DISCLAIMER

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Especially when using older guidebooks in this collection, note that locations may have changed drastically. Likewise, geological interpretations may differ from current understandings.

Please respect any trip stops designated as “no hammers”, “no collecting” or the like.

Consider possible hazards and use appropriate caution and safety equipment.

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BEDROCK GEOLOGY OF THE BURLINGTON REGION

The Burlington region is underlain by the Hinesburg synclinorium which trends northerly and is bordered on the west by the Champlain overthrust and on the east by the Hinesburg overthrust. The axis of the synclinorium plunges southerly in Colchester township and to the north in Charlotte and Hinesburg townships; the strata in the west limb of the synclinorium dip gently east and those in the east limb dip steeply west or are overturned; lesser folds furnish complexity to the structure. The Champlain overthrust dips gently east beneath the Hinesburg synclinorium and is formed sub-parallel to the strata of the west limb of the synclinorium. The Hinesburg overthrust also dips gently eastward, but overlies and truncates structures in the east limb of the synclinorium.

Lower Cambrian through Lower Ordovician strata are exposed in the Hinesburg synclinorium. The Lower Cambrian dolomites and quartzites of the west limb of the synclinorium are thrust westerly at the Champlain overthrust on Middle Ordovician shales along Lake Champlain. Lower Ordovician limestones near the axis of the synclinorium are overlain by Cambrian quartzites and slates above the Hinesburg thrust that have moved westerly over them.

The formations lie at the eastern border of the North American craton, the stable central platform of the continent which includes the Canadian Shield area, and the Adirondack Mountains west of Lake Champlain. Sandstones such as those represented by the quartzites of the Lower Cambrian Monkton and Upper Cambrian Danby formations thicken westerly and thin to extinction easterly and a western or cratonal source of their clastic constituents is indicated. This relationship is not readily demonstrated in the Burlington region because the earliest Cambrian rocks (pre-Dunham) exposed in the Hinesburg thrust slice cover the eastern part of the Hinesburg synclinorium, but it is apparent in areas a few miles to the north and south. The easterly thinning sandstone tongues are relatively 'clean', well sorted, and show cross-bedding and ripple mark and are thus of characteristic platform or cratonal type. These 'clean' sands are believed to have been derived through reqorking of earliest Cambrian sediments comprised of conglomerates, arkose, graywacke and shale such as are exposed in the Hinesburg overthrust slice.

Field Excursion, Saturday, October 9, 1948

Saturday morning, the Champlain overthrust and Lower Cambrian formations:

Assemble cars in front of Fleming Museum, University of Vermont, 8:00 a.m. Drive north through Winooski on Route 7 to the site of School No. 9 in Colchester township (Chimney Corners) where the hard surface road forks; take the left hand fork (Route 2) and turn left again on the gravel road to "Camp Winnisquam", where the first stop is scheduled for 8:30 a.m.

Stop 1 — 0.2 mi. SSE of Clay Point, Colchester
Canajoharie shale (Middle Ordovician): dips steeply east; crossbedding and fracture cleavage both indicate that the tops of the beds are to the west and that the strata are therefore overturned,-apparently on the west limb of an anticline whose axial plane dips steeply east. These structures are probably related to the Champlain overthrust seen at the next stop.

Stop 2 — 0.5 mi. SSE of Clay Point, Colchester
Champlain overthrust: dips gently east above the Canajoharie shale (Middle Ordovician) and beneath the Dunham dolomite (Lower Cambrian). The thrust surface is sub-parallel to the dip of the Dunham dolomite. Minor folds in the Canajoharie shale adjacent to the thrust plunge parallel to the dip of the thrust plane.

The Canajoharie shale contains limestone lenses (not to be confused with the Dunham dolomite) and is intruded by a small vertical dike.

Stop 3 — 0.3 mi. SW of School No. 3, Colchester
Dunham dolomite (Lower Cambrian): Pink and buff mottled dolomite with reddish deeply undulating shaly partings a few inches apart. At this locality the Dunham contains jasper that forms crosscutting veins and irregular masses; a jasper prospect is an interesting feature. The strata dip gently east.

Stop 4 — 0.3 mi. ESE of School No. 3, Colchester
Mallett member of the Dunham dolomite (Lower Cambrian): Sandy 'round weathering' gray dolomite is interbedded with dolomite such as that seen at Stop 3. Gentle easterly dips continue. The dolomites grade easterly and upward in the stratigraphic succession into shaly intraformational conglomerates that are in turn transitional into the Monkton quartzite.

Stop 5 1.0 mi. SE of School No. 3, Colchester
Monkton quartzite (Lower Cambrian): Gray rather than the typical red Monkton quartzites are more abundant here. The quartzite is interlaminated with thick beds of sandy dolomite easterly and upward in the succession; this is interpreted as the beginning of the transition into the succeeding Winooski dolomite, seen at the next stop. A very coarse breccia is found in the upper strata.

Stop 6 0.5 mi. E of "Town Farm", Colchester
Winooski dolomite (Lower Cambrian), Danby formation (Upper Cambrian): The Winooski dolomite crops out west of the highway and the Danby formation is exposed east of the brook that flows east of the highway; both dip gently east. The Winooski dolomite immediately above the Monkton quartzite is pink and west of the "Town Farm" the dolomite beds are separated by red siliceous partings that are not as deeply undulating as those in the Dunham dolomite. The siliceous partings and pink color disappear easterly and up in the section and are not found in the exposures near the highway. The Danby formation contains white quartzite beds interbedded with dolomite; the upper strata contain more sandy dolomite and less quartzite and are referred to the Wallingford member of the Danby formation. Cross-bedding is rather abundant in the Danby formation at this stop.

