,183	12	2,183	Glacial sand	Hard		D, S	Sufficient for 25 head stock.
2	SE.	2	"	"	"	"	18	2,205	- 14	2,191	13	2,192	" "	"		D, S	Insufficient supply in wet seasons.
3	SE.	4	"	"	"	Drilled	227	2,235	- 60	2,175			" fine sand	"		D, S	Sufficient for at least 30 head stock.
4	NE.	4	"	"	"	Dug	13	2,230	- 5	2,225	0	2,230	" gravel	"		D, S	Poor supply; seepage from ditch.
5	SW.	4	"	"	"	Drilled	150	2,230	- 60	2,170	140	2,090	" sand	" iron		D, S	Abundant supply for 50 head stock; neighbours tank from this well.
6	SE.	5	"	"	"	Dug	18	2,250	- 4	2,246			" "	"		D, S	Insufficient for 35 head stock.
7	SW.	6	"	"	"	Drilled	195	2,275	-135	2,140			" "	" iron		D, S	Abundant supply for 50 head stock.
8	NE.	7	"	"	"	Bored	50	2,270					"				Dry hole; village of Peebles.
9	SE.	9	"	"	"	Dug	20	2,220	- 16	2,204	16	2,204	" sand	Hard		D, S	Good supply of water.
10	NW.	10	"	"	"	"	20	2,240					"				Dry hole.
11	SE	10	"	"	"	Bored	150	2,225	- 75	2,150			" sand	Hard		D, S	Sufficient for 50 head stock.
12	SE.	11	"	"	"	Dug	10	2,200	- 8	2,192	8	2,192	" "	Soft		D, S	Insufficient for 10 head stock.
13	SE.	12	"	"	"	Bored	95	2,200	- 50	2,150	95	2,105	" "	Hard, iron		D, S	Abundant supply.
14	SE.	13	"	"	"	"	105	2,205	- 55	2,150	105	2,100	" fine sand	" "		D, S	Abundant supply.
15	SW.	14	"	"	"	Dug	35	2,230	- 24	2,206	9	2,221	" sandy clay	" " "alkaline		N	Water too alkaline for use.
16	SE.	15	"	"	"	"	22	2,235	- 16	2,219	2	2,233	Glacial sand	Hard		D, S	Sufficient for house only in dry years.
17	NE.	15	"	"	"	"	15	2,235	- 13	2,222	0	2,235	" " and gravel	" "alka-line"		D, S	Good supply; fast seepage; neighbours tank from this well.
18	NW.	16	"	"	"	"	16	2,240	- 2	2,238	6	2,234	Glacial gravel	Hard		D, S	Supply depends on slough seepage.
19	SE.	17	"	"	"	"	12	2,250	0	2,250	0	2,250	" sand	Hard		D, S	Intermittent supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of CHESTER NO.125, 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
20	NW.	17	14	7	2	Drilled	138	2,250	- 93	2,157			Glacial gravel	Hard, "alkaline"		D, S, I	Abundant supply; water 100 head stock.
21	NE.	18	"	"	"	Dug	80	2,250	- 68	2,182	16	2,234	Glacial sand	Hard		D, S, I	Sufficient for 25 head stock.
22	NE.	19	"	"	"	Dug	32	2,265	- 16	2,249	0	2,265	Glacial sand	Hard, "alkaline"		D	Poor supply even in wet seasons.
23	NW.	20	"	"	"	Drilled	145	2,260	- 85	2,175	135	2,125	Glacial sand	Hard, iron		D, S	Pump plugged with sand at present.
24	SE.	21	"	"	"	Dug	14	2,250	- 10	2,240	4	2,246	Glacial sandy clay	Hard		D, S	Insufficient for 15 head stock.
25	SW.	22	"	"	"	Dug	12	2,250	- 7	2,243	8	2,242	Glacial gravel	Soft		D, S, I	Intermittent supply.
26	NW.	22	"	"	"	Dug	15	2,250	- 13	2,237	13	2,237	Glacial gravel	Hard		D	Intermittent supply.
27	SE.	23	"	"	"	Drilled	147	2,225	- 40	2,185			Glacial gravel	Hard, iron		D, S, I	Abundant supply; irrigation results good.
28	NE.	24	"	"	"	Bored	108	2,215	- 60	2,155	108	2,107	Glacial sand	Hard, iron, "alkaline"		D, S, I	Abundant supply; irrigation results are fair.
