Document generated on 04/25/2024 4:48 p.m.

Cahiers de géographie du Québec

Some Observations on the Late-Glacia Stages in the Coaticook Valley, Southern Québec

John Thornes

Volume 9, Number 18, 1965

URI: https://id.erudit.org/iderudit/020598ar
DOI: https://doi.org/10.7202/020598ar

See table of contents

Publisher(s)

Département de géographie de l'Université Laval

ISSN

0007-9766 (print)
1708-8968 (digital)

Explore this journal

Cite this article

Thornes, J. (1965). Some Observations on the Late-Glacia Stages in the Coaticook Valley, Southern Québec. *Cahiers de géographie du Québec*, *9*(18), 223–238. https://doi.org/10.7202/020598ar

Article abstract

Cette étude a pour but de présenter les résultats de recherches sur le terrain portant sur certains aspects de la déglaciation de la région de Coaticook, dans les Cantons de l'Est. La principale conclusion de l'auteur, c'est la possibilité qu'il y
ait eu plus de deux avancées glaciaires à travers la région, suivies par une succession de lacs pro-glaciaires. Parmi les autres sujets qui ont retenu l'attention de l'auteur, on peut signaler la répartition des blocs erratiques de granité, ainsi que certaines formes d'origine fluvio-glaciaire (eskers, deltas pro-glaciaires, etc.).

Tous droits réservés © Cahiers de géographie du Québec, 1965

This document is protected by copyright law. Use of the services of Érudit (including reproduction) is subject to its terms and conditions, which can be viewed online.

https://apropos.erudit.org/en/users/policy-on-use/

This article is disseminated and preserved by Érudit.

Érudit is a non-profit inter-university consortium of the Université de Montréal, Université Laval, and the Université du Québec à Montréal. Its mission is to promote and disseminate research.

https://www.erudit.org/en/

SOME OBSERVATIONS ON THE LATE-GLACIAL STAGES IN THE COATICOOK VALLEY, SOUTHERN QUÉBEC

by

John THORNES

University of London, King's College

Introduction

It is the purpose of this paper to present observations made on the deposits and morphology of the Coaticook area ; to discuss some possible interpretations of the features in the local context ; and to draw some tentative conclusions from them.

The field work was undertaken on the northern flanks of the Appalachians south of the town of Sherbrooke, Québec. The area is centred on the town of Coaticook and extends north to Lennoxville and south to just beyond the United States border. Lake Massawippi lies on the western margin of the area and to the east is the interfluve between the Moe and Salmon valleys. The relief and general location of the area are shown in figure I.

Previous work on the glacial phenomena in the Coaticook and Moe valleys is confined to the observations of Chalmers,[1] Cann and Lajoie[2] and Cooke [3]. Chalmers (p. 74) mentioned levels of 1,235 and 1,361 feet at Coaticook station, but whether these are considered to be lacustrine or fluvial in origin is not clear. Cann and Lajoie (p. 46) noted the clayey sands of the Coaticook valley and considered that they had been deposited in pro-glacial lakes. Cooke (p. 30) also expressed the opinion that pro-glacial lakes were formed in the Coaticook valley and drew attention to the fact that the drift appeared to be entirely or largely ground moraine ; no pronounced recessional moraines were observed. He commented on the large amounts of fluvio-glacial material and suggested that ice lingered in the valleys after it had largely disappeared from the uplands. He also noted that remnants of drift overlie the fluvio-glacial gravels in places and that these gravels should be underlain by an older till. He inferred that the cutting of the Coaticook gorge took place not only in post-Wisconsin times, but also throughout at least one earlier interglacial stage.

Geologically the area comprises three main lithological types (figure II) : the granite to the south ; the shales, limestones and quartzites of the Silurian St. Francis Group in the centre ; and the rocks of the Beauceville slice to the north [3, 4]. The granite is a coarse-grained, light-grey biotite granite with

[1] CHALMERS, R., 1897, *Report on field work in the Eastern Townships of Québec,* Geological Survey of Canada, Ann. Rept. 1896, vol. 9, Part A, pp. 74-83.

[2] CANN, D. B., and P. LAJOIE, 1943, *Études des sols des comtés de Stanstead, Richmond, Sherbrooke et Compton,* Ministry of Agriculture, Canada, Tech. Bull., 45.

[3] COOKE, H. C., 1957, *Coaticook-Malvina Map Area,* Québec Department of Mines, Geol. Rept. No. 69.

[4] COOKE, H. C., 1950, *Geology of the southwestern part of the Eastern Townships of Québec,* Geological Survey of Canada, Memoir 257.