Return to Burlington for lunch 12:00 noon. Exposures of the Winooski dolomite may be seen west of the bridge at the falls in Winooski village as one enters Burlington from the north on Route 7.

Saturday afternoon, the Cambro-Ordovician succession of the Hinesburg synclinorium and the Hinesburg overthrust:

Assemble cars in front of Fleming Museum, University of Vermont 1:30 p.m. Drive south on Route 7 to Shelburne and take left-hand turn to Shelburne Falls. Note outcrops of the typical red Monkton quartzite immediately west of Route 7 about 1 mile north of Shelburne village.

Stop 7 Shelburne Falls
Danby formation (Upper Cambrian): Sandy dolomite, quartzite and some interbedded shales dip gently east in the bed of La Platte River. The sandy strata show broad bedding surfaces with abundant ripple mark, cross-bedding and mud cracks.

Stop 8 0.5 mi. ENE of Shelburne Falls

Clarendon Springs dolomite (Upper Cambrian), Shelburne marble and Cutting dolomite (Lower Ordovician - Beekmantown): These formations dip gently to the east and are exposed successively eastward up the hill north of the road east from Shelburne Falls. The Shelburne marble is partially dolomitic, - there is a "minute chaining and curdling" of the weathered surface of the otherwise clear marble. The transition from the Shelburne marble into the dolomitic formations above and below is irregular and possibly reflects distribution of secondary effects rather than entirely original conditions.

A dike cuts the formations at this stop.

In traveling easterly from this station note the alternate appearance of nearly flat lying Shelburne marble and Cutting dolomite.

Stop 9 0.5 mi. SW of Shelburne Pond

Danby formation, Clarendon Springs dolomite (Upper Cambrian), Shelburne marble (Lower Ordovician - Beekmantown): These exposures are in the east limb of a minor anticline within the Hinesburg synclinorium. This anticline is apparently complicated by a minor thrust fault west of Shelburne Pond, at which the Clarendon Springs dolomite and Shelburne marble are repeated.

Stop 10 0.3 mi. E of the south end of Shelburne Pond

Cutting dolomite and Bascom formation (Lower Ordovician - Beekmantown): The formations at this stop lie in the east limb of another minor anticline within the Hinesburg synclinorium. The Cutting dolomite is distinguishable by its predominantly dolomitic character. The Bascom, on the other hand, forms an interbedded succession of relatively thin limestone and dolomite units; the thicker limestone beds are near the base.

The strata in this vicinity are rather complexly folded with the development of fracture cleavage sub-parallel to the axial planes of folds.

A little southeast of this stop, south of the intersection of the crossroad south of Shelburne Pond with the Burlington - Hinesburg road (Route 116), the Bascom formation plunges north in several folds that apparently also involve overthrust Upper Cambrian slates. Both the slates and interbedded limestones may be seen in passing to Stop 11 along Route 116.

Stop 11 0.6 mi. NNW of Mechanicsville, Hinesburg township

Hinesburg overthrust: This fault dips gently east above the Shelburne marble (Lower Ordovician - Beekmantown) and beneath the Cheshire quartzite (Lower Cambrian). The Shelburne marble lies near the axis of a minor anticline within the Hinesburg synclinorium, the crest of which is truncated at the Hinesburg thrust so that strata younger than the Shelburne are absent. Near the thrust the marble is stretched and flattened and the quartzite is heavily drag folded. The drag folds were possibly formed before the thrust developed.

It should be noted that the quartzite at this stop differs from the typical Cheshire quartzite, such as most people are familiar with, in that it is 'dirtier' in appearance and less massive. The quartzite seen here forms the lower two-thirds of the formation commonly referred to as the Cheshire in Vermont. East of this stop it grades downward stratigraphically into a predominantly 'dirty' clastic succession that has been referred to in the geologic literature as the "Mendon series".

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41st ANNUAL
NEW ENGLAND INTERCOLLEGIATE GEOLOGICAL EXCURSION

Locality - Roxbury and Waterbury areas, Vermont
October 9-10, 1948

ECONOMIC GEOLOGY
(Saturday, October 9; Waterbury Talc Mine and Roxbury Verde Antique Quarries)

Leaders: - M. P. Billings and A. H. Chidester

Maps: - Montpelier, Barre, Camels Hump, and Lincolm Mountain topographica maps.

Assemble: - Saturday, Oct. 9 at 9:30 A.M. at the Waterbury Talc Mine, Eastern Magnesia Talc Co., 1-1/2 miles southeast of Waterbury on U.S. route 2. Sign on road reads: "Eastern Magnesia Talc Co., Mill No. 2).

Equipment: - Mine is dirty and wet. Wear old clothes. Mine will supply hard hats and lights. Those with rubber boots or waterproof high shoes should wear them. Mine will supply a limited number of rubber boots.

General Relations: - The country rock here is schist belonging to the Cambrian (?) Stowe (Bethel) formation; the average strike is N.20 E. and the average dip is vertical. The ultrabasic body is a large vertical sheet ranging in thickness from one foot to 550 feet. Most of the ultrabasic is serpentine, but along the comtact with the schist there is a zone of talc or grit (= talc + carbonate) ranging from o to 10 feet thick.

Locality 1: - Contact of schist and serpentine on west side of the ultrabasic body. East wall is about 140 feet to east of locality. Main drift follows west side of ultrabasic body to beyond locality 2.

Locality 2: - Exposure of both east and west wall of ultrabasic which here is only about 40 feet wide. Talc occurs on both walls at contact of serpentine with schist.