29	NE.	26	"	"	"	Bored	117	2,225	- 77	2,148	117	2,108	Glacial sand	Hard, "alkaline"		D, S	Abundant supply for 40 head stock.
30	SW.	26	"	"	"	Dug	14	2,235	- 6	2,229	11	2,224	Glacial sand	Hard		D, S	Insufficient for 18 head stock.
31	NW.	26	"	"	"	Dug	14	2,240	- 11	2,229	11	2,229	Glacial sand	Hard		S	Water 15 head stock only; slow seepage.
32	SE.	28	"	"	"	Test	30	2,250					Glacial				Dry hole.
33	SW.	28	"	"	"	Dug	60	2,250					Glacial				Dry hole.
34	NW.	28	"	"	"	Dug	42	2,250	- 12	2,238			Glacial sand and gravel	Hard, "alkaline"		D, S	Very poor supply.
35	SW.	32	"	"	"	Bored	110	2,265					Glacial				Dry hole.
36	SE.	33	"	"	"	Dug	22	2,260	- 10	2,250	7	2,253	Glacial coarse sand	Hard		D, S	Poor supply except in wet seasons.
37	SW.	34	"	"	"	Drilled	150	2,205					Glacial sand	Hard, clear, "alkaline"		S	Sufficient for 70 head stock; laxative effect on strangers.
38	NW.	34	"	"	"	Dug	15	2,250	- 13	2,237	14	2,236	Glacial gravel	Soft		D, S	Insufficient for 10 head stock.
39	SE.	34	"	"	"	Dug	20	2,240	- 17	2,223	3	2,237	Glacial sand	Soft		D, S	Intermittent supply.
40	NW.	36	"	"	"	Bored	93	2,220	- 70	2,150	93	2,127	Glacial sand	Hard, iron, "alkaline"		D, S	Abundant supply; laxative effect on man.
41	SW.	36	"	"	"	Bored	77	2,225	- 40	2,185			Glacial sand	Hard, iron		D, S	Supply has not altered in 22 years.
1	NE.	1	14	8	2	Dug	15	2,300	0	2,300			Glacial	Hard		D, S	Slough seepage; intermittent supply.
2	NE.	2	"	"	"	Bored	60	2,310	- 43	2,267	56	2,254	Glacial fine sand	Hard, "alkaline"		S	Sufficient for about 20 head stock; water has bad taste.
3	NE.	4	"	"	"	Dug	40	2,265	- 38	2,227	38	2,227	Glacial gravel	Hard, "alkaline"		D	Sufficient only for house use.
4	NE.	6	"	"	"	Dug	17	2,240	- 11	2,229	11	2,229	Glacial gravel	Hard, "alkaline"		S	Intermittent supply.
5	SW.	6	"	"	"	Dug	40	2,240	- 38	2,202			Glacial	Hard		D	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 CHESTER NO. 125, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	HEIGHT TO WHICH WATER WILL RISE Elev.	PRINCIPAL WATER-BEARING BED Depth	PRINCIPAL WATER-BEARING BED Elev.	PRINCIPAL WATER-BEARING BED Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
6	NE.	7	14	8	2	Bored	40	2,220	- 37	2,183	32	2,188	Glacial sand	Hard, "alkaline"		D, S	Insufficient for 15 head stock.
7	NE.	8	"	"	"	Dug	21	2,160	- 3	2,157	2	2,158	Glacial gravel	Hard, iron		D, S	Usually sufficient for 50 head stock.
8	NW.	10	"	"	"	Bored	94	2,310	- 87	2,223	92	2,218	Glacial gravel	Hard, iron		D	Sufficient for house use only.
9	SE.	10	"	"	"	Dug	14	2,295	- 11	2,284	13	2,282	Glacial sand	Hard		D	Insufficient for house use.
10	SW.	11	"	"	"	Bored	75	2,310			70	2,240	Glacial sand	Hard		D	Sufficient for house use only.
11	SW.	11	"	"	"	Bored	200	2,310					Bedrock marine shale				Dry hole.
12	NW.	12	"	"	"	Bored	70	2,270	- 47	2,223			Glacial sand	Hard		D, S, I	Sufficient for 40 head stock.
13	SE.	12	"	"	"	Drilled	291	2,290	-111	2,179	290	2,000	Glacial gravel	Hard, iron		D, S	Well has never been pumped dry.
14	SE.	13	"	"	"	Bored	30	2,280	- 28	2,252			Glacial sand	Hard, iron		D	Intermittent supply.
15	SE.	14	"	"	"	Dug	16	2,270	- 14	2,256	14	2,256	Glacial sand	Hard		D, S	Sufficient for 12 head stock.
16	NW.	14	"	"	"	Dug	58	2,275	- 47	2,228	58	2,217	Glacial gravel	Hard, iron, "alkaline"		D, S	Sufficient for 25 head stock; laxative effect on strangers.