Figure I

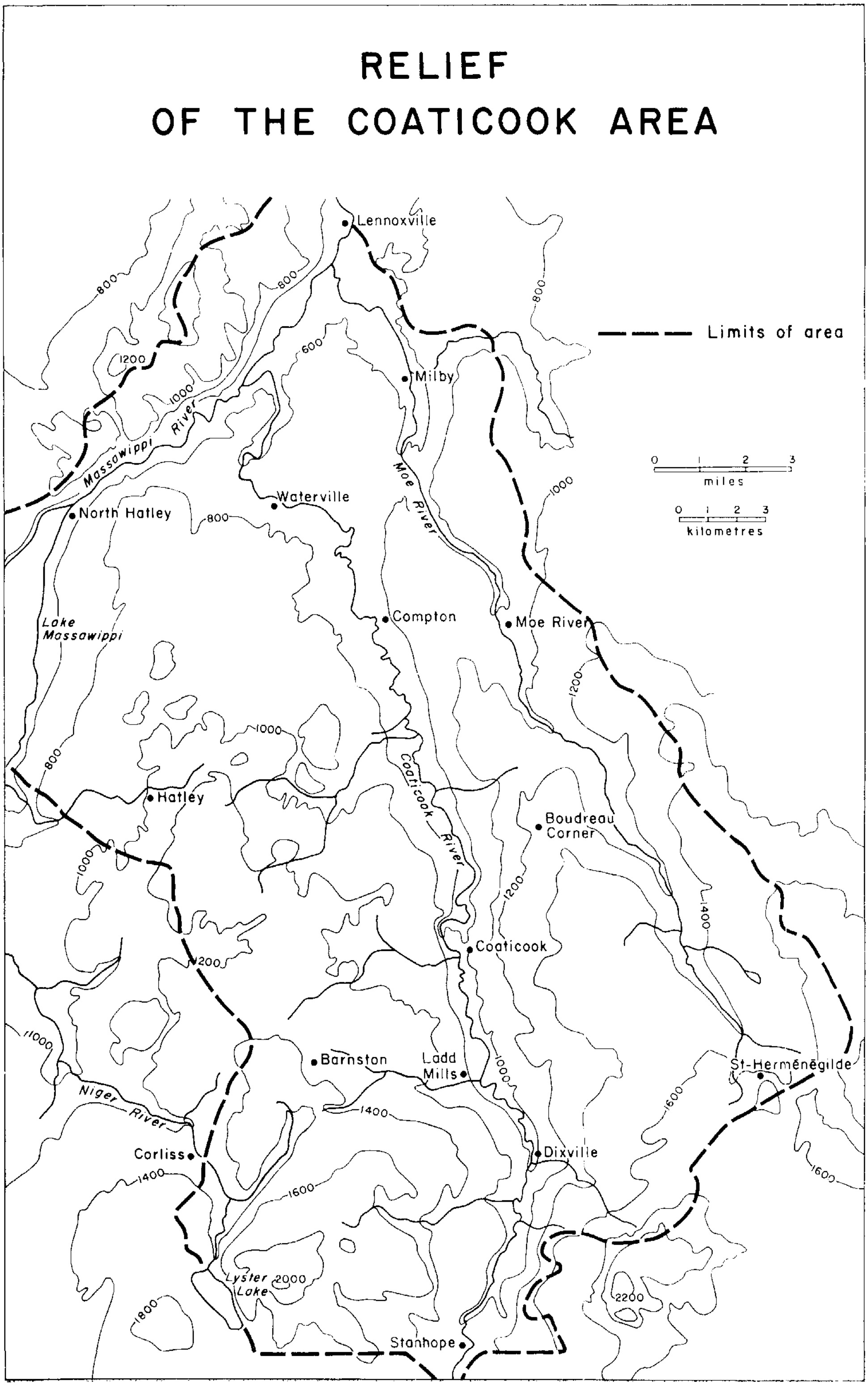
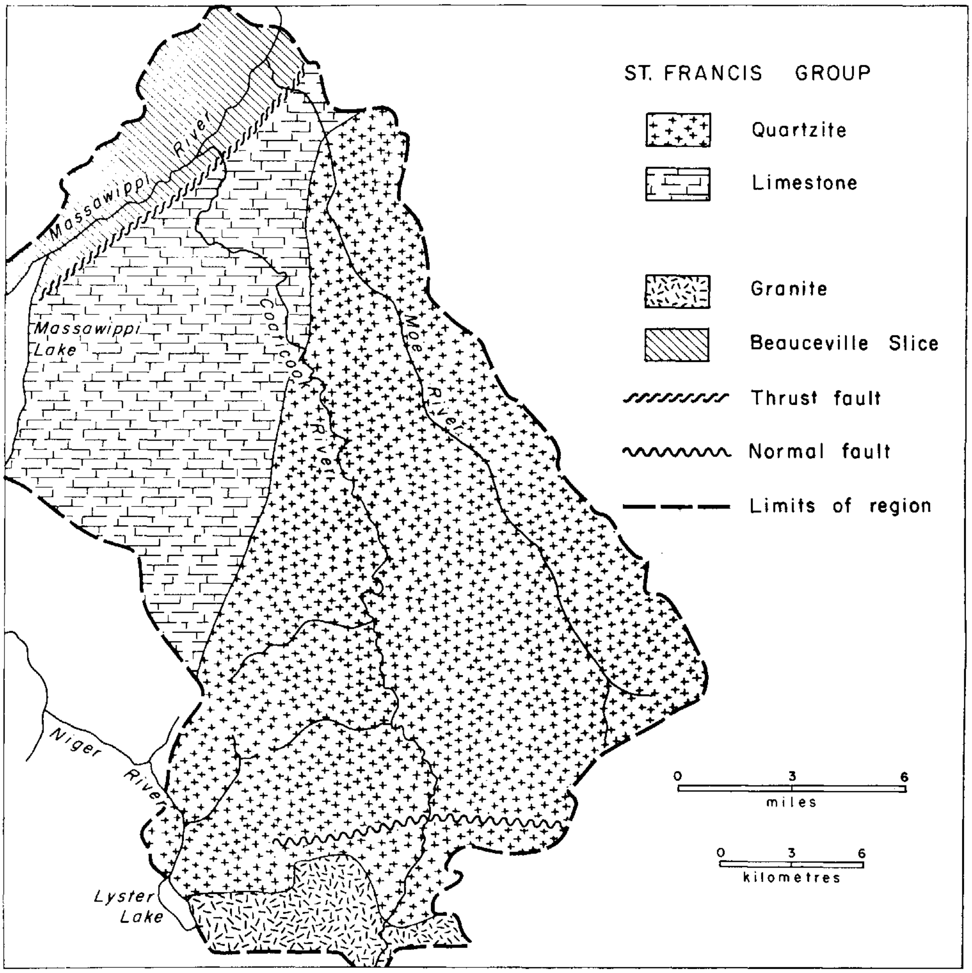