Locality 3: - Ultrabasic has pinched down to width of 6 feet, and being all talc or grit has been completely mined out. 90 feet to the south of here the ultrabasic body begins to widen again and the serpentine core again appears.

Locality 4: - Note that main level now follows east side of ultrabasic body.

Locality 5: - Center of serpentine body. Note veins of green talc and carbonate; also variations in serpentine.

Locality 6: - Main level passes into schists to east of the ultrabasic body.

Locality 7: - Main level returns to ultrabasic body which here is only 4 feet wide and consists entirely of talc or grit. For the next 1000 feet south the body is approximately the same width. On the surface at this same latitude, however, the ultrabasic is 550 feet wide and consists mainly of serpentine.

Locality 8: - Mafic dike exposed on east wall of level.

Locality 9: - Same mafic dike exposed on west wall of level, indicating vertical fault striking N., east side moved northward and downward to the north 150 feet at angle of 35 degrees.

Locality 10: - Crosscut through ultrabasic body, which is here 25 feet wide. Talc-grit zone 5-6 feet wide developed at eastern contact of ultrabasic and schist. Serpentine "core" 15-20 feet wide.

Locality 11: - Adit on east wall of ultrabasic body at 530 feet shows relations of serpentine, grit, and schist.

Locality 12: - Adit of abandoned level at altitude of 680 feet. On west wall of ultrabasic body. Shows well the relations of serpentine, grit, and schist.

Locality 13: - North end of cave-in at 820 feet. Shows relations of serpentine, grit, and schist. Ultrabasic body 100 feet wide; cave-in extends across the entire width of body.

ROXBURY VERDE ANTIQUE QUARRIES

Route: - To get to the verde antique quarries at Roxbury, take U.S. route 2 eastward to Montpelier, which is about 11 miles from the Waterbury Mine. From Montpelier take State Route 12 south to Northfield, which is about 9 miles from Montpelier. One mile south of the center of Northfield, take State Route 12A (right) to Roxbury, which is about 6 miles. 0.7 miles south of the cross-roads in the center of Roxbury, turn right and cross railroad tracks; assemble to left of road beyond R.R. (N.B. Route 12A is on the east side of the railroad and not on the west side as shown on the topographic map).

General: - The country rock here is schist belonging to the Ordovician (?) Moretown formation; it strikes about N.20E. and is about vertical. The schists are cut by greenstones which, in turn, are cut by the ultrabasics.

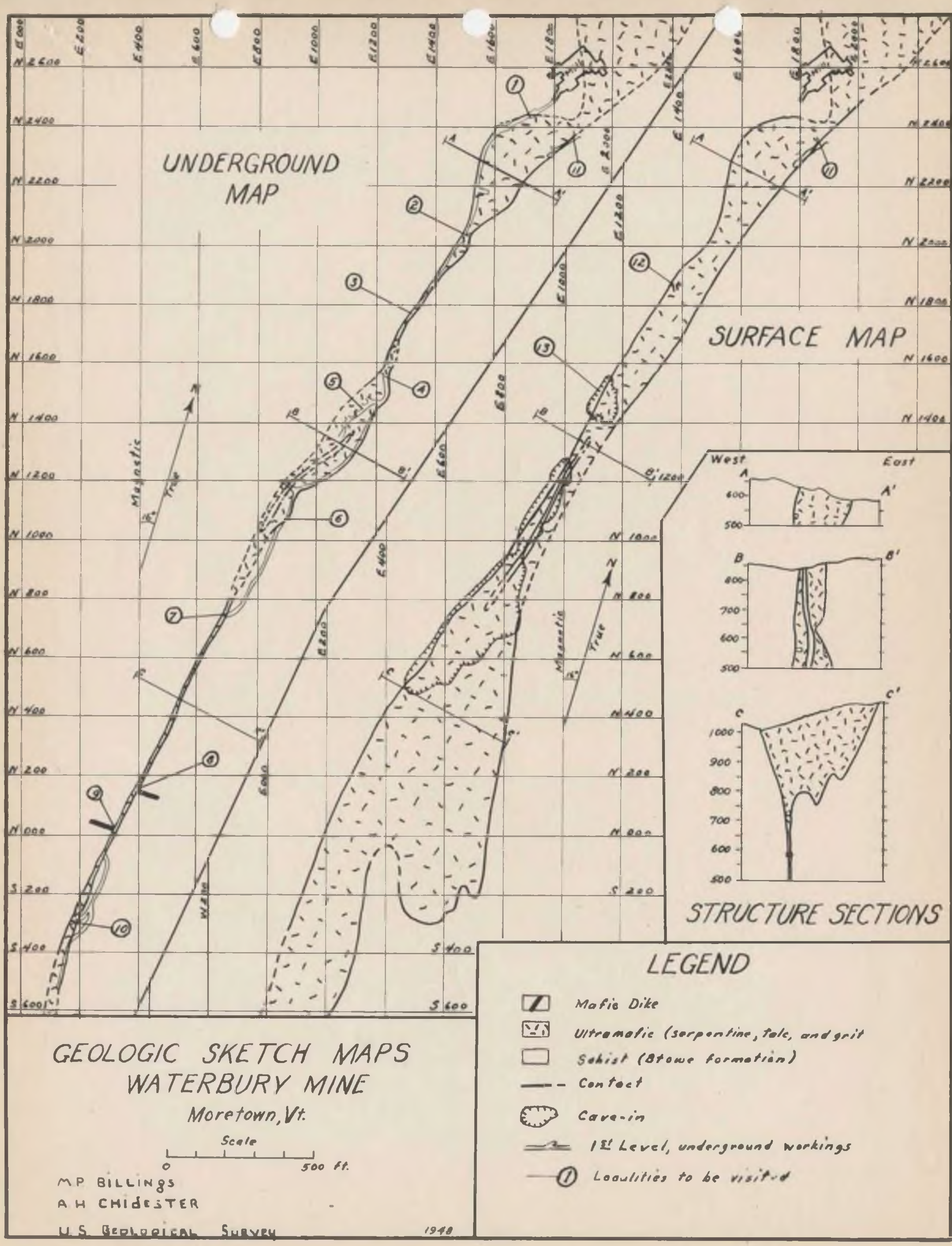
Locality 1: - Small abandoned quarry filled with water. The ultrabasic body here is podlike, The quarry was abandoned because the serpentine pinched out downwards, the quarry bottoming in gret. At the north end of the quarry the following relations may be observed: The ultramafics are untruded into greenstones; the greenstones, in turn, are dikes which cross-cut the schists (Moretown, Ordovician (?)). The sequence from the center of the ultramafic outwards in both directions into the schist is:

1. Verde antique
2. Talc and/or grit
3. Blackwall (here,altered greenstone)
4. Greenstone
5. Schist

Locality 2: - Working quarry (Roxbury #10). The same general relations hold here as in Locality 1. Grit is more prevalent in the north and east walls of the quarry. Note that verde antique body is made up of masses of massive serp, ranging in size from that of a man's fist to several feet across, bordered by highly sheared zones. The yellow material occurring as veins in verde is called sulfur rock by the quarry men and is probably serpentine.

(Those who wish may look around and collect from the dump at this time.)

Locality 3: - Small greenstone dike in road cut. R.H. Jahns has demonstrated that this dike (and the others in the Roxbury area) were intruded after the major folding of the region which stood the rocks on end and produced the schistosity; but that the dikes were subjected to minor folding and stresses in the end stages of the disturbance Thus, the dikes,and therefore the ultrabasics which intrude them and which also are affected by the last stages of the disturbance, clearly were intruded late in the disturbance. This disturbance is probably late Devonian. So the dikes and ultramafics are also probably late Devonian.



GEOLOGIC SKETCH MAPS
WATERBURY MINE
Moretown, Vt.

M.P. BILLINGS
A.H. CHIDESTER
U.S. GEOLOGICAL SURVEY

1948

NEW ENGLAND INTERCOLLEGIATE GEOLOGICAL EXCURSION

Burlington, Vermont
October 9-10, 1948

Field Trip No. 3 Glacial Geology

Leader: D. H. Chapman, University of New Hampshire.
Subject: Some Late-Glacial and Postglacial Features in the vicinity of Burlington.
Topographic Maps: Burlington, Milton and St. Albans, Vermont, sheets.
Bibliography:

(1) Merwin, H. W.: Some late Wisconsin and post-Wisconsin shorelines of northwestern Vermont. Vermont State Geologist, Report 6: pp. 113-138, 1908.

(2) Fairchild, H. L.: Post-glacial marine waters in Vermont. Vermont State Geologist, Report 10: pp. 1-41, 1916.

(3) Chapman, D. H.: Late-glacial and postglacial History of the Champlain Valley. Amer. Jour. Sci., Vol. XXXIV, August, 1937, pp. 89-124.

(4) Chapman, D. H.: Late-glacial and Postglacial History of the Champlain Valley. Vermont State Geologist, Report 23: pp. 48-83, 1942. (Note: This is a reprint of (3) except that the features in Vermont are described in greater detail, with added illustrations).

Summary: In line with descriptions of a retreating ice front in the mid-west, it was long ago stated that as the Pleistocene ice retreated northward through the Champlain Valley, a body of water of some sort grew pari passu. Fairchild believed that this body of water was entirely marine and that the marine estuary grew northward from the Hudson, through the Champlain Valley, eventually joining with marine waters in the St. Lawrence and cutting off New England as an island in the late-glacial sea. However, Woodworth, working in New York State, argued that the earlier stages of the Champlain submergence were by fresh water and this lake came to be known as Lake Vermont. In 1928-1930, Chapman studied both the New York and Vermont shores and reconstructed a history which was more nearly like Woodworth's than Fairchild's, but differed from the former's in important respects.

Evidence gathered by Chapman consisted mostly in shore features such as beaches, deltas and wave cut-and-built terraces. The altitudes of most of these features were ascertained by precise level and plotted in profile. Tilted water planes similar to those drawn earlier by Leverett and Taylor, Goldthwait and others, and more recently by Stanley, in the Great Lakes area, were constructed.

According to Chapman, there were two main stages of Lake Vermont: (1) Coveville and (2) Fort Ann. During both stages, the outlet of Lake Vermont was southward into the Hudson. When the ice disappeared from the valley, marine water flooded it, but only as far south as Whitehall. Thus New England was at no time cut off as an island in the late glacial sea. Parallelism of the three major water planes in the Champlain Valley proved stability of the land until after the marine water entered. Chapman then described a few features belonging to "subsiding stages" of the marine water, each succeeding one with less tilt as the land rose differentially, more to the north, less to the south. Chapman did not study the clays in the Champlain valley, nor their fossil content, and no attempt was made to carry the study into the valleys tributary to the Champlain Valley.

The field trip has been arranged so as to allow the party to visit representative shore features within reach from Burlington. There will be opportunity to observe the material which makes up many of the features described by Chapman. All the gravel pits and other cuts to be visited during the day have been opened since Chapman did his work and offer new light on the origin of many of the features described by him.

Start: The party will meet at East Hall, University of Vermont Campus at 8:30 A.M., Saturday, October 9.

