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ST. THOMAS AREA (WEST HALF)

SOUTHERN ONTARIO

Scale 1:50,000
N.T.S. Reference 40 I/4 West Half

LEGEND

CENOZOIC

Pleistocene

Recent

- 9 Modern alluvium: Gravel, sand, and silt, containing organic remains
- 8 Swamps and bogs: Peat, muck, marl

Recent and Late Wisconsin

- 7 Aeolian: Fine sand; low dunes and sand plains, mostly in areas of former sandy deltaic, lacustrine and beach deposits, and eastward of them

Late Wisconsin

Glacio-lacustrine and Glacio-fluvial

- 6 Gravel and gravelly sand
 - 6e Beach deposits
 - L.Wa.: Lake Warren
 - L.Wh.: Lake Whittlesey
 - L.Ar.: Lake Arkona
 - L.M.III: Lake Maumee III
 - L.M.II: Lake Maumee II
 - 6d Deltaic deposits in Lake Warren and Lake Arkona
 - 6c Deltaic deposits in Lake Whittlesey
 - 6b Deltaic deposits in Lake Maumee II, covered by a veneer of silty sand of Lake Maumee III; 6b'-older than L.Maumee II
 - 6a Valley trains
- 5 Silt, silty sand, and clay; lacustrine deposits; level or slightly hummocky topography (in stagnant ice areas):
 - 5b Silty sand and very fine to fine sand predominates
 - 5a Clay and clayey silt predominates

Glacio-lacustrine and glacial, undifferentiated

- 4 Stagnant ice moraine: hills and ridges of lacustrine silt and sand, or silty clay till, deposited in crevasses and pits in stagnant ice area, inundated by lake
 - 4a Silt and sand predominates

Glacial, Erie lobe

- 3 Port Stanley silty clay till and clayey silt till, in places covered by thin patches of lacustrine silt; ground moraine plains and end moraine ridges; slightly undulating topography, except for the more hilly slopes of the Ingersoll end moraine

Glacial, Huron lobe

- 2 Till, in places covered by thin patches of lacustrine silt; slightly undulating ground moraine, and more hummocky end moraine ridges with stagnant ice topography (less pronounced than in 4):
 - 2c Lucan end moraine and the related ground moraine N.W. of it: clayey silt till
 - 2b Mitchell end moraine and the related ground moraine W. of it: sandy silt till
 - 2a Arva moraine and the related ground moraine W. of it: silty clay till

Glacial, Undifferentiated by lobes

- 1 Tills, older than 2 and 3: silty till predominates

Note: deposits, thinner than 3 feet, are not shown as separate units.

SYMBOLS

- Raised shoreline: Well developed
- Raised shoreline: Poorly developed
- Raised shoreline: Modified by associated stagnant ice and lacustrine deposits, particularly silt knolls
- Stream trench
- Direction of glacial movement, concluded from alignment of pebbles in till
- Sand and gravel pit
- Clay pit, tile and brick factory

For other conventional signs refer to 1:50,000 National Topographic Map Series

SOURCES OF INFORMATION

Geology by A. Dreimanis and assistants, 1963
Topography directly from map 40 I/4 West Half of the National Topographic Series

Note

Magnetic declination in the map-area approximately 4' W., 1950

PLEISTOCENE GEOLOGY OF THE ST. THOMAS AREA (WEST HALF)

By A. Dreimanis

Mapping of the area was done by the writer and three field assistants, U.J. Vagners, G.D. McKenzie, and J.R. Etherington, during the summer of 1963, and it will be continued in the summer of 1964.

Bedrock consists principally of Devonian limestone with chert of the Delaware formation in the eastern half of the map, and gray shale of the overlying Hamilton formation in the western half. The regional slope of the bedrock surface is from the north east, where it is approximately 700 feet above sea level, towards the south west (450 feet above sea level). The drift thickness is approximately 200-300 feet, except for some valleys, where it is thinner.

No Pleistocene deposits, older than the Wisconsin or the last ice age have been found in this area. The natural and artificial exposures have revealed only the Late or the Main Wisconsin deposits. During this time three glacial lobes or flows have been active in this area: a) the Huron lobe, advancing from the Lake Huron basin approximately as far as London, b) the Erie lobe, advancing from the south-east and contacting the Huron lobe along the Delaware - London line, c) a general glacial flow from north-east towards south-west, probably most active during the maximum of the ice age, when the ice margin was south of the Great Lakes and the Huron and the Erie lobal flows were confined to the corresponding lake basins. Because of competition among these three glacial flows, and oscillations of glacial margins during retreats and readvances, several till layers and associated stratified drifts were deposited.