17	SE.	15	"	"	"	Dug	18	2,270	- 8	2,262	16	2,254	Glacial sand	Hard, iron		D, I	C.N.R. Kegworth well; seldom used.
18	SE.	15	"	"	"	Bored	98	2,280	- 83	2,197			Glacial	Hard, iron, "alkaline"		D, S	Insufficient for 20 head stock; seepage too slow.
19	NE.	15	"	"	"	Bored	60	2,260	- 36	2,224	50	2,210	Glacial sand and gravel	Hard, iron, "alkaline"		D, S, I	Abundant supply; well has never been pumped dry.
20	SE.	16	"	"	"	Test	70	2,275					Glacial				Dry hole.
21	NE.	16	"	"	"	Bored	22	2,250	- 20	2,230			Glacial	Soft		D	Intermittent supply.
22	NW.	16	"	"	"	Bored	23	2,200	- 15	2,185	21	2,179	Glacial gravel	Hard, iron		D, S, I	Sufficient water for 90 head stock.
23	SW.	17	"	"	"	Dug	12	2,210					Glacial				Dry hole.
24	SW.	18	"	"	"	Dug	12	2,200	- 10	2,190	10	2,190	Glacial sand	Hard		S	Sufficient for 12 head stock.
25	SW.	20	"	"	"	Dug	28	2,190	- 3	2,187			Glacial gravel	Hard		D, S, I	Sufficient for 15 head stock.
26	NW.	20	"	"	"	Bored	25	2,200	- 6	2,194	0	2,200	Glacial sand	Hard		S	Insufficient for 15 head stock.
27	NW.	22	"	"	"	Drilled	175	2,270	- 35	2,235	161	2,109	Glacial fine sand	Hard, iron		D, S, I	Well not in use; pump is plugged with sand.
28	SE.	24	"	"	"	Dug	22	2,275	- 18	2,257	17	2,258	Glacial sand	Hard		D	Sufficient for house use only.
29	SE.	26	"	"	"	Dug	28	2,260	- 26	2,234	16	2,244	Glacial gravel	Hard		D	Sufficient for house use only.
30	NW.	27	"	"	"	Dug	16	2,255	- 6	2,249	15	2,240	Glacial sand	Very hard "alkaline"		S	Insufficient for 20 head stock.
31	NE.	28	"	"	"	Dug	21	2,240	- 19	2,221	3	2,237	Glacial sand	Hard, "alkaline" green colour		N	Water condemned by analyst.

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 CHESTER NO. 125 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
32	SW.	28	14	8	2	Bored	22	2,200	- 8	2,192	20	2,180	Glacial sand	Hard, "alkaline"		D, S	Will water about 20 head stock.
33	SW.	30	"	"	"	Dug	14	2,245	- 4	2,241			Glacial	Hard		D, S	Direct seepage from a slough.
34	NE.	32	"	"	"	Bored	50	2,210	- 10	2,200	40	2,170	Glacial fine sand sand	Hard, "alkaline"		D, S	Insufficient for 20 head stock.
1	SE.	1	14	9	2	Bored	24	2,250	- 18	2,232	14	2,236	Glacial gravel	Hard		D, S	Sufficient for 20 head stock.
2	NE.	2	"	"	"	Dug	10	2,245	- 6	2,239	0	2,245	Glacial sand	Soft		D, S	Abundant supply; well cannot be bailed dry.
3	SW.	2	"	"	"	Bored	30	2,220	- 25	2,195	24	2,196	Glacial sand	Hard		D, S	Insufficient for 15 head stock.
4	SW.	3	"	"	"	Bored	35	2,230	- 10	2,220			Glacial sand	Hard, "alkaline"		D, S	Insufficient for 15 head stock.
5	SE.	4	"	"	"	Drilled	160	2,210	- 60	2,150	140	2,070	Glacial gravel	Very hard iron		D, S, I	Abundant supply; well cannot be pumped dry.