Miles	Cumulative	
0	0	University of Vermont Campus. Leave 8:30 A.M. Drive E on Williston Road (U.S. 2).
2.0	2.0	Stop I. Winooski deltas - 10 minute stop

Arrive 8:35 A.M. Depart 8:45 A.M.

When the water level in the Champlain Valley dropped from the level of Lake Vermont to sea level, the Winooski River began to erode its Lake Vermont delta and spread quantities of sand over the area between Williston and the quartzite ridge at Burlington. The apex of the delta lay near Essex Junction, altitude near 345 ft., and from this point, the level surface of the top of the delta, now dissected by postglacial erosion, can be traced westward toward the lake. A peculiar feature of the delta is the lack of any perceptible foreslope. East of Essex Junction, higher level sand flats represent the earlier delta built by the Winooski into the Fort Ann stage of Lake Vermont.

Continue E on U.S. 2 to the western edge of Williston village. Turn left onto a dirt road and drive north to the road corner, (Elev. 535); park east of this corner, facing E.

9.2 11.2 Stop II. Williston Hill beaches - 30 minute stop

Arrive 9:05 A.M. Depart 9:35 A.M.

From the road corner 535, walk NW up the slope of Williston Hill to observe a series of beach ridges. Williston Hill stood out as an island during the Coveville stage of Lake Vermont. Fairchild described beaches, a "sloping bar", other "bar-like" features and a "prominent cliff and terrace" which he believed were all wave-formed. The lower beaches were accepted by Chapman as evidence of the Coveville stage of Lake Vermont.

Continue E for ½ mi., turn R, pass through Williston village crossing there U.S. #2, and drive S, passing W of Hinesburg Pond, through Mechanicsville to Hinesburg. From Hinesburg drive south on State Route 116 to the mouth of Hollow Brook ravine, near South Hinesburg. Turn L at the Champlain Sand and Gravel sign and proceed E ¼ mi.

14.3 25.5 Stop III. Hollow Brook "delta". - 30 minute stop

Arrive 10:00 A.M. Depart 10:30 A.M.

N of the road at this point may be observed a 140 ft. face of rather evenly bedded gravel and sand. S of the road, nearly opposite, is a nearly equally high face of similar gravel. A State-owned gravel pit is located ¼ mi. SW of the parking area, just S of the Hollow Brook bridge, and a fourth pit, privately owned, is located 1/3 mi. E of the N-S road, near B.M. 434. The topographic map displays the level surface of this feature, interpreted by both Merwin and Fairchild as the delta of Hollow Brook built into Lake Vermont. Continuing gravel deposits banked against the western slope of the Green Mountains both N and S of this point may be observed and can be used as proof that the entire series of features are in reality kame terraces.

From South Hinesburg, drive SW through Monkton Ridge to North Ferrisburg, and there turn R 1 mile to the base of Mt. Philo.

16.0 41.5 Stop IV. Mt. Philo State Forest Park - 1 hr. & 15 min. stop

Arrive 11:15 A.M. Depart 12:30 P.M. LUNCHEON AT SUMMIT

Cars will be parked near the base for a view of the lower terrace, then driven to the summit and parked there during the luncheon period.

Mt. Philo is one of the prominent knobs which rise from the nearly level surface of the Champlain lowlands. On a clear day, a superb view of the Champlain Valley may be obtained from the summit: One looks N into Canada, S to the southern end of Lake Champlain, and W to the Adirondacks.

Since Mt. Philo is such a prominent hill, it must have been an island during the history of any glacial lake in the valley, such as Lake Vermont. With the splendid exposure westward, it was natural for Fairchild to search for evidence of wave erosion. The steep W-facing cliff, from which many talus blocks have been separated and have rolled down the side of the hill, was ascribed by Fairchild to erosion during the marine invasion. Lower terraces could earlier be observed on the W flank of the mountain, but have now been hidden by the evergreen forest which was planted about 1930. From the base, the party will walk up to the lower terrace which Chapman ascribed to wave work during the Fort Ann stage of Lake Vermont.

Returning to the cars, the party will ascend the mountain by the toll road (Charge: 25¢ paid at summit). No stop will be made at the Coveville terrace level, but it may be observed at the second horseshoe turn of the road, at an elevation of 540 feet.

At the summit, there will be opportunity for viewing the valley from the Fire Tower or from the "Vista" points cut by the Forestry Department. Luncheon will be eaten in the picnic area.

The party should reassemble promptly at 12:30 for the descent.

Drive W from the base of the mountain to U.S. 7, turn R and drive straight to Burlington. Enter Burlington on Shelburne Road, driving north on St. Paul Street to Pearl Street, then west on Pearl to Battery Park. Drive through the Park (from which an excellent view of the Adirondack Mountains may be had), leaving by the north exit to North Avenue (Route 127). Just prior to reaching Lakeview Cemetery (L), notice the Winooski River meander scarp on the R where the Winooski almost succeeded in cutting through to the lake front. The Central Vermont railroad tunnels under the highway at this point. Proceed along the road passing the Cemetery on the L, and turn L into Staniford Road.

22.0 63.5 Stop V. Starr Farm beaches - 20 minute stop

Arrive 1:15 P.M. Depart 1:35 P.M.

These beaches were built during one of the subsiding stages of the marine invasion of the Champlain Valley. The sandy material may be observed at various points. Along the Starr Farm Road (next north), this series of beaches may again be observed, but here they are modified considerably by dunes.

Drive back to State Route 127, and continue toward Malletts Bay. Lower terraces cut by the Winooski River in postglacial time may be observed at various points along the route. The material is the sand of the Winooski delta.