RELIEF
OF THE COATICOOK AREA
Limits of area
miles
kilometres
Lennoxville
Milby
Waterville
North Hatley
Lake Massawippi
Massawippi River
Moe River
Compton
Moe River
Hatley
Boudreau Corner
Coaticook River
Coaticook
Barnston
Ladd Mills
St-Herménégilde
Niger River
Corliss
Dixville
Lyster Lake
Stanhope
800
600
1000
1200
1400
1600
1800
2000
2200

FIGURE II

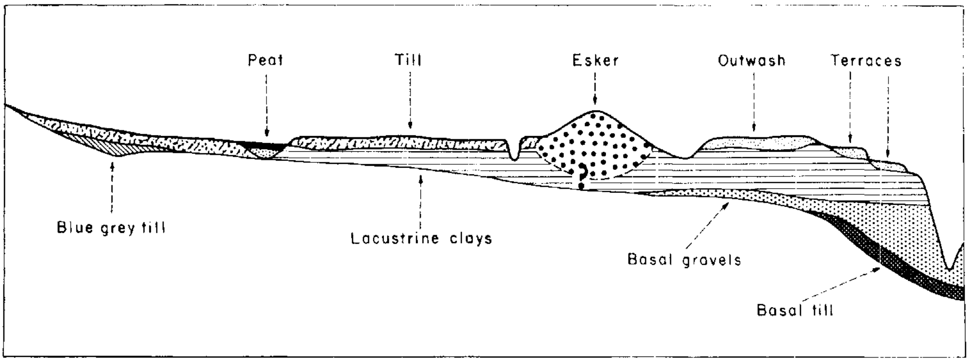


Geology of the Coaticook area.

a distinctive composition. It has a much greater resistance to erosion than the neighbouring St. Francis Group. Of the latter the quartzites are the most resistant but vary considerably in their quartz content. The Beauceville Slice, which lies to the north-west of the Massawippi valley, is composed of quartzites, grey slates, black limestones, and lavas which range in type from basalts to rhyolites. The granite is a relatively homogenous mass, but in the St. Francis Group the steep dip and varying lithology are reflected in the differential etching of the bare rock surface where it is exposed.

A series of erosion surfaces cuts across the ridges decreasing in altitude northwards from the border to the Massawippi valley. Residuals of resistant rocks such as the Stanstead granite stand above these surfaces. North of the

FIGURE III



Idealised section through the superficial deposits.

Massawippi valley the land rises sharply to reach 1,300 feet on the outcrop of the Beauceville Slice. This high land is broken by the St. Francis River gap at Sherbrooke and continues eastwards as the Stoke Range. A series of northwest trending valleys cuts obliquely across the strike, resulting in the dissection of the erosion surfaces into interfluves and valleys. The Coaticook and the Moe are two of these valleys, tributaries to the structurally guided south-west to north-east depression occupied by the Massawippi and St. Francis Rivers.

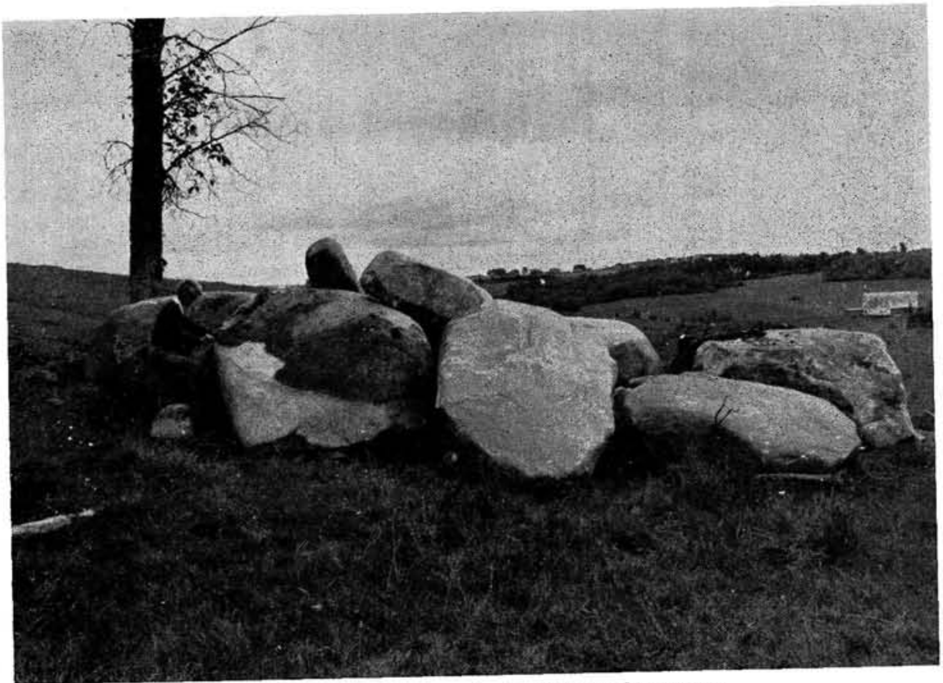
Superficial Deposits

An idealised section through the deposits of the Coaticook valley is shown in figure III. With the exception of the basal till, the position of which is inferred, all the components of this sequence may be observed between Coaticook High School and Barnston. The evidence presented below suggests that this idealised section is valid for much of the area south of Coaticook. The till shown overlying the lacustrine clays in the west has not been found to the north of Coaticook and occurs only sporadically to the south.

Pockets of a very hard, compact, blue-grey till, composed of rocks predominantly of local origin, occur in isolated situations. The position of this till beneath the gravels was not observed but it is suggested that it might be found there since it is overlain unconformably by the lacustrine clays where these lap onto bedrock at the valley sides. The structural bedrock lineaments (particularly the quartz bands) are not carried over into the unconsolidated deposits ; therefore we conclude that the material is not weathered bedrock. Furthermore, rocks of the St. Francis Group found in the till are angular and fairly fresh.