The oldest tills (see 1 on the map) are exposed at London, and deciphering of their stratigraphy is in progress.

During the final retreat (the late Cary substage), the oscillating margin of the Huron lobe formed three end moraines: a) the Arva moraine (the oldest of these three), b) an endmoraine between Melrose and Hyde Park Corner which appears to be the continuation of the more northerly Mitchell moraine, c) the Lucan moraine. Tills of the Arva and the Lucan moraines are underlain by extensive lacustrine deposits, and the clayey and silty texture of these tills is probably due to incorporation of the lacustrine deposits during the readvances of the Huron ice lobe.

The Erie lobe formed the following three endmoraines during its retreat of the late Cary substage: the Ingersoll (the oldest), the Westminster, and the St. Thomas moraines. The tills of these endmoraines and the associated ground moraines and stagnant ice moraines range from clayey silt till to silty clay till, and they are classified as part of the Port Stanley drift. The next older, more silty and sandy Catfish Creek drift has been encountered underneath the Ingersoll and the Westminster moraines. Extensive lacustrine clays, younger than the Catfish Creek drift, have been found underneath the Port Stanley till cover, particularly in the western half of the map area. Prior to those readvances of the Huron and the Erie lobes which formed the adjoining Arva and Ingersoll moraines, a proglacial lake, probably equivalent to the Highest Lake Maumee farther southwest, covered the area between the two lobes. This occurred probably during the Lake Erie Interstadial interval.

During the oscillating retreat of the Huron and the Erie lobes, several proglacial lakes inundated the lowest portions of the ground between the lobes, in the following sequence (beginning with the oldest): Lake Maumee, Lake Arkona, Lake Whittlesey, Lake Warren.

Beaches of these lake phases are discontinuous, because several of them were formed in stagnant ice areas. Abundance of stagnant ice moraines and genetically related land forms even in areas of lacustrine deposits suggest presence of dead ice as late as the Lake Warren time. Protection by stagnant ice caused absence of lacustrine deposits in large portions of the proglacial lake areas, for instance in the centre of the map.

In the adjoining East Half of this map area, the Lake Maumee II (or the lowest Lake Maumee) beach deposits were found to be contemporaneous with the St. Thomas end moraine. The youngest of the three Huron lobe moraines of this map area, the Lucan moraine, appears to be older than the Lake Maumee II. Along the south side of the Lucan moraine (west of Komoka) the Lake Maumee II shore line is covered by lacustrine silt and fine sand, and some of these lacustrine deposits form low ridges, perpendicular to the shore. They were deposited probably in between blocks of dead ice.

Main economic deposit of this area is gravel and gravelly sand: mostly deltaic and valley train deposits along the Thames River, also some beach gravels in the Lambeth area and near the south edge of the map.

Lacustrine clays of Lake Maumee age are used for making tiles between Mount Brydges and Delaware.

Bogs are confined mostly to kettle holes and some former stream channels. In some of them marl was encountered underneath peat. The central portion of the deepest kettle, the Byron bog (north-east of Byron) is occupied by a lake.

ADDITIONAL SOURCES OF INFORMATION

Bedrock: Sanford, B.V., 1957, Geological map of Southwestern Ontario; Geol. Surv. Canada, Map 1062A.

Bedrock surface and drift-thickness: Sanford, B.V., 1953, Preliminary map, Elgin county and parts of Middlesex county, Ontario, showing drift-thickness and bedrock contours; Geol. Surv. Canada, Paper 53-6.