8.4 71.9 Cross Indian Brook bridge at Junction of U.S. 2 and U.S. 7. Turn R immediately after crossing bridge on State Route 2A toward Colchester village. Along this road, Cobble Hill may be observed to the north (L), rising prominently above the rolling lowland. At Colchester village, turn L toward Cobble Hill.

3.8 75.7 Stop VI. Cobble Hill terrace - 50 minutes stop

Arrive 2:00 P.M. Depart 2:50 P.M.

Cars will be parked along the country road. The party will climb by foot to the terrace on the E side of Cobble Hill.

Cobble Hill is another bedrock hill which rises precipitously from the rolling floor of the Champlain lowlands. During the Fort Ann stage of Lake Vermont, Cobble Hill must have remained a sharp island surrounded by deep water. When Chapman studied this locality in 1928-30, the terrace ran, uninterruptedly, more than half-way around the hill. There was no gravel pit, and material was examined only by a few shallow test pits. The terrace was described by Chapman as "wave-built" and the feature used as one of the delineating features of the Fort Ann water plane.

As early as 1938, a large gravel pit had been cut into the face of the terrace and the material could be examined in detail. During the last ten years, large quantities of gravel have been taken out of the terrace and the original form and shape of it is practically gone. However, the dirty, kamey, gravel, with mixed till, is clearly observed in the present-day pit.

Milton terrace. From the Cobble Hill terrace, one may look east across the valley of Malletts Creek and observe the long and continuous terrace which Chapman described as cut by waves into till. There will not be time to visit this locality, but its character is very similar to the terrace on St. Albans Hill (Stop VII).

Drive N, join Route U.S. 7 south of Milton and continue N on this highway to St. Albans Hill.

13.8 89.5 Stop VII. St. Albans Hill terrace - 10 minute stop

Arrive 3:20 P.M. Depart 3:40 P.M.

This terrace is representative of those described by Chapman as being wave-cut into till. Fairchild pictured this terrace in his paper, but did not describe it, probably because its altitude did not agree with the level of his Marine Plane. Since Chapman published his paper, shallow excavations have revealed poorly-sorted sand and gravel with boulders in the outer part of the terrace. No evidence of wave-wear on the bedrock was ever observed. Presumably the waves simply washed the till, building a slight shelf. The sharp outward slope of the terrace is typical of all those described in the Champlain valley. It was supposed that the rather steep outward slope betrayed the immaturity of the terraces, built during the relatively brief duration of Lake Vermont.

The party will turn at this point and drive S through Milton to the Junction of U.S. 7 and U.S. 2, at Chimney Corner. Turn R (west) at this junction on U.S. 2. Shortly after passing School No. 3, turn L toward Clay Point and continue to first left-hand road junction.

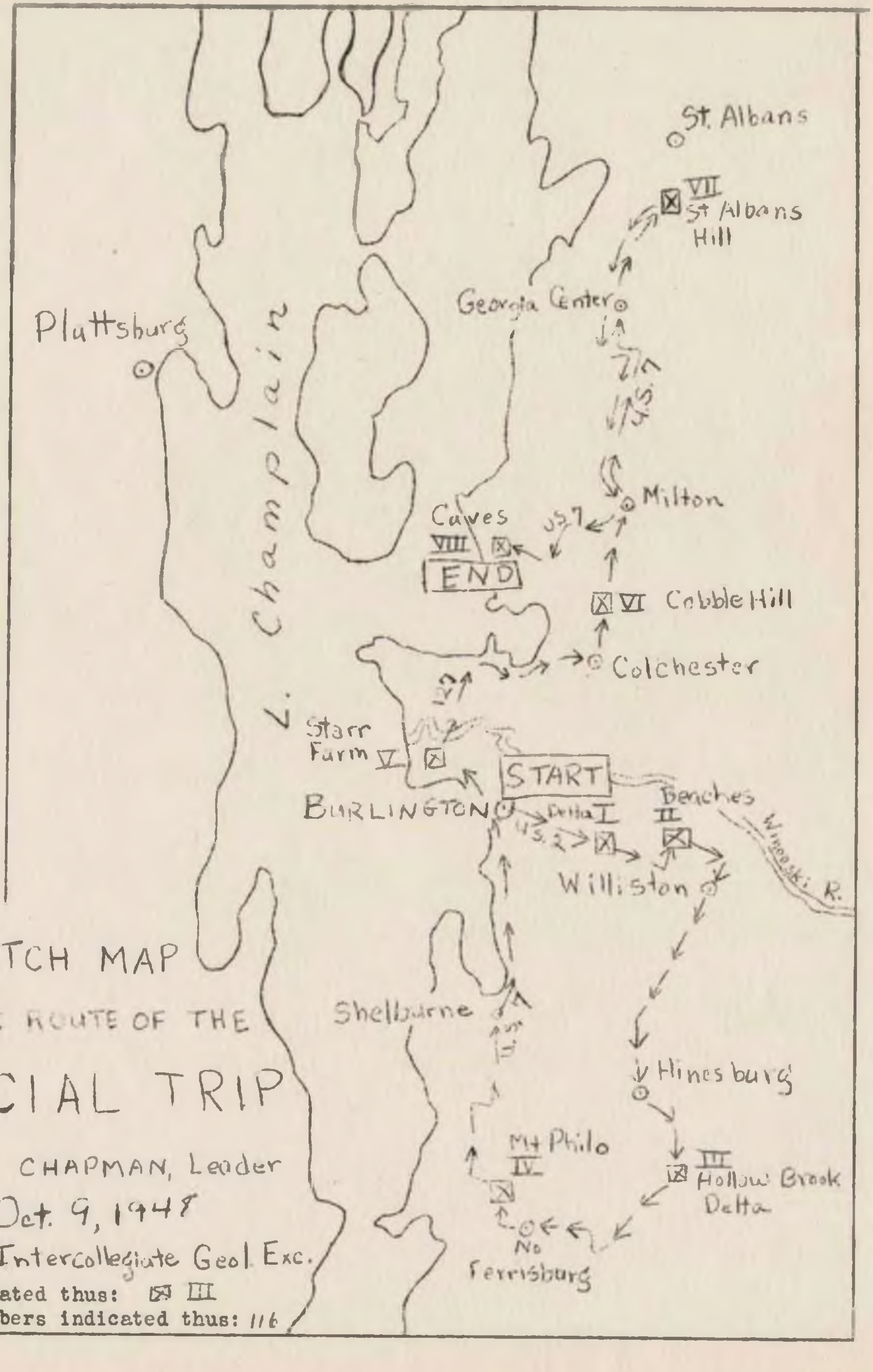
19.6 109.1 Stop VIII. Clay Point Sea Caves - 30 minute stop

