

DISCLAIMER

Before visiting any of the sites described in the New England Intercollegiate Geological Conference guidebooks, you must obtain permission from the current landowners.

Landowners only granted permission to visit these sites to the organizers of the original trips for the designated dates of the conference. It is your responsibility to obtain permission for your visit. Be aware that this permission may not be granted.

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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38th ANNUAL
NEW ENGLAND INTERCOLLEGIATE GEOLOGICAL EXCURSION

LOCALITY:- MOUNT WASHINGTON region. NEW HAMPSHIRE

October 5 and 6, 1946

Headquarters- Glen House, Route 16, 12 miles north of Jackson, N.H.
and 8 miles south of Gorham, N.H.

Subject:- Emphasis on structure, petrology, and metamorphism, with
some attention to physiography and glacial geology.

Leaders:- Randolph W. Chapman, Katherine Fowler-Billings, and
Marland P. Billings.

Lodgings and Meals:- see enclosure

Transportation:- Each person must arrange his own transportation,
lodgings, and meals.

Clothing:- Bring warm and waterproof clothing, especially for the
mountain trips.

Lunches:- Bring lunches and water for every trip.

Topographic maps: Many of the quadrangles were surveyed 50 years
ago, but they were resurveyed during the last decade. Be
sure to get the newer editions. The excursions will be
in the following quadrangles: Mt. Washington (1938), Gor-
ham (1942), North Conway (1945), Whitefield (1938), Percy (1934),
and Guildhall (1937).

Geological Maps:- The following will be for sale at the headquarters
at the Glen House. (1) colored geological map of the Mt.
Washington quadrangle; (2) "The geology of the Mt. Washing-
ton quadrangle", just published by the New Hampshire Plan-
ning and Development Commission. Route maps will be fur-
nished free.

Trips:- Two all day trips will be run on Saturday; and two all-day
trips will also be run on Sunday. Each person must choose
which trip to take.

TRIP A:- Saturday, October 5, -8:45 A.M. to 5:00 P.M.

R.W. Chapman, leader. Percy Quadrangle.

An auto trip with short side trips by foot involving
climbs of several hundred feet. Purpose:- to see the
Oliverian magma series, Ammonoosuc volcanics, Albee
formation, and ring dikes, stocks, and screens of the
White Mountain magma series.

Assembly- At 8:45 A.M., headed north on State Highway 110,
approximately one mile north of the city of Berlin, N.H.
at tall white brick chimney on right of road just north
of city dump. Check mileage carefully as there are sev-
eral chimneys in the vicinity.

(trips continued, next page)
(reverse side of this sheet)

New England Intercollegiate Geological Excursion-Oct. 5, 6, 1946

Trip B1-Saturday, October 5, 8:45 A.M. to 5:00 p.m.

Leaders- Marland P. Billings and Katharine Fowler-Billings. Gorham and Mt. Washington quadrangles. A nine mile trip on foot, all but 1.5 miles of it are on the Mt. Washington auto road; involves a climb of more than 3000 feet.

Purpose:-to show lithology and structure of the schists and quartzites characteristic of the higher parts of the Presidential Range; paragenesis of metamorphic minerals. Highest altitude reached is 4800 feet (1500 feet below top of Mt. Washington); part of trip is above the timber line so bring additional warm and waterproof clothing.

Assembly Point:- Glen House- 8:45 A.M.

Trip B2-Those plutocrats possessing an extra three dollars may prefer to take a variation of this trip whereby they ride to the top of Mt. Washington by bus and part of the way down. Anyone interested in Trip B 2 please notify M.P. Billings as soon as possible.

Trip B3-If weather is exceptionally good, some of the mountaineers may prefer to continue to the top of the mountain and descent through Huntington or Tuckerman Ravine. This can be done if an extra leader is available.

Sunday Trips

Trip C- Sunday, October 6, 8:45 A.M.- 3:00 p.m.

