

filled with water and have had water in them ever since. These sloughs will undoubtedly dry again, and many of them could easily be drained so that they would always be available as hay meadows. The traverse of these sloughs might be of value for topographical purposes. It would, however, be a mistake to deduct areas for them, as the first time they became dry the owners would apply for titles to them.

#### Eighty Per Cent. Would Shrink

I would estimate that at least 80% of the water areas in the West belong to one of the last three classes. Or, in other words, if all the water areas on the prairie were traversed after a series of wet years and again traversed after a series of dry years, 80% of these water areas would either show a much smaller area or would disappear altogether.

The area of a quarter section made fractional by one of these water areas, if calculated to the water line, which is the only line that can be readily traversed, would only be correct for the date of the traverse. It is very unlikely that the area of the quarter section when patented would be the same as shown on the township plan.

The nature of the water areas in the West was fully understood by the Surveyor-General and his staff. When it was decided in 1913 to revise the water areas, the following classification for the disposal of the lakes was decided on as being most likely to cover all cases met with.

#### Lake Classification

Class 1.—Lakes that have entirely dried up. The shore line of the lake according to last traverse is shown on the township plan by broken line and called "Former bed of Lake No. — now dry land."

Class 2.—Shallow lakes likely to dry up. The shore lines of lakes are shown on township plan by broken lines, and are called "Low land liable to flooding." No area is deducted for these lakes.

Class 3.—Lakes which do not dry up but which have shore lines subject to large variations, say, 10 to 20 chains. These lakes are usually fairly deep in the centre and surrounded by shallow water which is likely to dry up. They are shown on the township plans by aliquot parts of sections for the centre, the shallow water being called "Low land liable to flooding." Careful soundings are taken to determine what aliquot parts are worthless.

Class 4.—Lakes which do not dry up but whose shore lines are subject to moderate variations, say, five to ten chains. These lakes are shown by aliquot parts on the township plans.

A lake classified as Class 4 in a dry year might be Class 3 in a wet year.

Class 5.—Lakes whose shore lines do not change. Their shores are shown in full lines on township plans and the areas are taken to the banks.

The surveyor classifies the water areas at time of survey. If the classification does not agree with the report on lakes, it is changed in the office.

#### Two Extremes in Five Years

The surveys for the revision of water areas have now been carried on for the last five years. During this period we have had two extremes in the amount of surface water. The year 1914 was the climax of a series of dry years, and in that year there was hardly a drop of surface water left on the prairie. The following year the sloughs began to fill again, and owing to abnormally heavy falls of snow during the past two winters, there was more surface

water in the spring of 1917 than at any other time during the past twenty years.

We have here, then, an opportunity to see if the above classifications will cover the water areas in a township investigated in both a dry and wet year, and yet give practically the same results.

The permanent lakes whose shores do not vary, and also the alkaline beds with well-defined banks, will cover practically the same area in both a wet and dry year.

The gumbo flats with fairly well-defined banks will likely be a little larger in a wet year than in a dry year. If one of these was shown on the township plan of the original survey as a lake and investigated in 1914, it would be reported as dry land; if investigated in 1917, more significance would likely be placed on the worthlessness of the bed when dry, and it would still be called a lake. If not shown on the township plan, no note would be made of it in 1914, but it is most likely a traverse would be made in 1917, and the water area classified as low land liable to flooding.

#### Dry and Wet Conditions

A traverse of a permanent lake with a variable shore line made in 1914, would contain only those aliquot parts which are worthless. The same lake would be much larger in 1917, and a traverse made then would contain a number of aliquot parts which should not be deducted from the area. However, if careful soundings are taken and reliable information obtained from the settlers, the worthless aliquot parts may be selected, the remainder of the lake being called low land liable to flooding. If both traverses have been carefully made, the aliquot parts considered worthless should closely agree.

The hay sloughs depending on surface water, would not be considered as water areas in 1914, and if traversed in 1917 would, if their nature could be ascertained, undoubtedly be shown as low land liable to flooding.

So that if the same township was investigated during a dry cycle and again investigated during a wet cycle, the area shown on the township plans as being worthless, with the exception of shallow lakes previously traversed, should be practically the same. There would, however, be a number of low-land-liable-to-flooding areas shown on the plan of the township compiled from the investigation made in the wet years.

#### Reliable Information Needed

This close agreement can only be obtained if reliable information can be had from the settlers, and I regret to say that I know of no other subject on which the western settlers disagree so much, as on the true character of these water areas.

As pointed out, the condition of the water areas in the West depends almost wholly on the winter snowfall and the amount of evaporation the next season. As these move in cycles there are a large number of water areas which are alternately flooded land and dry land. Some of these beds produce hay when dry, while others are worthless. It would appear that if the water in the hay sloughs were drained into the worthless beds, considerable land of value would be reclaimed and a number of permanent lakes formed. Much valuable information as to the feasibility of these schemes could be very cheaply obtained by having a leveller attached to a stadia party.

I might add that frequent requests are made to stadia parties for information as to the drainage of these lakes.

The nature and extent of the water areas is continually changing as are also the banks of the rivers, so that it is unlikely that the township plans made now will show the