Arrive 4:25 P.M. Depart 4:55 P.M.

Caves in the bedrock in this vicinity are presumed to have been carved by wave activity during one of the subsiding stages of the marine invasion of the Champlain Valley. Some of the caves are filled with postglacial sands which contain fossils.

11.0 120.1 Burlington. Campus at East Hall.

Arrive 5:20 P.M. END OF TRIP



SKETCH MAP

OF THE ROUTE OF THE

GLACIAL TRIP

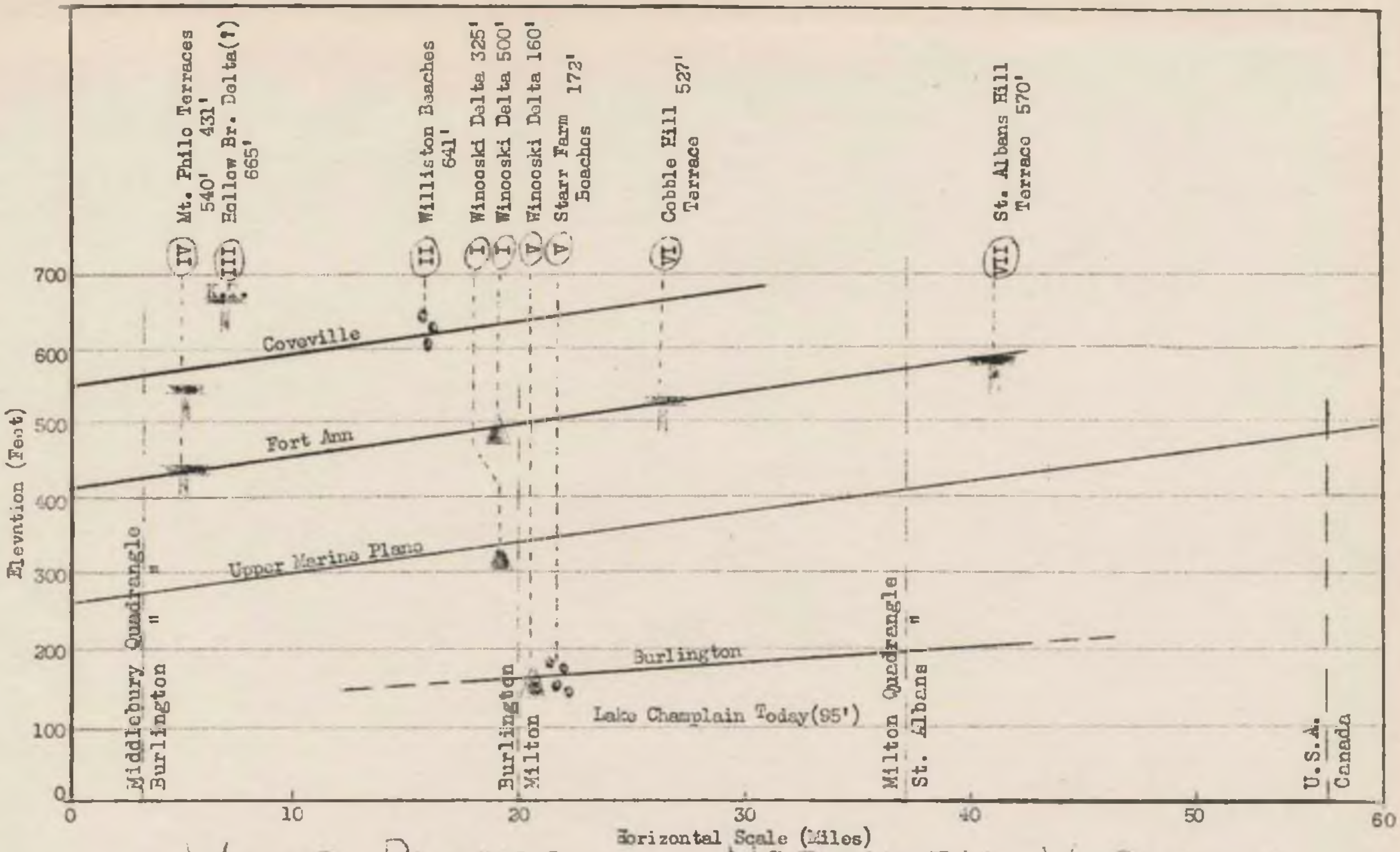
D. H. CHAPMAN, Leader

Oct. 9, 1948

41st N.E. Intercollegiate Geol. Exc.