R.W. Chapman, leader. Northern part of Mt. Washington quadrangle. An auto trip with short side trips involving climbs of several hundred feet. Purpose-to show the rocks of the Oliverian magma series and shatter zone illustrating one mechanism of ring-rink intrusion.

Assemble- at 8:45 A.M. at Mobilgas station in Jefferson, N.H. on U.S. Route No. 2, headed northwest.

Trip D- Sunday, October 6-8:45 A.M.-3:00 p.m.

Leaders-Marland P. Billings and Katharine Fowler-Billings. Lower northern slopes of Mt. Adams and Mt. Madison. A four mile trip on foot, all on trails; involves a climb of 1400 feet. Purpose:-to see lithology of the Mount Washington quadrangle; Oliverian magma series, Ammonoosuc volcanics, Bickford granite, gneiss, schists, and quartzites of the Little formation.

Assembly point:-Cold Brook Lodge, which is the yellow farm house, 0.3 miles west of the Ravine House at Randolph on Route 2. To reach Cold Brook Lodge turn south on very obscure dirt road 0.3 miles west of Ravine House. Some of this trip will be on open ledges, so bring warm clothing.

Trip E- An emergency trip, either Saturday or Sunday, in case weather prevents foot trips on mountains. An auto trip in southern part of Mt. Washington quadrangle to see Oliverian magma series, Bickford granite, gneiss, schists,
(continued on page 3)

New England Intercollegiate Geological Excursion-Oct. 5, 6, 1946

and quartzites of the Littleton formation, Conway granite.

Assembly Point:- Glen House, 8:45 A.M. either Saturday or Sunday. Leaders-Marland P. Billings and Katharine Fowler-Billings.

In case bad weather necessitates a change in plans a representative of the leaders will be at the listed assembly point to direct people to proper assembly point.

ANNUAL MEETING

GLEN HOUSE at 8:00 p.m. on Saturday, October 5, 1946
Discussion of trips
Renewal of acquaintances
Collection of dues

A C C O M M O D A T I O N S

Hotels, Cabins, and Restaurants

ALL RESERVATIONS SHOULD BE MADE DIRECTLY WITH HOTEL. In making reservations state number in party, number of couples, number of unattached males and females. State you are attending New England Intercollegiate Geological Excursion.

HOTELS:-GLEN HOUSE-Route 16, 12 miles north of Jackson, N.H.
HEADQUARTERS. Address: Manager, Glen House, Gorham, N.H. Rate-\$10 for lodging Friday and Saturday nights, all meals Saturday and two meals Sunday. Accommodations for 40.

PINKHAM NOTCH CAMP, Appalachian Mountain Club, Route 16, 9 miles north of Jackson. Address- Mr. Joe Dodge, Appalachian Mountain Club, Gorham, N.H. Rate \$7.25 for lodging Friday and Saturday night, all meals Saturday and two meals Sunday.

DANA PLACE, Route 16, about six miles north of Jackson, N.H. Address, Manager, Dana Place, Jackson, N.H. Rate \$10.75 for lodging Friday and Saturday nights, all meals Saturday and two meals Sunday.

RAVINE HOUSE, on Route 2, Randolph, N.H. Address:-Mr. George Lane, Ravine House, Randolph, N.H. Rate \$7.00 a day with something off for meals missed.

CABINS:-Those staying in cabins should plan to eat in North Conway or Gorham. Allow plenty of time for meals, as neither town can handle large groups rapidly.

Streeter's Cabins and Cottages-Route 16, 1 mile south of Jackson Restaurant. F.L. Streeter, Jackson, N.H. Telephone 17.

Brae Burn Cabins-Route 2. Two miles west of Gorham, N.H. Lewis A. Reid, Gorham, N.H. Telephone 36-2

New England Intercollegiate Excursion-October 5,6,1946

Twin Gables, Route 2, 3 miles east of Gorham.N.H. Breakfast.
C.M.Philbrook,Gorham,N.H.Tel.24-12

Lowe's Cabins, Route 2, 8 miles west of Gorham,N.H. Gordon Lowe,
prop.Randolph,N.H. Light lunches.