6	NW.	4	"	"	"	Dug	15	2,175	- 12	2,163	15	2,160	Glacial sand	Soft		D	Intermittent supply.
7	NE.	6	"	"	"	Bored	30	2,210	- 27	2,183	27	2,183	Glacial gravel	Hard		D	Intermittent supply.
8	NE.	7	"	"	"	Dug	20	2,235	- 17	2,218	19	2,216	Glacial gravel	Soft		D, S	Intermittent supply.
9	NW.	8	"	"	"	Bored	60	2,230	- 48	2,182			Glacial	Hard		S	Insufficient for stock purposes in winter.
10	SW.	10	"	"	"	Dug	48	2,235	- 43	2,192	10	2,225	Glacial sand	Hard, "alkaline"		D, S	Very poor supply.
11	NE.	10	"	"	"	Dug	20	2,245	- 15	2,230	15	2,230	Glacial gravel	Hard, "alkaline"		D, S, I	Sufficient for 20 head stock; fast seepage.
12	NW.	11	"	"	"	Dug	20	2,240	- 14	2,226	17	2,223	Glacial gravel	Slightly hard		D, S	Barely enough for 20 head stock.
13	NW.	12	"	"	"	Dug	35	2,260	- 25	2,235	33	2,227	Glacial gravel	Hard, iron		D, S	Insufficient for 15 head stock.
14	NE.	12	"	"	"	Dug	32	2,260	- 24	2,236	18	2,242	Glacial sand	Hard, "alkaline"		S	Intermittent supply.
15	SW.	14	"	"	"	Bored	24	2,260	- 18	2,242			Glacial quicksand	Hard, slightly, "alkaline"		D, S, I	Sufficient for 40 head stock.
16	NW.	18	"	"	"	Dug	20	2,250	- 15	2,235	14	2,236	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 15 head stock.
17	SE.	19	"	"	"	Dug	14	2,245	- 8	2,237	13	2,232	Glacial gravel	Hard, "alkaline"		D	Intermittent supply.
18	SW.	22	"	"	"	Dug	30	2,255					Glacial				Dry hole.
19	NW.	22	"	"	"	Drilled	170	2,260	-150	2,110	162	2,098	Glacial gravel	Hard, iron		S	Water comes in too slow; insufficient for 70 head stock.
20	NE.	23	"	"	"	Dug	14	2,240	- 13	2,227			Glacial	Hard, "alkaline", black colour		N	Water cannot be used.
21	NW.	24	"	"	"	Dug	22	2,255	- 18	2,237	12	2,243	Glacial gravel	Hard, "alkaline"		D, S	Barely sufficient for 20 head stock; slow seepage.
22	NE.	24	"	"	"	Dug	26	2,240	- 22	2,218	11	2,229	Glacial sand	Hard		D, S	Insufficient for 40 head stock.
23	NW.	25	"	"	"	Drilled	233	2,240					Glacial sand	Hard, iron		D, S	Sufficient for at least 35 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 CHESTER NO. 125, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	HEIGHT TO WHICH WATER WILL RISE Elev.	PRINCIPAL WATER-BEARING BED Depth	PRINCIPAL WATER-BEARING BED Elev.	PRINCIPAL WATER-BEARING BED Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
