GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

92 I NE

LEGEND

PLEISTOCENE AND RECENT

Alluvial (9,10)

10 Stream Channel and Flood-plain Deposits: gravel, sand, and mucky peat

9 Alluvial Fan Deposits: poorly sorted gravel, sand, silt, and clay

Lacustrine and Glacio-lacustrine

8 Lake Deposits: silt, clay, sand, and gravel; 8a, 'collapsed' lake deposits; 8b, thick silt, clay, and sand; 8c, thin veneer lake deposits, (silt and clay); 8d, thin silt and clay deposits with irregularly interspersed pockets, hummocks, and ridges of sand and gravel

Fluvial and Glacio-fluvial (6,7)

7 Stream Deposits: gravel, sandy gravel, and sand; 7a, terrace deposits; 7b, deltaic deposits

6 Kettled Stream Deposits: gravel, sandy gravel, sand, and silt, surface marked with kettle holes; 6a, terrace deposits; 6b, deltaic deposits

Glacial and Glacio-fluvial (4,5)

5 Rill Deposits: complexes of channel-bottom gravels, bouldery bars, and small patches of ponded silts and clays

4 Morainal Gravels: poorly sorted gravel and sand characterized by irregular hummocky and kettled topography; includes kames and eskers

Glacial

3 Till: 3a, drumlinized till; 3b, hummocky and ridged till

2 Drift, undifferentiated: 2a, mainly till devoid of distinctive glacial landforms generally covered by 1 foot to 5 feet of colluvium; may include areas of younger deposits; 2b, mainly glacial and glacio-fluvial deposits and hummocky and ridged till, overlain by colluvium in many areas; may include areas of other deposits. (Largely mapped from air photos in forested regions)

Glacial and Interglacial

1 Sub-till Stratified Deposits: includes ice-advance outwash and non-glacial sand, silt, and gravel

CENOZOIC

TERTIARY AND EARLIER

R Rock; includes areas of outcrop or near surface rock

Geological boundary (defined, approximate or assumed)

Drumlinoid ridge, crag-and-tail hill (direction of ice movement known, not known)

Esker (direction of stream flow known)

Till ridge

Gravel pit

Meltwater channel (small, large)

Geology by R. J. Fulton, 1960–62

Cartography by the Geological Survey of Canada, 1963

Roads, all weather

Other roads

Trail

Township boundary (surveyed, unsurveyed)

Indian Reserve boundary

Surveyed line, lot number

Railway

Telephone or telegraph line

Post Office

Intermittent stream

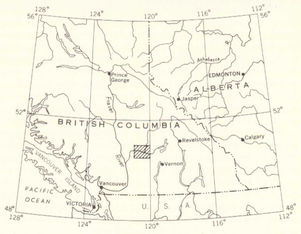
Marsh

Contours (interval 100 feet)

Height in feet above mean sea-level

Base-map by the Surveys and Mapping Branch, 1962

Approximate magnetic declination, 23° 36' East, decreasing 3.1' annually.



INDEX MAP

PUBLISHED, 1963
COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR, GEOLOGICAL SURVEY OF CANADA, OTTAWA

PRINTED BY THE SURVEYS AND MAPPING BRANCH

MAP 9-1963
SURFICIAL GEOLOGY
KAMLOOPS LAKE
BRITISH COLUMBIA

Scale: One Inch to Two Miles = $\frac{1}{126,720}$

2 1 0 2 4 6
Miles

DESCRIPTIVE NOTES

The Kamloops Lake map-area consists of a series of rolling uplands separated by deep, in some places broad valleys. The valley bottoms and lower uplands are easily-studied, open rangeland whereas on the higher uplands the surficial deposits are masked by vegetation.

Bedrock outcrops on the steeper slopes and the tops of hills but in most areas rock is covered by a varying thickness of unconsolidated material. Areas shown as rock (R) are characterized by 25 per cent or more actual outcrop. The bedrock of the area was studied by Cockfield[1].

About 90 feet of stratified sand, silt, clay, and gravel containing oxidized plant fragments and gastropod shells are exposed on Peterson Creek south of Kamloops separating two tills. Up to 350 feet of sub-till stratified deposits (1), correlated with this inter-till deposit, are exposed at other localities along and near Thompson Valley, but the lower till is seen only on Peterson Creek. A succession of silt, over gravel, over tan silt, over rusty gravel, near Cherry Creek, occupies the stratigraphic position of the inter-till deposits and silt over gravel that overlies a tan silt containing gastropod shells and oxidized plant fragments is exposed below till on Paul and Hefftey Creeks. The tan silt and rusty gravel are considered to be remnants of a non-glacial (interstadial or interglacial) valley-fill; the silt and gravel directly below the upper till an ice-advance outwash. Poorly sorted rusty gravel and poorly sorted rusty sand and silt containing freshwater gastropod and pelecypod shells – radio carbon age 25,200 ±460 (date no. GSC-79) – is exposed on the south side of the Thompson Valley north of Dufferin Hill. This material may also, it is believed, be correlated with the inter-till deposits exposed on Peterson Creek, even though neither till is present and geological evidence might lead one to anticipate a greater age for the sub-till deposits.