Grand View Cabins, Route 2, 5 miles west of Gorham.

(There are scores of inns,hotels,and cabins at Intervale and
North Conway. You make your own reservations).

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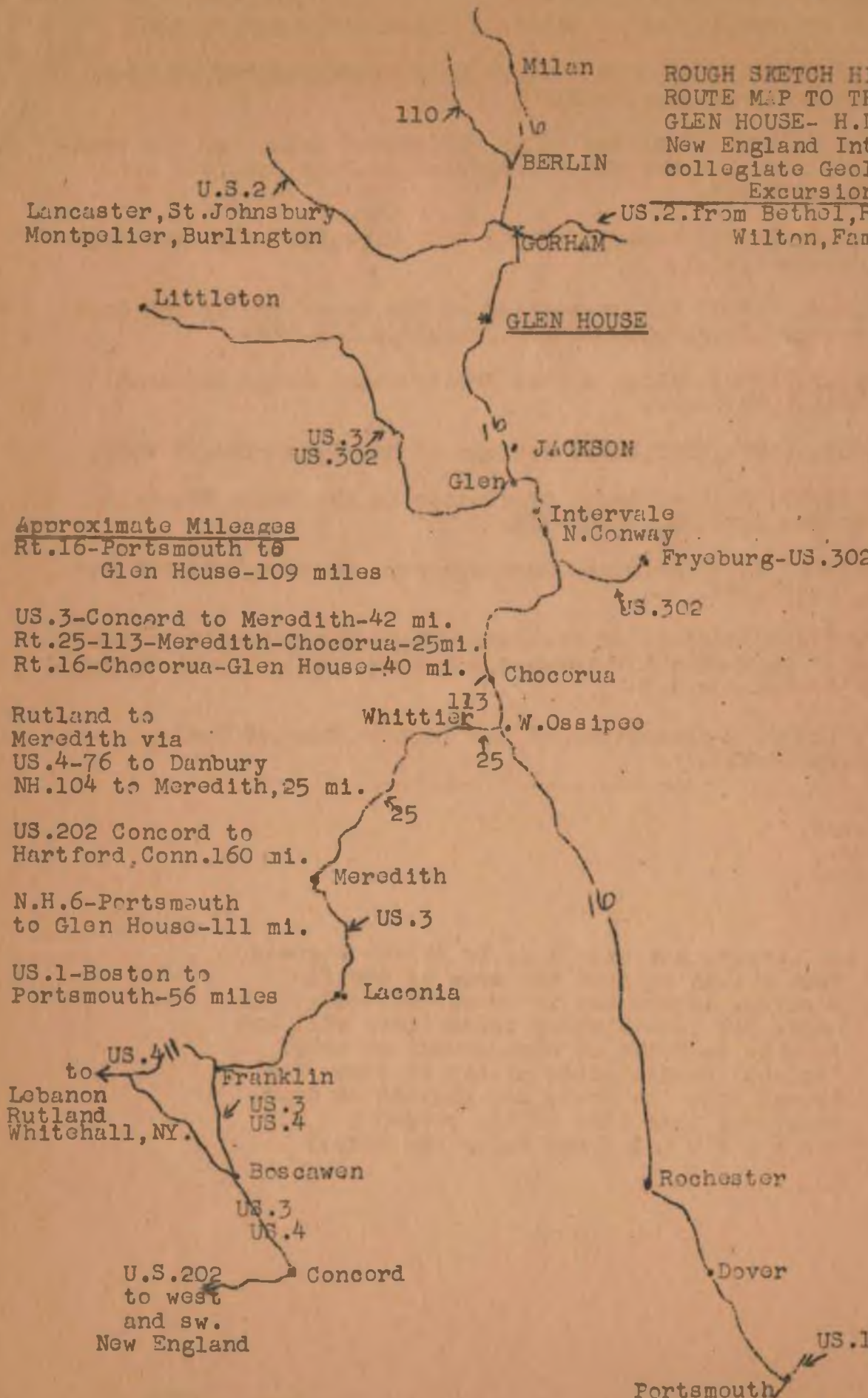
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Secretary:-
Lloyd W.Fisher,
Bates College,
Lewiston,Maine