24	SE.	26	14	9	2	Dug	25	2,250	- 20	2,230			Glacial sand	Hard		D, S	Sufficient for 15 head stock.
25	NE.	26	"	"	"	Dug	50	2,250					Glacial				Dry hole.
26	NE.	27	"	"	"	Dug	24	2,250	- 10	2,240	0	2,250	Glacial sand	Hard		D,	Intermittent supply.
27	SE.	28	"	"	"	Bored	41	2,255	- 36	2,219	20	2,235	Glacial quick-sand	Hard		D, S	Sufficient for 10 head stock.
28	NW.	28	"	"	"	Dug	18	2,250	- 16	2,234	0	2,250	Glacial sandy clay	Hard		D, S	Sufficient for 25 head stock.
29	SW.	30	"	"	"	Dug	12	2,250	- 3	2,247	10	2,240	Glacial sand	Hard, yellow colour		S	Insufficient for 15 head stock.
30	SE.	31	"	"	"	Dug	32	2,260	- 20	2,240			Glacial sand	Hard		D, S, I	Sufficient for 20 head stock.
31	SW.	32	"	"	"	Dug	30	2,250	- 20	2,230	28	2,222	Glacial sand	Very hard, "alkaline"		D, S	Intermittent supply.
32	SE.	32	"	"	"	Dug	13	2,260	- 9	2,251	0	2,260	Glacial sand and gravel	Soft		D, S	Well can water 25 head stock.
33	SE.	34	"	"	"	Bored	95	2,260					Glacial				Dry hole.
34	SW.	35	"	"	"	Bored	23	2,255	- 13	2,242			Glacial	Hard, "alka-line"			Depend on slough seepage.
1	SE.	1	15	7	2	Test	60	2,215					Glacial				Dry hole.
2	SW.	2	"	"	"	Dug	18	2,245	- 15	2,230	10	2,235	Glacial gravel	Hard, "alka-line"		S	Intermittent supply.
3	SW.	3	"	"	"	Drilled	133	2,250	-100	2,150			Glacial	Hard, "alka-line"		S	Insufficient for stock.
4	SE.	4	"	"	"	Dug	12	2,260	- 7	2,253			Glacial sand and gravel	Hard, iron, "alkaline"		D, S	Intermittent supply.
5	NW.	4	"	"	"	Drilled	145	2,260	-100	2,160			Glacial sand	Hard, iron		D, S, I	Abundant supply; has watered 125 head stock.
6	SE.	12	"	"	"	Bored	82	2,215	- 80	2,135	80	2,135	Glacial sand	Hard, iron, "alkaline"		D, S, I	Sufficient for 25 head stock.
7	SE.	14	"	"	"	Dug	12	2,215	0	2,215	0	2,215	Glacial sand	Hard, "alka-line"		D, S	Intermittent supply.
8	S.	15	"	"	"	Bored	29	2,240	- 21	2,219			Glacial red sand	Hard			
9	S.	15	"	"	"	Bored	95	2,240					Glacial				Dry hole.
10	SW.	16	"	"	"	Dug	45	2,260	- 35	2,225	43	2,217	Glacial gravel	Hard, "alka-line"		D, S	Sufficient for 20 head stock.
11	NW.	18	"	"	"	Dug	50	2,235	- 44	2,191	46	2,189	Glacial sand	Hard, "alka-line"		D, S	Good supply for 15 head stock.
12	NW.	20	"	"	"	Dug	16	2,240	- 10	2,230	15	2,225	Glacial gravel	Hard, "alka-line"		D, S	Good supply but requires cleaning.
13	SW.	21	"	"	"	Dug	45	2,255	- 40	2,215			Glacial sand	Hard		D, S	Sufficient for 40 head stock.
14	NW.	22	"	"	"	Bored	65	2,230	- 55	2,175			Glacial sand	Hard, iron, "alkaline"		S	Limited supply.
15	NE.	22	"	"	"	Dug	30	2,215	- 27	2,188			Glacial	Hard		D, S	Depends entirely on slough seepage.
16	NW.	23	"	"	"	Bored	45	2,195	- 42	2,153	44	2,151	Glacial sand	Hard		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 CHESTER NO.125, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
17	SE.	24	15	7	2	Bored	57	2,200	- 50	2,150	50	2,150	Glacial sand	Hard, "alkaline"		D, S	Barely enough for 40 head stock.
18	NE.	27	"	"	"	Dug	12	2,150	- 6	2,144	0	2,150	Glacial gravel	Hard, "alkaline"		D, S, I	Abundant supply; lake seepage.
19	NE.	28	"	"	"	Bored	45	2,195	- 43	2,152	43	2,152	Glacial gravel	Hard		D, S, I	Abundant supply for 40 head stock; neighbours tank from this well.
20	SE.	31	"	"	"	Dug	30	2,200	- 5	2,195			Glacial sand	Hard		D, S, I	Sufficient for 40 head stock.
21	SW.	32	"	"	"	Bored	35	2,200	- 21	2,179	20	2,180	Glacial sand	Hard, "alkaline"		S	Intermittent supply.
22	SW.	35	"	"	"	Dug	2	2,150	0	2,150	0	2,150	Glacial gravel	Hard, iron		D	Spring fed.
23	NW.	36	"	"	"	Dug	48	2,180	- 41	2,139	48	2,132	Glacial gravel	Hard		D, S, I	Abundant supply, well has never been pumped dry.