On the interfluves north of Coaticook a similar till is found which may represent the lateral equivalent of the basal till. The colour, the consistency, and the results of mechanical analysis are comparable, as also is lithological composition. This till occurs on the interfluves to the south-east of Coaticook but on the interfluves to the south-west it is replaced by another till-like deposit. It

PHOTO I



Granite erratics between Lyster Lake and Barnston.

appears to be concealed in the valley axes by lacustrine clays and fluvial terrace deposits.

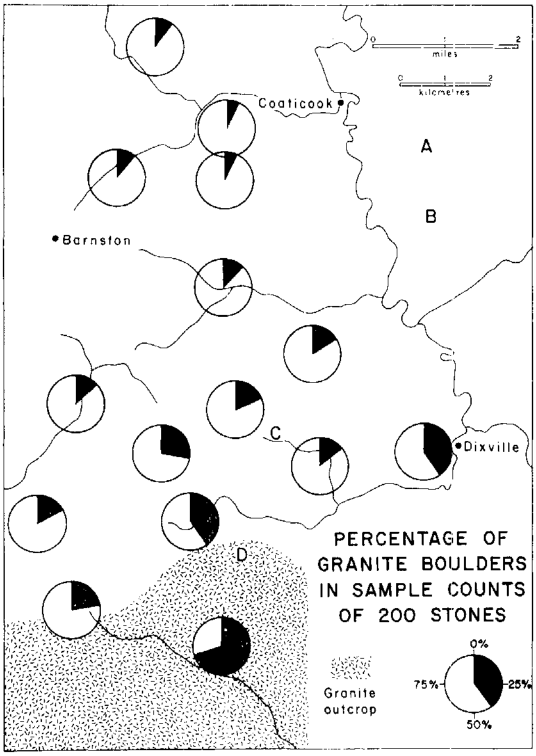
On the south-west interfluve and to the south, beyond the United States border, is a brown, sandy, loosely-compacted deposit which has the characteristics of an ablation till as described by Flint.[5] That it is not an alteration product of the underlying blue-grey till is shown by its higher sand content and its association with large granite erratics, some up to 8 or 9 feet across (photo I). The determination of these rocks as Stanstead granite (found in the outcrop marked on figure II) was made by comparison of a specimen from the actual outcrop with the erratics. Stone counts of 200 stones each were made at particular localities in the field ; the percentage of granite stones is expressed in figure IV. The map shows the decrease in granite percentages in a north or north-east direction ; there is a parallel decrease in size. The absence of large, very conspicuous granite erratics north and east of Barnston also suggests that the erratics were derived from the outcrop to the south.

Several two-dimensional till fabric analyses (figure V), carried out by the method described by Kirby,[6] are located by letters on figure IV. All the analyses

[5] FLINT, R. F., 1957, *Glacial and Pleistocene Geology*, John Wiley and Sons, New York, pp. 120-122.

[6] KIRBY, R. P., 1961, *The last phases of deglaciation in the Schefferville area as interpreted from glacial drift and till fabric analysis*, unpublished M.Sc. Thesis, McGill University.

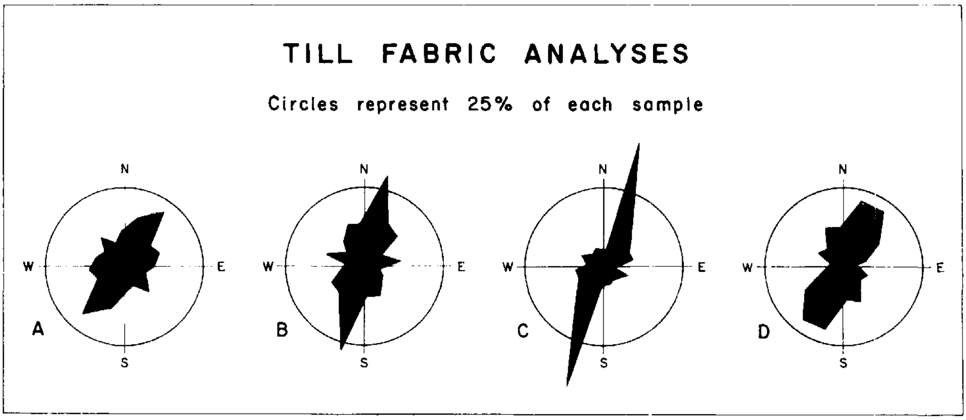
FIGURE IV



indicate an orientation of N. 16° E. or S. 16° W. This coincides approximately with the structural alignment of the bedrock, suggesting that, in the later stages at least, ice movement was controlled by structure. On the exposed rock surfaces north of Coaticook however (on the west side of the valley two miles northwest of the town, for example), striations indicate a movement of S. 30° E. or N. 30° W.

The valley axes are filled with gravels and sands which reach a thickness of 120 feet in exposures in the vicinity of North Coaticook. In the deposits at his locality there is a predominance of gravels with sand lenticles up to 7 or 8 feet in thickness. Further south, near Dixville and between Dixville and Norton exposures show a predominantly sandy deposit, whereas at Milby and Huntingville the deposits are mainly gravels. The deposits appear to occupy a buried channel, approximately parallel to

FIGURE V



Two-dimensional till fabric analyses (*Sampling localities are shown by letters on figure IV*).

PHOTO II

Folding and overturning in basal beds near Coaticook High School.

route 22, from the Coaticook valley to the Moe valley at Milby. Occasionally the beds show much coarser material, as in the roadside exposure about 1½ miles north of North Coaticook. Here, beneath roughly ten feet of sand of presumably fluvial origin, lie southerly-dipping beds of large, well-sorted boulders having a mean diameter of two feet.

The situation of these beds below lacustrine material (*see below*) and the morphological continuity of the features containing them suggest that they are all part of the same deposit. The upper surface of the gravels shows a marked unconformity with the overlying lacustrine clays. Furthermore the gravels at Coaticook and Milby have been considerably disturbed. Here folding and overturning have taken place (photo II), and in addition, in the exposure at Milby, regulardrag folds with an amplitude of 8 inches to 1 foot have been observed. These features suggest subsequent overriding of the deposit by ice.