(an attempt has been made to sketch highway
routes leading into the area of the field
meeting. Sketch map is on reverse side this
page. Six lane highway specialists will not
be able to drive at high speeds on these
"twisty" roads. Allow plenty of time for
travel into the area. New England is most
beautiful this time of the year-D R I V E
C A R E F U L L Y and enjoy the trip.)

ROUGH SKETCH HIGHWAY
ROUTE MAP TO THE
GLEN HOUSE- H.D.Q.
New England Inter-
collegiate Geologists'
Excursion

US.2. from Bethel, Rumford
Wilton, Farnington



Approximate Mileages

Rt.16-Portsmouth to
Glen House-109 miles

US.3-Concord to Meredith-42 mi.

Rt.25-113-Meredith-Chocorua-25mi.

Rt.16-Chocorua-Glen House-40 mi.

Rutland to
Meredith via
US.4-76 to Danbury
NH.104 to Meredith, 25 mi.

US.202 Concord to
Hartford, Conn.160 mi.

N.H.6-Portsmouth
to Glen House-111 mi.

US.1-Boston to
Portsmouth-56 miles

to
Lebanon
Rutland
Whitehall, NY.

U.S.202
to west
and sw.
New England

NEW ENGLAND INTERCOLLEGIATE GEOLOGICAL EXCURSION

LOCALITY: - MOUNT WASHINGTON REGION, NEW HAMPSHIRE --

October 5 and 6, 1946

TRIP B 1

Mt. Washington Auto Road and Nelson Crag Trail

Maps: Gorham and Mt. Washington topographic maps (or AMC Mt. Washington Range map); colored geological map of the Mt. Washington quadrangle.

Assemble: Saturday, October 5, 8:45 A.M., Glen House, Route 16.

Localities: All localities are given by altitude on the Auto Road or the Nelson Crag trail. First 1.8 miles of trip are on the Auto Road. Start up Auto Road. The entire trip is in the upper part of the Lower Devonian Littleton formation.

1600 feet: Massive, gray quartz-mica-garnet schist near base of the upper part of the Littleton formation. Face of outcrop with plaque on it is a formal fault that has tourmaline on it.

1630 feet: Interbedded schist and quartz-mica schist. Intermittent outcrops continue up the road.

2030 feet: A light-gray biotite-quartz diorite occurs here but is difficult to distinguish from the schists.

2140 feet: Road bends toward the northwest. Pegmatites and schists occur along this section of the road.

2280 feet: Road bends toward the west-southwest.

2300 feet: Bedded schist in a broad fold.

2340 feet: Metadiabase in volcanic vent. Associated with the metadiabase are small areas of breccia, which consists of blocks of metadiabase in a tuffaceous matrix composed chiefly of schist minerals.

2360 feet: Road bends toward the west.

2440 feet: Enter Mt. Washington quadrangle. Schists, bedding N.50°W., 25°NE.

2450 feet: Pegmatite sill.

2460 feet: Schist and pegmatite; bedding N.30°W., 25°NE.

2470 feet: Schist. Bedding N. 30°E., 25°NW. Note variation in attitude of rocks in last few exposures as indicative of folding. Note minor folds.

2580 feet: Folded schists plunging 20°N. 15°E.

2600 feet: Leave Auto Road to follow Nelson Crag trail.