24	NE.	36	"	"	"	Dug	50	2,175	- 45	2,130			Glacial sand	Hard		D, S, I	Sufficient for 40 head stock.
1	SE.	1	15	8	2	Dug	14	2,260	0	2,260	13	2,247	Glacial sand	Soft		D, S, I	Insufficient supply.
2	NW.	1	"	"	"	Bored	70	2,250					Glacial black sand	Hard, "alkaline"		D, S	Intermittent supply.
3	SE.	2	"	"	"	Dug	28	2,260	- 18	2,242	25	2,235	Glacial sand	Very hard, "alkaline"		D, S	Intermittent supply.
4	SW.	2	"	"	"	Bored	98	2,250					Glacial				Dry hole.
5	SW.	4	"	"	"	Dug	40	2,240	- 10	2,230			Glacial sand	Hard		D, S	Sufficient supply, although decreased greatly during drought.
6	SW.	6	"	"	"	Bored	82	2,200	- 50	2,150	82	2,118	Glacial sand	Hard		D, S	Abundant supply.
7	SE.	7	"	"	"	Dug	18	2,210			17	2,193	Glacial sand	Hard		D	School well; sufficient supply.
8	NW.	8	"	"	"	Dug	18	2,220	- 3	2,217	9	2,211	Glacial gravel	Hard		S	Poor supply and not used very much.
9	NE.	8	"	"	"	Bored	34	2,225	- 26	2,199	20	2,205	Glacial sand	Hard, salty, "alkaline"		S	Water condemned by analyst.
10	NE.	9	"	"	"	Bored	16	2,235	- 14	2,221	0	2,235	Glacial fine sand	Hard		D, S	Sufficient supply.
11	NW.	12	"	"	"	Dug	20	2,240	- 12	2,228			Glacial quicksand	Hard		D, S	Sufficient for house use only.
12	SW.	12	"	"	"	Bored	30	2,250	- 8	2,242	12	2,238	Glacial sand	Hard		D, S	Insufficient for 25 head stock.
13	SE.	12	"	"	"	Dug	20	2,260	- 18	2,242			Glacial quicksand	Hard, salty		D	Sufficient for house use only.
14	NW.	13	"	"	"	Bored	70	2,250	- 30	2,220	64	2,186	Glacial sand	Hard, iron		D, S	Abundant supply.
15	NE.	14	"	"	"	Bored	85	2,240	- 35	2,205	85	2,155	Glacial sand	Hard, iron, "alkaline" sulphur		D, S	Sufficient but slow seepage.
16	SW.	14	"	"	"	Bored	65	2,220	- 40	2,180			Glacial sand	Hard, iron		D, S	Sufficient for 70 head stock.
17	SE.	16	"	"	"	Dug	20	2,220					Glacial				Dry hole.
18	SW.	16	"	"	"	Bored	90	2,220					Glacial				Dry hole.
19	NW.	17	"	"	"	Dug	34	2,215	- 28	2,187	22	2,193	Glacial quicksand	Hard		D	Sufficient only for house at present; has watered 100 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 CHESTER NO.125, 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
20	SE.	18	15	8	2	Dug	30	2,210	- 22	2,188	3	2,207	Glacial sand	Hard		D, S	Poor supply.
21	NE.	18	"	"	"	Bored	20	2,210	- 17	2,193			Glacial clay	Hard		S	Intermittent supply.
22	NE.	19	"	"	"	Bored	84	2,220	- 19	2,201	75	2,145	Glacial sand	Hard		D	Sufficient for house use only.
23	SW.	23	"	"	"	Bored	90	2,210					Glacial				Dry hole.
24	NE.	23	"	"	"	Bored	80	2,220	- 50	2,170	80	2,140	Glacial sand	Hard, iron		D, S	Sufficient but slow seepage.
25	SW.	24	"	"	"	Bored	64	2,230	- 40	2,190			Glacial sand and gravel	Hard, iron		D, S	Sufficient for 75 head stock.
26	NE.	24	"	"	"	Bored	65	2,225	- 35	2,190			Glacial sand	Hard, iron		D, S	Sufficient for 35 head stock.
27	SW.	26	"	"	"	Bored	50	2,210	- 48	2,162			Glacial gravel	Hard, iron, slightly "alkaline"		D	Intermittent supply.
28	SE.	27	"	"	"	Dug	16	2,190	- 8	2,182	8	2,182	Glacial sand and gravel	Soft		D	Seepage water from a dugout.
29	NE.	28	"	"	"	Bored	110	2,205	- 30	2,175	110	2,095	Glacial sand	Hard		D, S	Abundant supply.
30	SW.	31	"	"	"	Dug	15	2,215	- 5	2,210	0	2,215	Glacial sand	Hard		D	Intermittent supply.
31	NW.	32	"	"	"	Dug	12	2,210	- 9	2,201	12	2,198	Glacial quick-sand	Hard, slightly "alkaline"		D, S	Barely sufficient for 6 head stock.