The overlying lacustrine deposits consist of three types : the usual blue-grey laminated clays, composed for the most part of silt and clay ; a littoral facies with a high granule content ; and a sandy facies associated with deltaic deposits.

The laminated clays are found in the main axis of the valley up to a height of 1,360 feet. In the vicinity of Coaticook, and for about three miles north, they outcrop on the valley sides. At Coaticook itself they are represented in

PHOTO III

Small slumps in the lacustrine clays near Compton Station. The features are probably due to the melting-out of small ice lenses.

stream sections near the power station and in the valley just north of the high school. Further south they appear only in artificial exposures, as for example at the junction of the St. Herménégilde and the Coaticook-Dixville roads. To the north they may be seen in the vicinity of the camp site near Milby. Similar deposits are reported from Lennoxville by Keele.[7] Near the station at Compton the clays occasionally show slump features, which possibly originate from the melting out of ice blocks (photo III).

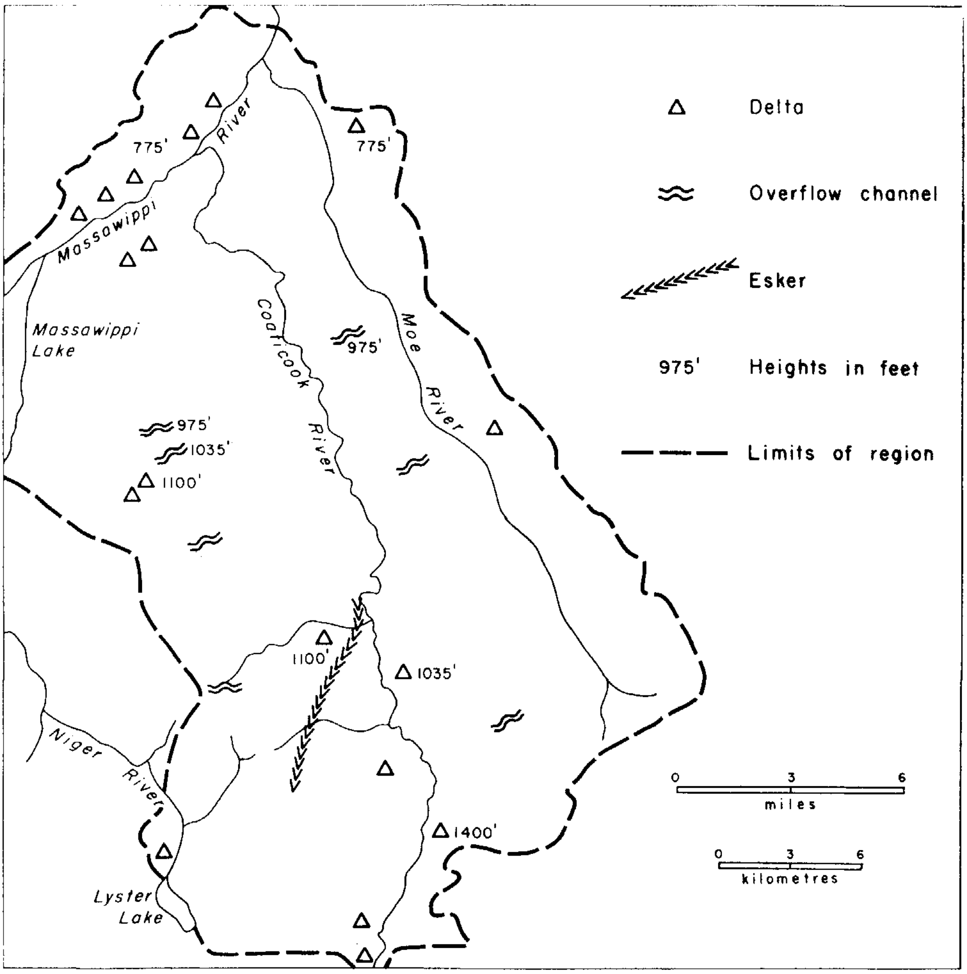
On the east side of the valley near Coaticook the clays have a high granule content near their uppermost limit and it seems likely that they represent a littoral equivalent of the laminated clays described above.

Near Dixville, at about 1,380 feet, streams have cut through an extensive deposit of regularly alternating bands of clay and fine sands some 40 feet thick. It is believed that these deposits were marginal with respect to the main basin of deposition. They suggest (following the arguments of Deane),[8] that a stream probably entered the lake at or near this point.

[7] KEELE, J., 1915, *Preliminary report on the clay and shale deposits of the Province of Québec*, Department of Mines, Canada, Memoir 64.

[8] DEANE, R. E., 1961, *Geology of lacustrine clays*, National Research Council of Canada, Assoc. Committee on Soil and Snow Mechanics, Tech. Memoir, No. 69, pp. 174-183.