Lower part of Nelson Crag trail, between 2600 feet and 4400 feet.

Interbedded quartzite and schist. The schists contain andalusite, which is fresh in some places, but elsewhere is partially or completely altered to sericite, muscovite, or sillimanite. In some places chiastolite is developed.

4400 feet. Timber line.

4400 to 4800 feet. Open ledges of interbedded quartzite and sillimanite schist, typical of higher parts of the Presidential Range. Schists contain sillimanite, staurolite, garnet and muscovite; sillimanite crystals exceed 2 inches in length. Folds, wave length of which is 5 to 20 feet; net dip is eastward. Pegmatite sills with garnet and black tourmaline. At 4625 feet are quartz veins, some with rose tint.

4800 feet. Trail joins Auto Road. North of this point and between B.M. 4704 and 5000 feet on the Auto Road, is another excellent display of folded interbedded quartzite and sillimanite schist. Watch for folded sillimanite.

Trip now descends along the Auto Road.

4620 feet: Five-mile Post.

4400 feet: Bend in road. On knob 300 feet west of road, trend of bedding is N. 75°E., dip 20°N.; thrown into folds, axial planes of which dip SW $\frac{3}{4}$.

4300 feet: Trend of bedding N.80°W., dip 35°N., but thrown into folds.

4200 feet: Knob 200 feet east of trail is chiefly fine-grained pegmatite, with garnet and black tourmaline.

4100 feet: Knob 300 feet east of trail typical interbedded sillimanite schist and quartzite. General trend N.90°E., has thrown into folds plunging 25°N.

4020 feet: Road bends sharply to east.

3950 feet: Road bends sharply to south.

3850 feet: 4 mile post. Bedding N. 90°E., 60°N. Dike of actinolite-biotite granulite, one foot thick.

3850 feet: Halfway House. Across road are interbedded quartzites and schists sillimanite, muscovite, and garnet. Also pegmatite.

3620 feet to 3400 feet: Interbedded schist and quartz-mica schist.

Variable attitude of bedding indicates folding. Fracture cleavage strikes N., dips nearly vertical.

3360 feet: Pegmatite sill.

3300 feet: Folded schist, with axial plane cleavage.

3260 feet: Glacial striae N. 15°W.

3200 feet: Folded schist.

3100 feet: Interbedded quartzite and schist. 4 sills of pegmatite, each about one foot thick. Folds plunge 15°NE.

2960 feet: Interbedded quartzite and schist. Bedding and fracture cleavage.

2900 feet: Road bends sharply toward south. Quartzite and schist.

2750 feet: Road bends sharply to NE. Good exposure of folds; fracture cleavage parallel to axial planes of folds.