32	NE.	32	"	"	"	Bored	115	2,210	-114	2,096			Glacial	Hard, "alka-line"		N	Practically a dry hole.
33	NE.	33	"	"	"	Bored	75	2,200	- 50	2,150			Glacial sand	Hard		D, S	Well cannot be bailed dry. #
34	NW.	34	"	"	"	Bored	135	2,200	- 55	2,145	135	2,065	Glacial quick-sand	Hard, iron, black colour		S	Good supply but seldom used.
35	SE.	34	"	"	"	Bored	75	2,190	- 45	2,145			Glacial quick-sand	Hard, iron		D, S	Abundant supply.
36	NE.	35	"	"	"	Bored	60	2,160	- 32	2,128			Glacial sand	Hard, iron, "alkaline"		N	Water condemned by analyst.
37	NE.	36	"	"	"	Spring	4	2,170	0	2,170			Glacial	Hard, very "alkaline"		S	Can only be used in winter.
1	NE.	2	15	9	2	Dug	25	2,245	- 22	2,223	24	2,221	Glacial sand	Hard		D, S	Well water supply poor; good spring on the farm.
2	NW.	2	"	"	"	Dug	50	2,265	-,43	2,222			Glacial sand	Hard, "alka-line"		D, S	Small supply; insufficient for 30 head stock.
3	NW.	3	"	"	"	Dug	15	2,260	- 12	2,248			Glacial sandy clay	Hard		D, S	Intermittent supply.
4	SE.	4	"	"	"	Dug	25	2,300	- 8	2,292	25	2,275	Glacial sandy clay	Hard, "alka-line"		D, S, I	Insufficient for 20 head stock.
5	NE.	4	"	"	"	Dug	32	2,275	- 30	2,245			Glacial	Soft		D, S	Intermittent supply.
6	SW.	4	"	"	"	Dug	15	2,310	- 7	2,303	7	2,303	Glacial sand	Hard		D	Intermittent supply.
7	SE.	5	"	"	"	Dug	20	2,280	- 9	2,271	20	2,260	Glacial black sand	Hard		S	Intermittent supply.
8	NW.	5	"	"	"	Dug	20	2,250	- 4	2,246	4	2,246	Glacial red sand	Medium hard		D, S	Barely sufficient for 25 head stock.
9	NE.	6	"	"	"	Bored	40	2,285	- 20	2,265	39	2,246	Glacial gravel	Medium hard		D, S	Insufficient for 35 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 CHESTER NO.125, 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
10	SW.	6	15	9	2	Bored	90	2,260			80	2,180	Glacial sand	Very stronly "alkaline"		N	Water unfit for use and well was filled in.
11	NW.	8	"	"	"	Dug	28	2,255	- 15	2,240	10	2,245	Glacial sand	Hard, "alkaline"		D, S	Intermittent supply.
12	SW.	10	"	"	"	Dug	5	2,240	- 4	2,236			Glacial	Hard		D, S	Intermittent supply.
13	NW.	10	"	"	"	Drilled	333	2,240	- 90	2,150	332	1,908	Glacial	Hard		S	Abundant supply; cannot be pumped dry. #
14	SE.	10	"	"	"	Dug	13	2,255	- 9	2,246	0	2,255	Glacial sand	Hard		D	Intermittent supply.
15	SW.	12	"	"	"	Dug	14	2,190	- 8	2,182	2	2,188	Glacial sand	Hard		D, S, I	Intermittent supply.
16	NE.	12	"	"	"	Dug	18	2,210	- 14	2,196	15	2,195	Glacial sand	Hard		D	Sufficient for 40 head stock.
17	SE.	14	"	"	"	Dug	21	2,220	- 16	2,204	18	2,202	Glacial sand	Hard		D, S, I	Sufficient for 40 head stock.
18	NE.	14	"	"	"	Dug	14	2,200	- 6	2,194	8	2,192	Glacial fine sand	Hard		D, S, I	Well has watered 50 head stock easily.
19	SW.	14	"	"	"	Dug	13	2,200	- 10	2,190	4	2,196	Glacial quick-sand	Hard		D, S	Insufficient for 25 head stock; water comes in very slowly.