FIGURE VI

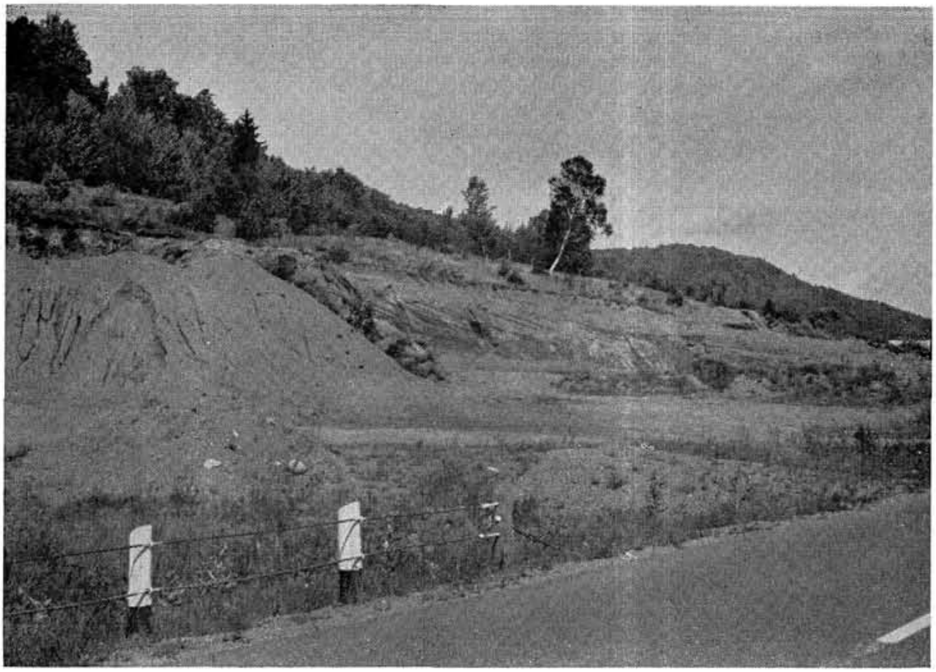


Distribution of deltas and overflow channels, and the approximate location and trend of the Coaticook esker.

It must be concluded from the data given above that the valley was once a basin of deposition for lake sediments ; from the evidence put forward below it seems probable that these deposits belonged to a single stage of glaciation.

Delta deposits believed to be of the same stage are found throughout the valley from Stanhope to Lennoxville (figure VI). The levels at which the deltas occur coincide with other features believed to be of pro-glacial origin and have been used to determine the levels of a series of successively lower lake stages which once occupied the valley (photo IV).

PHOTO IV



Delta features near Eustis, between Lennoxville and North Hatley, at 775 feet.

West of Coaticook, the five mile long ridge which terminates above the gorge cut by the Coaticook River is composed predominantly of well-sorted sand and gravel. The two components are often sharply separated, with beds varying appreciably in thickness. The gravel beds are generally much thicker than the sand beds. The sand grains vary in surface texture along the ridge. From the form and lithology of the feature it is considered to be an esker. At its south-west end the esker has an abrupt face, whereas at the north-east end it terminates in a series of low, well-developed lobes up to half a mile in length. These lobes extend towards the Coaticook River and are composed entirely of sand. They exhibit delta-like structures and morphology. These characteristics may be seen in the exposures on the Coaticook Golf Course. The lobes are confined to the north-east section and their dendritic form suggests a series of distributaries flowing to the north-east.

Just to the east of the northern end of the esker, in the vicinity of the power station, are found coarse sands and gravels overlying lacustrine deposits. They could represent flood deposits of the Coaticook River or alternatively might be considered as outwash deposits associated with the esker. Just to the west of this, on the road-side near the dam, the esker deposits overlie a clayey sand about 10 feet thick. The origin of these sands is not known but they could be either outwash or lacustrine deposits.

Morphological features

The interfluves above 1,400 feet south of Dixville and above 1,360 feet south of the latitude of Barnston are broad, gently-sloping and to a large extent till-covered. It is apparent that the plugging of minor topographic hollows by till has smoothed out much of the area. The till is thickest in these hollows but elsewhere is only a few feet deep. South-west of Coaticook, the surface is littered with large Stanstead granite and smaller St. Francis Group boulders. The interfluves north of Boudreau Corner, above 1,100 feet, have similar characteristics. Below this level, for example around Compton, the surface material is a sandy loam on till. This appears to be the result of the reworking of the till by lacustrine waters. Towards the valley axes there is a transition to lacustrine clays and the land becomes flatter and the soil heavier.

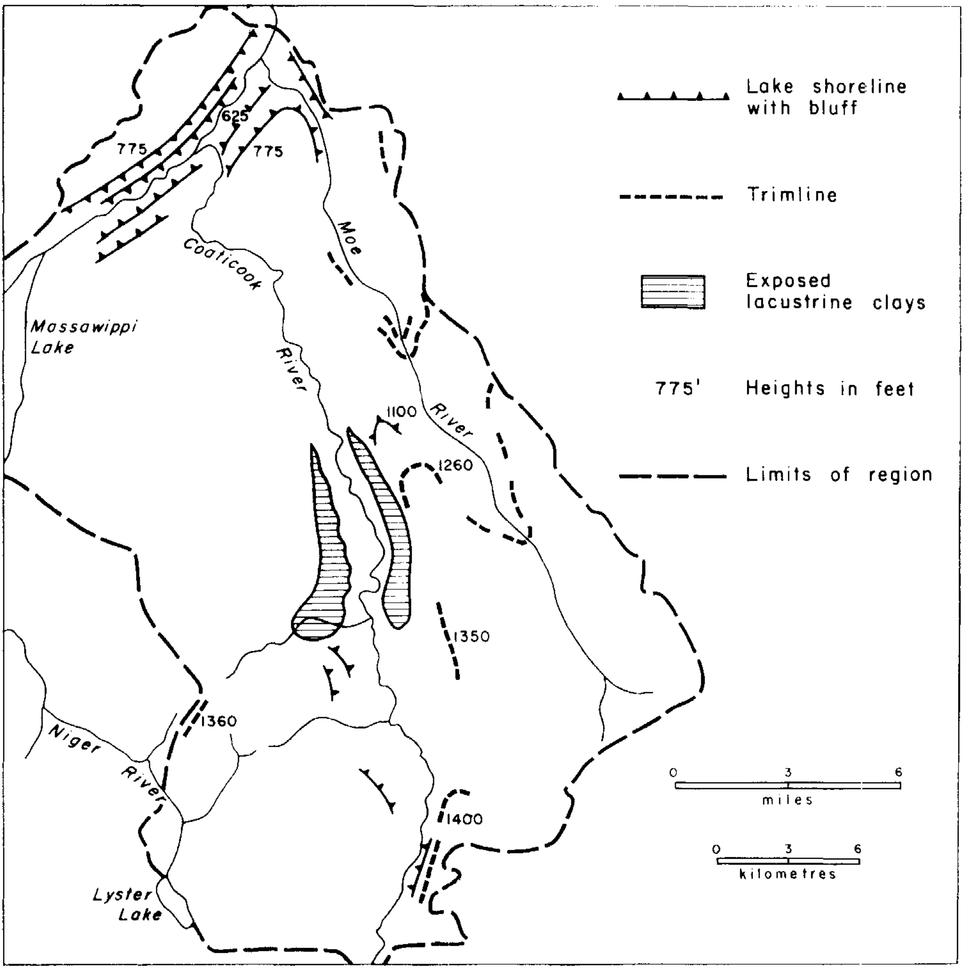
At lower altitudes both in the north and south, there is a series of shoreline features which marks the successively lower stages of a pro-glacial lake. The main criterion used to determine the heights of the lake stages is the altitude of the upper surface of deltas. These become progressively lower to the north. A good example can be seen at 1,100 feet just north of Boudreau Corner. Again at Stanhope, on the east side of the main road, well-developed delta features occur at 1,390 feet. Associated features, also indicative of former lake levels, are constructional flats (figure VII). One such flat may be traced for several miles along the northern slope of the depression occupied by the Massawippi River, between North Hatley and Lennoxville.