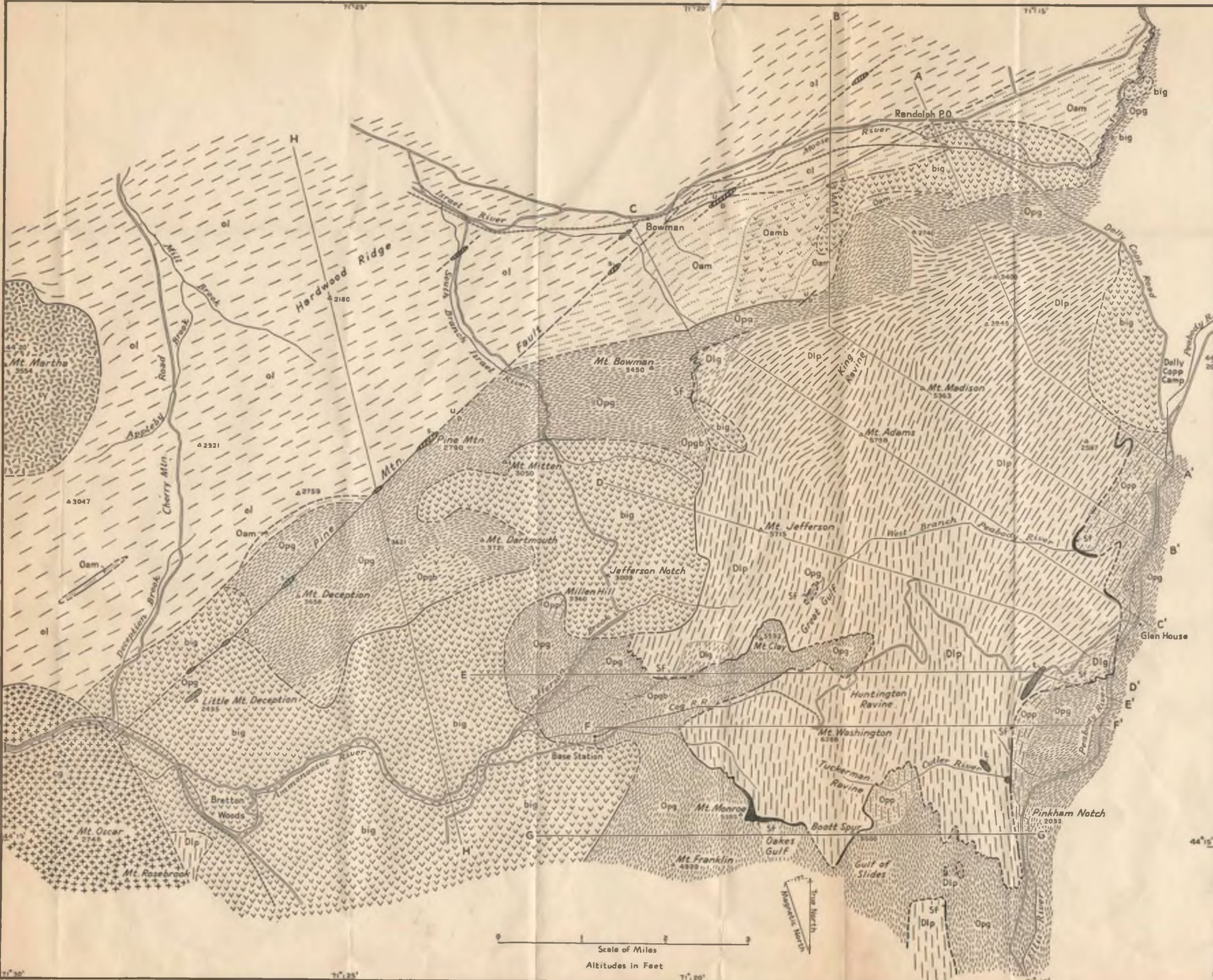
2730 feet: Folded schist.

2700 feet: Garnet schist and quartzite.

2680 feet: Madison Gulf trail.

2570 feet: Sillimanite schist and quartzite. Some pegmatite.

2600 feet: Lower end of Nelson Crag trail. Return to Glen House on Auto Road over same route followed in morning.



LEGEND

Mississippian ?
 White Mountain Magma Series
 cg Conway granite
 sy Syenite
 t Tuff, breccia, and diabase in volcanic vents

Late Devonian ?
 New Hampshire Magma Series
 big Bickford (+Concord?) granite

Olivetian Magma Series
 ol (Various units not distinguished on this map)

Lower Devonian
 Dlp, Dlg Littleton formation
 Dlp - Paraschists
 Dlg - Gneiss

Middle Silurian
 SF Fitch formation

Ordovician ?
 Opp, Opg, Opgb Partridge formation
 Opp - Paraschists
 Opg - Gneiss
 Opgb - Gneiss with dikes of Bickford granite