20	SE.	16	"	"	"	Dug	16	2,225	- 5	2,220	9	2,216	Glacial sand	Hard		D	Sufficient for house use only.
21	NW.	16	"	"	"	Dug	25	2,230	- 17	2,213	22	2,208	Glacial sand	Hard		D	Sufficient for house use only.
22	SW.	17	"	"	"	Dug	20	2,240	- 14	2,226	14	2,226	Glacial black sand	Medium soft		D, S, I	Abundant supply for 30 head stock.
23	NE.	18	"	"	"	Dug	25	2,225					Glacial				Dry hole.
24	NW.	18	"	"	"	Dug	33	2,235	- 27	2,208	10	2,225	Glacial sand	Hard		D, S, I	Sufficient for 60 head stock at least; rapid seepage.
25	NW.	20	"	"	"	Dug	24	2,220	- 14	2,206	12	2,208	Glacial sand	Hard		D, S	Very small supply, seldom used.
26	NE.	20	"	"	"	Bored	117	2,215	-104	2,111	115	2,100	Glacial coarse gravel	Very hard		D	Abundant supply before partly caving in, laxative effect on man.
27	NE.	22	"	"	"	Bored	42	2,200	- 35	2,165	40	2,160	Glacial sandy clay	Hard		D, S	Insufficient for 15 head stock.
28	SE.	24	"	"	"	Dug	12	2,180	- 2	2,178	0	2,180	Glacial gravel	Soft		D, S	Good supply for 25 head stock.
29	NE.	25	"	"	"	Dug	16	2,200	- 4	2,196	6	2,194	Glacial quick-sand	Hard		D, S, I	Sufficient for 20 head stock.
30	NE.	26	"	"	"	Dug	16	2,180	- 3	2,177	11	2,169	Glacial white sand	Hard		D, S	Sufficient for 30 head stock at least.
31	SW.	26	"	"	"	Dug	30	2,210	- 20	2,190	28	2,182	Glacial sand	Very hard		D	Sufficient for house use only.
32	SW.	27	"	"	"	Bored	40	2,195	- 32	2,163			Glacial sand	Hard, iron		D, S	Intermittent supply.
33	SE.	28	"	"	"	Spring	2	2,160	+ 2	2,162	0	2,160	Glacial gravel	Hard		D, S, I	An excellent spring; neighbours tank from here; cannot be pumped dry. #
34	SW.	28	"	"	"	Dug	22	2,210	- 6	2,204	10	2,200	Glacial sandy clay	Hard		D, S	Intermittent supply.
35	NW.	28	"	"	"	Dug	12	2,210	- 9	2,201	8	2,202	Glacial quick-sand	Soft		D, S, I	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 CHESTER NO. 125, 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
36	SW.	30	15	9	2	Dug	34	2,220	- 30	2,190	4	2,216	Glacial sand	Hard		D, S	Intermittent supply.
37	SW.	32	"	"	"	Bored	125	2,190	- 10	2,180			Glacial gravel	Hard, iron		D, S	Abundant supply; sufficient for 30 head stock at least.
38	SE.	32	"	"	"	Bored	60	2,180	- 50	2,130			Glacial gravel	Hard		D, S	Well can be pumped dry but it refills quickly.
39	SE.	33	"	"	"	Dug	22	2,140	- 19	2,121	17	2,123	Glacial sand	Hard		D, S, I	Sufficient for at least 20 head stock.
40	SW.	34	"	"	"	Dug	21	2,170	- 15	2,155	20	2,150	Glacial fine sand	Medium hard		D, S	Insufficient for 30 head stock.
41	NW.	34	"	"	"	Bored	52	2,165	- 41	2,124	49	2,116	Glacial sand	Hard		D, S, I	Barely sufficient for 25 head stock.
42	SW.	35	"	"	"	Drilled	216	2,195					Glacial	Hard, iron		D, S	Abundant supply.
43	NE.	35	"	"	"	Bored	60	2,215	- 33	2,182	58	2,157	Glacial gravel	Hard, iron		D, S, I	Abundant supply for 30 head stock.
44	SE.	36	"	"	"	Bored	64	2,215	- 58	2,157	56	2,159	Glacial gravel	Hard		D, S	Well can be pumped dry but refills quickly; sufficient for 50 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.