Reconnaissance of Unconsolidated Deposits Near Cawston, B.C. -- July, 1951

By H. Nasmith

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Area of Investigation

The area is shown on the sheet MS71 of the Columbia River Basin issued by the Surveys and Mapping Bureau of the Department of Mines and Resources in 1949. It lies east of the line 119° 47' and extends from the Similkameen River northeast to the 1600-foot contour. The same area is shown on air photos.B.C.-84:38 to B.C.-84:40 taken in August 1938.

Object of the Investigation

During June and July 1951 Mr. P.G. Odynsky of the Water Rights Branch collected information regarding the location and elevation of wells in this area from which water is obtained for irrigation. Systematic readings will be made of water level in these wells and in the Similkameen River in order to determine the effects of the withdrawal of water for irrigation. The reconnaissance of the unconsolidated deposits was made to learn something of the nature of these deposits and to see if there are any features which might significantly affect the interpretation of these water-level readings.

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Unconsolidated Deposits

Within the area the unconsolidated deposits have four conspicuous topographic forms. These are: 1. the present flood plain of the Similkameen River; 2. flat topped terraces bordering the northeast edge of the flood plain; 3. fans with gentle slopes and the form of shallow cones which head in gullies and creek channels to the northeast and spread out across the terraces toward the river; 4. steep active rock talus slopes bordering the valley walls wherever there is a supply of mechanically broken rock available.

Flood Plain of the Similkameen

The flood plain of the Similkameen River slopes gently scutheast from an elevation of 1,330 feet at the north to 1,300 feet at the south of the area. Air photos show numerous meander scars on the flood plain where the Similkameen has cut off meanders and gradually shifted its course across the flood plain. The old channels have been filled with sediment and show up on the air photos because of differences in vegetation. Some of the more recent changes in the course of the river have left marshes and sloughs such as Lowe

Slough. The surface of the flood plain is covered with a variable thickness of fine silt overlying clean well-rounded river gravel. Northwest of Cawston along the railway grade the silt is only a few inches thick while in a recently dug drainage ditch north of Cawston more than 8 feet of very clayey silt is exposed. Probably the deep clayey silt is sediment filling an old slough and the shallow silt is deposited on top of an old gravel bar. Keremeos Creek flows for about 3 miles parallel to the Similkameen less than a mile from it. The land along the creek is marshy and poorly drained and is probably abandoned channels of the Similkameen which have been filled with silt.

Terraces.--The main terrace (Cawston Bench) is northeast of Cawston and smaller terraces fringe the valley north of the main terrace. These terraces lie at elevations of 1,370 to 1,400 (60 or 70 feet above the flood plain of the Similkameen) and slope gently toward the river and downstream. The material exposed in excavations on these terraces consists of a layer of silt over well-rounded washed gravel. These terraces appear to be the remnants of a flood plain of the Similkameen formed when the river flowed at a higher elevation than it does now, and

variations in the thickness and distribution of the silt are similar to variations found on the present flood plain.

Much of the material opposite Blind Creek may have been deposited as a delta of Blind Creek which was modified by the main stream. At the edge of the terrace it slopes steeply to the present flood plain and the scarp has obviously been formed by erosion of the Similkameen at its present level. The cusp-shaped bites which the river has taken into the terrace are clearly visible in air photo B.C. 84:38. The surface of the terrace has also been slightly eroded by the temporary streams which flow across it.

In addition to the terraces which stand 60 or 70 feet above the present flood plain there are remnants of a still higher terrace which evidently stood about 200 feet above the present flood plain. Two such remnants can be seen on either side of Manuel Creek and were evidently protected from erosion by the rock bluff about a quarter of a mile farther west.

Fans.---Cone-shaped fans with gentle slopes extend onto the terraces from gullies in the side of the valley. One of the largest fans spreads out from

the gully in which Blind Creek flows and this fan is being cultivated. The material making up the fan appears to consist of silt mixed with a large proportion of small angular rock fragments and a few boulders. The material is probably less permeable than the gravels which make up the terrace and it does not seem to have been deposited by running water. In several of the gullies remnants of glacial till stand like pillars and these gullies were probably at one time completely filled with glacial till. This glacial material mixed with fine talus debris would move as a mud flow on relatively flat slopes when saturated and the fans were probably formed in this way.

Talus Cones.--Where there is a supply of mechanically weathered rock from the valley walls steep cones of talus material have developed. The material in these cones is very permeable and rain and small streams coming down the valley sides are readily absorbed into the talus.

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Unconsolidated Deposits and Ground-water

All the unconsolidated deposits except the clayey silt filling old sloughs seem to be very permeable. The material in the fans may be slightly less permeable than that of talus cones, terraces, and flood plain. Therefore much of the rainfall and snow melt probably seeps into the ground and flows to the Similkameen underground. The rate of ground-water flow will determine whether or not water is moving from ground-water storage to the river all year. If the flow is rapid most of the ground-water storage may be discharged to the river by midsummer after which losses from ground-water storage (by withdrawal or evaporation) would be replaced by flow of water from the river.

The deposits of the flood plain where most of the wells are located are probably in lenticular beds with local variations in permeability. Anomalous water-level readings in a particular well might easily be due to the presence of a deposit of silt in an old river channel which interfered with the normal movement of ground-water.