Only one example of a possible wave-cut bench in bedrock was found. This is above Dixville on the west side of the valley at 1,400 feet. On the other hand, in many places there is a sharp distinction between boulder strewn topography and smooth, lower, sandy or clayey terrain which is believed to represent a « trimline » at about the height of a former lake shoreline. Elsewhere in the valley marked flats occur, apparently where earlier deposits have been removed, at or near a particular lake level. Examples occur at 1,260 feet on the east side of the valley just south of Coaticook and at 1,100 feet north-west of Coaticook. The latter, just north of route 50, is extensive and is covered with coarse sands several feet thick. To the west of it, stream erosion has cut down into heavy lacustrine clays. Because of its proximity to the northern extremity of the esker, it is difficult to determine whether this sand is lacustrine or fluvio-glacial in origin.

Finally, one must note the existence of a number of channels (figure VI). They are considered to be overflow channels because of their form and in three cases (Norton, Boudreau Corner and East Hatley) because of their association with delta-like features. With the exception of the one at Boudreau Corner the channels appear to be sub-aerial rather than sub-glacial in origin. Their altitudinal coincidence with other features described above lends support to this belief.

The nature and distribution of these forms suggest the following sequence of events. A lake at 1,400 feet was confined to the area south of a point about one and a half mile north of Dixville. This lake was then succeeded by another at

FIGURE VII



Lacustrine shoreline features and the surface outcrops of the lacustrine clays.

1,360 feet south of a line from Boudreau Corner to Barnston. This second lake could have drained westwards towards the Massawippi depression by the shallow channel through Barnston village. Subsequent lakes at 1,260, 1,100, 775, and 625 feet are suggested, the first two being associated with channels at and south of East Hatley. Two further channels north of East Hatley, at 1,035 and 965 feet, do not appear to be coincident with a particular series of features.

In addition to the esker described above, several eskerlike features occupy the Norton-Island Pond gap, forming long promontories and islands in Norton Pond. They are formed of cobble gravel which is poorly sorted. If they predate the 1,400-foot lake stage they must have escaped erosion when this gap was used as an overflow channel.

The floor of the Coaticook valley has a low gradient except for two sharp breaks of slope, a small one at Dixville and a large one (250 feet) at Coaticook. The river has by-passed the latter, cutting a gorge to the west of it through hard quartzites. At the east of this steep slope, near Coaticook High School, a stream is cutting into gravels and clays, re-excavating the former course of the Coaticook River.

Above the gorge at Coaticook the river has one main fluvial terrace, but down-stream there are three well-marked terraces, the highest apparently merging into lacustrine features near Waterville. The lower two can be traced into the Massawippi valley around Lennoxville and it may be suggested, though only on the basis of map evidence, that they pass through the Sherbrooke gap. It seems likely that their heights were controlled by events occurring to the north of Sherbrooke.

* * *

The main component of the superficial deposits in the area is the fluvio-glacial material described in the first part of this paper. If, as the morphological evidence and the stratigraphic position suggest, the deposit extends through the entire valley, and is roughly contemporaneous at Milby, Coaticook and Stanhope, then its proportion of fines increases markedly towards the American border. Moreover, because of the volume of the deposit, it must have been produced from a large mass of ice. It seems probable that this mass was retreating in a northerly direction, depositing material either (*i*) as a valley train, with a river flowing south by the Stanhope-Island Pond gap, or (*ii*) as a series of proglacial contact features at the ice margin, or (*iii*) as deltas at the ice front in a pro-glacial lake.

If the latter were the case the lacustrine deposits would rest conformably on the outwash material ; the lacustrine deposits, as well as gravels, would have been subjected to any subsequent disburbance. This is not the case, however. In the second instance, it would be difficult to account for the great thickness and continuity of the deposits over such a distance, though it may well explain the irregular upper surface of the gravels. The first interpretation, therefore, seems the most probable of the three.

However, it was shown, in the earlier part of this paper, that the lake stages became progressively lower to the north. For this to have occurred, the land which was uncovered as the ice front retreated must have had a slope in that direction. We must therefore conclude that fluvial or glacial erosion took place between the deposition of the outwash train and the lacustrine sediments.

Cooke[3] (p. 30) believed that the gorge must be older than post-glacial times because of its great depth, the fact that it is cut through the hard quartzites of the St. Francis Group, and because of the absence of a large supply of water coming from the south. He inferred a pre-Wisconsin age for the blocking of the original valley, so that at least an inter-glacial period would be available for the initiation of the gorge. It was further suggested that, if this were the case, the gravels should be overlain by till, and he presented evidence to support this suggestion.