Undifferentiated drift (2) consists of unconsolidated material not encompassed by other map-units. The unit 2a is for areas underlain largely by ground moraine and the unit 2b largely for complexes of glacial and glacio-fluvial deposits. By more detailed study both could be further subdivided but, as much of unit 2 is in forested and largely inaccessible areas, further breakdown is not warranted.

During the last period of glaciation, ice overrode the entire map-area depositing a mantle of till from 0 to 70 feet thick (the upper till of the Peterson Creek section). The composition and texture of the till reflects the nature of the underlying material. Where derived from granite the till is loose, sandy, and stony; where derived from greenstone and argillite the till is compact and silt-rich; where the till has a provenance in the clay-rich Tertiary sediments it is plastic and clay-rich; and in the main valleys where the ice overrode unconsolidated gravel and sand the till is scarcely distinguishable from the stratified material it overlies. The drumlinized till (3a) is marked by an abundance of streamlined landforms developed by the movement of the ice-sheet. The hummocky and ridged till (3b) probably resulted from several processes, such as ice squeeze and ice shove, active near the retreating margin of the ice. Glacial till lacking these distinguishing landforms is included with undifferentiated drift (2a).

The last ice-sheet retreated largely by downwasting, tongues of ice remaining in the main valleys after the surrounding uplands were bare. During this phase of partial deglaciation glacio-fluvial, fluvial, glacio-lacustrine, and lacustrine deposits formed in valleys tributary to Thompson Valley. The terrace deposit (7a) of lower Tunkwa Creek formed where meltwater from the north entered a small ice-marginal lake that occupied the lower valley of Tunkwa Creek; the kettled stream terraces (6a) and kettled deltaic terraces (6b) south and east of Kamloops and similar terraces (6a and 6b) at the mouth of Campbell Creek are composed of material deposited where meltwater from the south and west dumped debris on the edge of the ice tongue occupying Thompson Valley; morainal gravel in the valley of Durand Creek, on lower Caribine Creek, and south of Kamloops, was deposited where meltwater and runoff from the deglaciated uplands carried debris onto ice that extended into these areas from Thompson Valley.

Abandoned channels on the surface of the large kettled deltaic terrace (6b) at the mouth of the Deadman River indicate that the debris was transported from the north but the specific source is not known. The stream terrace (7a) west and 200 feet below the main delta is thought to be composed largely of consanguineous material reworked at a later time by a large eastward flowing river occupying Thompson Valley.

The thick (up to 650 feet), extensive silt deposit east of Kamloops forms a mappable unit referred to as the South Thompson Silt[2]. 1- to 2-inch varves at the top of the silt grade downwards into varves as much as 200 inches thick, indicating anomalous conditions of erosion, transportation, and deposition during early silt deposition. The South Thompson Silt was deposited in a glacial lake, referred to as Lake Thompson[3], which formed in Thompson Valley between an ice-dam east of the Kamloops Lake map-area and an ice tongue lying in the basin of Kamloops Lake. Lake Thompson came into existence during the deglaciation of the lower uplands south, west, and north of Kamloops. Meltwater from the retreating ice- cutting ice-marginal channels and flushing out preglacial drainageways- eroded large quantities of till. The coarse fraction of the reworked till was left on the uplands in fluvial and glacio-fluvial deposits, and the silt and finer grained fraction was deposited in Lake Thompson.

The greatest number of varves seen in any one section is 75 and the entire silt deposit is thought to consist of no more than 200 varves, it therefore occupies a relatively short span of the history of the area.

[1] Cockfield, W. E.: Geology and Mineral Deposits of Nicola Map Area; Geol. Surv., Canada, Mem. 247 (1948)

[2] Fulton, R. J.: Deglaciation of the Kamloops Region, British Columbia; Northwestern University, unpub. Ph. D. Thesis (1963)

[3] Mathews, W. H.: Glacial Lakes and Ice Retreat in South Central British Columbia; Trans. Roy. Soc. Canada, Sec. IV vol. 38, p. 39-57 (1944)

MAP 9-1963
KAMLOOPS LAKE
BRITISH COLUMBIA
92 I NE