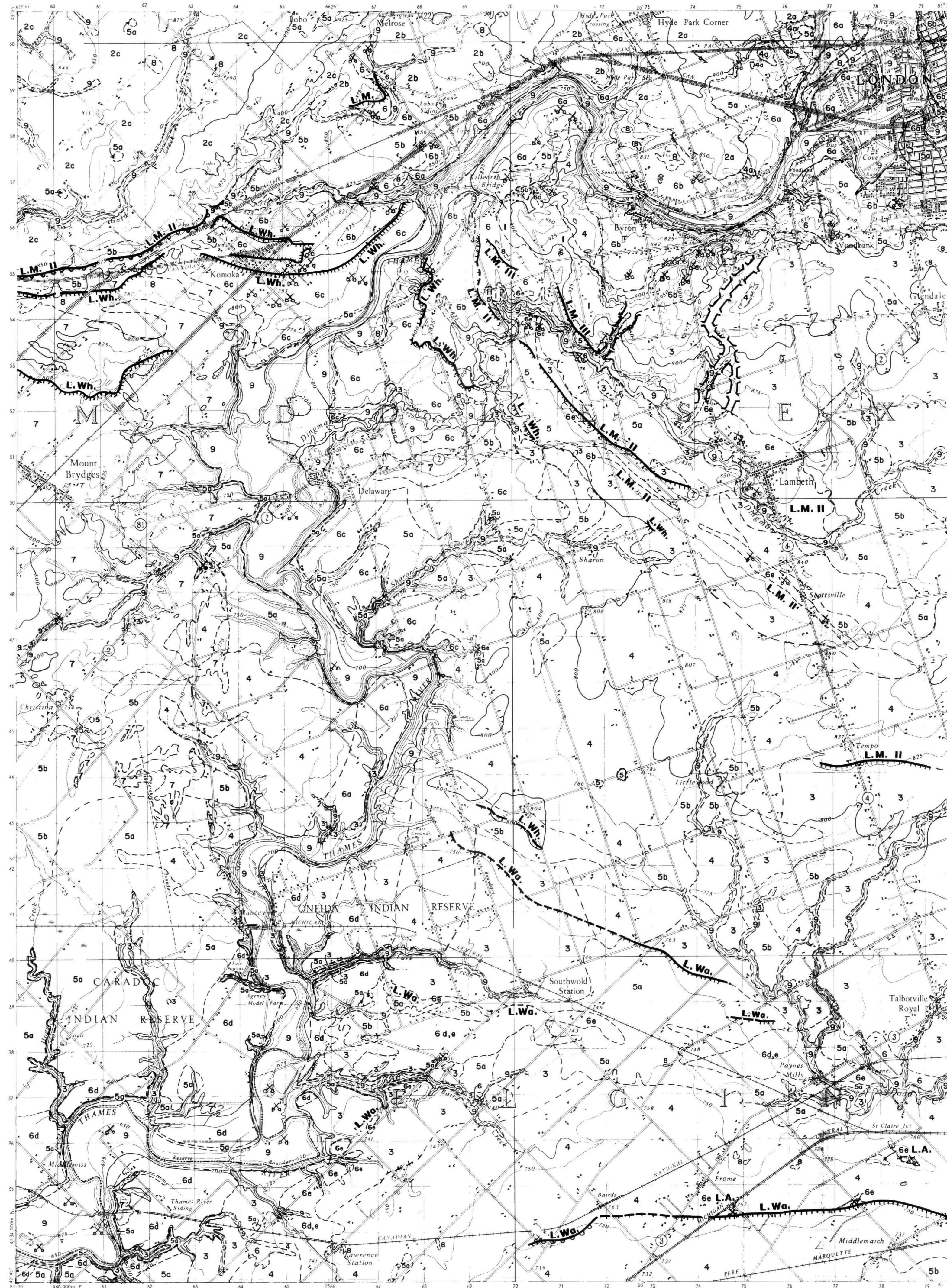
Physiography: Chapman, I.J., and Putnam, D.F., 1951, The Physiography of Southern Ontario; Ontario Research Foundation.

Tills: Dreimanis, Aleksis, 1961, Tills of Southern Ontario; Soils in Canada, Royal Society of Canada Spec. Publ. No. 3.

Sand and gravel: a) Hewitt, D.F., and Karrow, P.F., Sand and gravel in Southern Ontario; Ontario Dept. Mines, Industrial Min. Report No. 11.
b) Ontario Department of Highways, Toronto, Ontario.

Pedology: a) Soil survey map of County of Middlesex, 1931, Province of Ontario Soil Survey Report No. 6, Ontario Agricultural College.
b) Soil map of County of Elgin, 1929, Province of Ontario Soil Survey Report No. 2, Ontario Agricultural College.

Aerial Photography: Ontario Department of Lands and Forests, Downsview, Ontario.



Original survey 1963
Aerial photography by the RCMP 1948
Revised or drawn and printed by
The Army Survey Unit, RCCE 1947-48
Compiled from the second edition of the 1:63,360 map to 1:50,000
by the A.S.U. 1951.