It is possible that, after the deposition of the fluvio-glacial material, the northerly drainage re-asserted itself, initiating the cutting of the gorge and dissecting the fluvio-glacial gravels *downstream* from the gorge rather than upstream from it. A readvance of ice would have deposited till on the gravels (in accordance with the observations of Cooke) ; the gravels would have been over-ridden and contorted, for which there is abundant field evidence ; and on retreat, the slope of the land would have permitted the formation of pre-glacial lakes.

It seems probable from this that a second glacial advance occurred, independent of that which deposited the fluvio-glacial material, and subsequent to it. On its retreat it would have been responsible for the formation of a series of lakes, for which there is ample evidence. The lake heights are noted above. Levels of 1,360, 1,260, 975, and 775 feet have been noted by Hitchcock,[9] Sangree [10] and Bird [11] in the Massawippi and Memphremagog areas. These lakes were probably the result of the same retreat phase and in fact the 775 feet stage is continuous in both areas and probably extends much further east than Lennoxville. Gadd [12] (p. 54) notes evidence from the Chaudière valley of « . . . basically two periods of glaciation from Laurentian centres of accumulation ». This is in agreement with the observations from the Coaticook area, and the lacustrine phase succeeding these periods in the Chaudière valley is probably of a similar age to that in the Coaticook valley. The latter may be related to the system of moraines described in Gadd's most recent paper.[13]

It is interesting to observe that the margin of the Pleistocene Champlain Sea was situated only a little to the north of this locality. If the ice which withdrew from this area permitted the transgression of the Champlain Sea, then the age of the ice might be considered to be Mankato. If this premise is correct, it implies that Mankato ice extended at least as far south as Dixville.

Two final questions may be considered : the position of the Coaticook esker and the distribution of granite erratics south west of Coaticook. If the esker were produced by southward-flowing water, it is difficult to explain the lobe-like features at the north-eastern extremity as sub-glacial tributaries because of their high content of fines and also because of the predominant current bedding of the lobes, which is towards the east. The lobes trend obliquely from the main body of the esker and it is likely that they would have been removed in the event of subsequent ice readvance. Also, there is no evidence that the water was able to escape at the south-west end by a channel. If the stream became englacial, then the deposits could be expected to have been left with the melting

[9] Hitchcock, C. H., 1907, *Glacial Lake Memphremagog*, Geological Society of America, Bull., v. 18, pp. 641-642.

[10] Sangree, A. C., 1953, *A geomorphological study of the Stanstead area, Québec*, unpublished M.Sc. thesis., McGill University.

[11] Bird, J. B., *et al.*, 1961, *The landscape of the Eastern Townships of Québec*, McGill University, Department of Geography, Miscellaneous Papers, No. 3.

[12] Gadd, N. R., 1964*a*, *New morainic systems in the St. Lawrence Lowlands*, Geological Survey of Canada, Paper 64-1, pp. 54-55.

[13] Gadd, N. R., 1964*b*, *Moraines in the Appalachian region of Québec*, Geological Society of America, Bull., v. 75, pp. 1249-1254.

of the ice. However, as noted above, the esker stops abruptly on the hillside with no further trace.

If, on the other hand, the water responsible for the formation of the esker were flowing in the opposite direction, the lobes might be explained as distributaries emerging from a stagnant ice mass and depositing their material into a lake at the east side of the main ridge. Lack of appreciable ice movement would maintain the esker intact, the finer material would be at the distal end of the lobes and the water issuing from the esker could be readily dissipated.

If such a stagnant ice mass had existed, its ablation might explain the presence of the sandy type of till mentioned earlier, and outwash from it might have yielded the sediments found near the uppermost dam in the Coaticook gorge. For this ice mass to be responsible also for the northward transport of erratics, some movement *before* the formation of the esker would have been necessary, otherwise the esker lobes would have been destroyed. It is impossible to see how the advance of a relict ice mass in the south-west could be contemporaneous with the retreat of the main ice to the north.

It was formerly thought [14] that there was positive evidence of northward movement of ice in this area. However neither Gadd or B. McDonald (personal communication) have found evidence of such an advance in the areas they have studied. Moreover, Stewart and McClintock [15] (working in Vermont) have found evidence to suggest that the latest movement in that area was from a north-west direction. Further evidence is therefore required before these problems can be solved.

Conclusions

It seems reasonable to suggest that at least two ice advances took place, separated by a period of fluvial erosion or glacial erosion or both. The first glacial episode, probably responsible for the blue-grey till, deposited a series of fluvio-glacial sands and gravels and appears to have extended beyond the United States border. The second advance, associated in its retreat with pro-glacial lake formation, extended at least as far south as Dixville. The two lowest lake stages, especially the 775 feet stage, had widespread distribution and their drainage and the development of river terraces appears to have been controlled by events beyond the Sherbrooke gap. No firm conclusions can yet be drawn concerning the problems associated with the Coaticook esker.

RÉSUMÉ

Cette étude a pour but de présenter les résultats de recherches sur le terrain portant sur certains aspects de la déglaciation de la région de Coaticook, dans les Cantons de l'Est. La principale conclusion de l'auteur, c'est la possibilité qu'il y

[14] THORNES, J. B., 1964, *The late-glacial geomorphic evolution of the Coaticook and Moe River valleys, Southern Québec*, unpublished M.Sc. Thesis, McGill University.

[15] STEWART, D. P., and P. MCCLINTOCK, 1964, *The Wisconsin stratigraphy of Northern Vermont, Am. J. of Sciences*, v. 262, pp. 1089-1097.

ait eu plus de deux avancées glaciaires à travers la région, suivies par une succession de lacs pro-glaciaires. Parmi les autres sujets qui ont retenu l'attention de l'auteur, on peut signaler la répartition des blocs erratiques de granite, ainsi que certaines formes d'origine fluvio-glaciaire (eskers, deltas pro-glaciaires, etc.).