Stops indicated thus: ⊠ III

Highway numbers indicated thus: 116



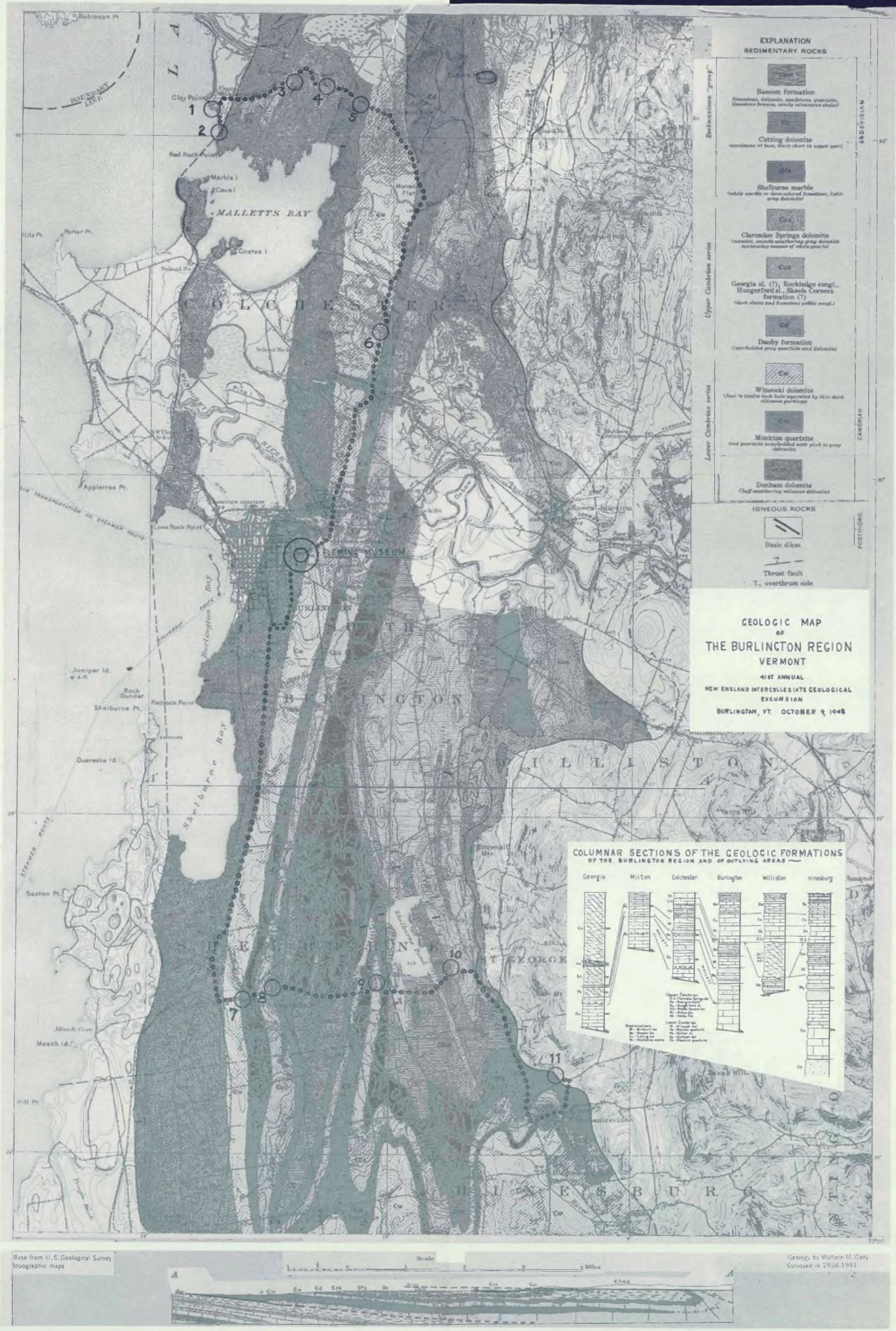
WATER PLANES in NORTHERN VERMONT

(According to D.H. Chapman)

Showing only those features to be visited by NEIGE on Oct 9, 1948

(IV) Numerals indicate Step Numbers.

Topographic Map names indicated at base of chart.


EXPLANATION
SEDIMENTARY ROCKS
Beekmantown "group"
Bascom formation
Cutting dolomite
Shelburne marble
Clarendon Springs dolomite
Georgia sl. (?), Rockledge congl., Hungerford sl., Skeels Corners formation (?)
Danby formation
Winooski dolomite
Monkton quartzite
Dunham dolomite
Upper Cambrian series
Lower Cambrian series
ORDOVICIAN
CAMBRIAN
IGNEOUS ROCKS
Basic dikes
Thrust fault
T., overthrust side
POSTORD.
GEOLOGIC MAP
OF
THE BURLINGTON REGION
VERMONT
41ST ANNUAL
NEW ENGLAND INTERCOLLEGIATE GEOLOGICAL
EXCURSION
BURLINGTON, VT. OCTOBER 9, 1948
COLUMNAR SECTIONS OF THE GEOLOGIC FORMATIONS
OF THE BURLINGTON REGION AND OF OUTLYING AREAS
Georgia
Milton
Colchester
Burlington
Williston
Hinesburg
MALLETTS BAY
FLEMING MUSEUM
Clay Point
Red Rock Point
Lone Rock Point
Appletree Pt.
Juniper Id.
Rock Dunder
Shelburne Pt.
Saxton Pt.
Meach Id.
Coates I.
C O L C H E S T E R
W I L L I S T O N
S H E L B U R N E
H I N E S B U R G
Burlington Bay
Shelburne Bay
Base from U.S. Geological Survey topographic maps
Scale
Geology by Wallace M. Cady
Surveyed in 1934-1941