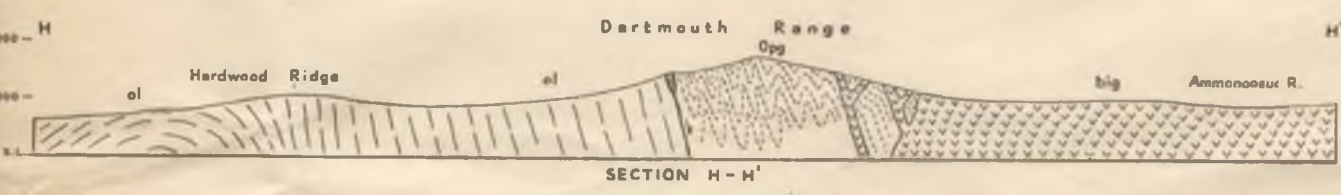
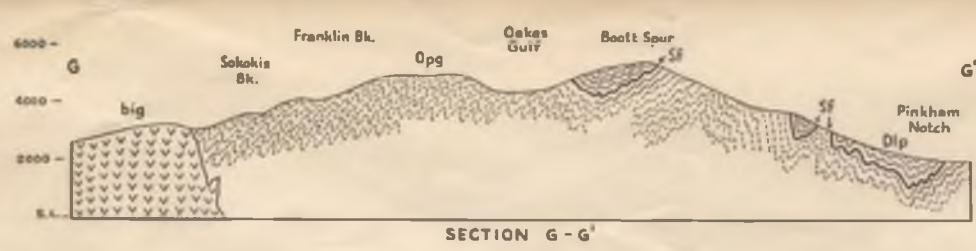
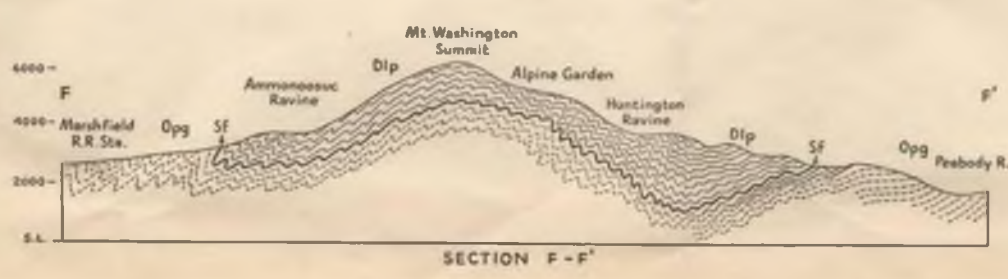
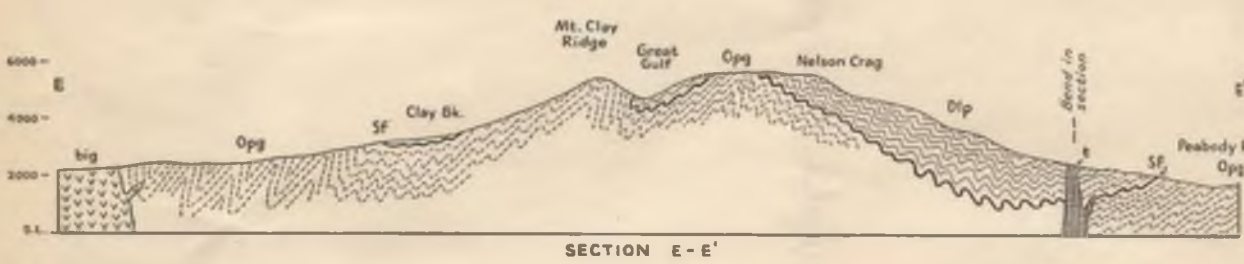
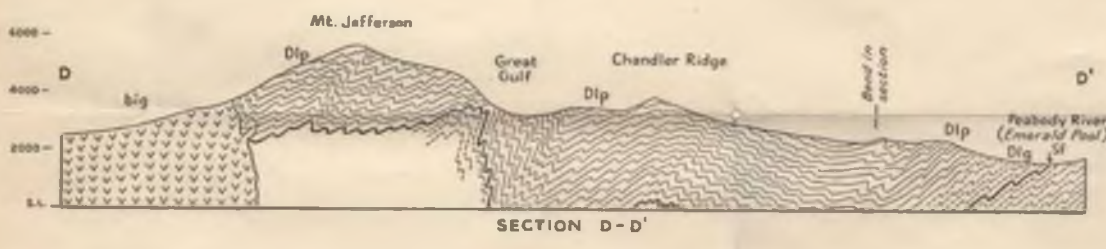
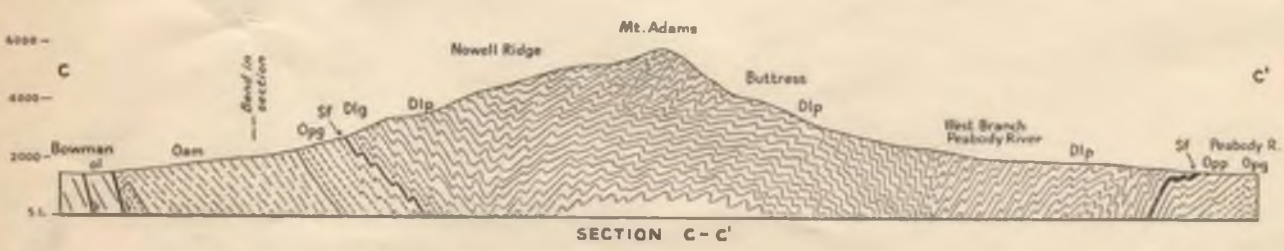
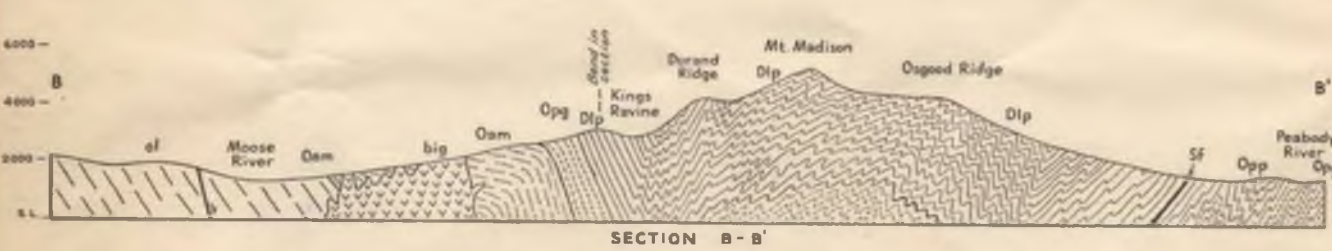
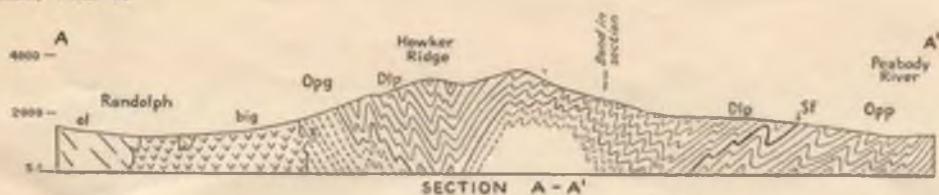
Ammonoosuc volcanics
 Oam - Ammonoosuc volcanics with many dikes and sills of Bickford granite
 Oamb

CONTACTS
 — Accurate
 - - - Approximate
 Transitional

Other Symbols:
 Silicified zone
 Normal fault
 D = Downthrown side
 Altitudes in feet

GEOLOGIC MAP OF MT. WASHINGTON AREA

Linear patterns indicate trend of axes of folds in metamorphic rocks and foliation in plutonic rocks. Nonlinear patterns indicate massive rocks.



STRUCTURE SECTIONS

Taken along lines shown in Plate 1. Vertical scale in feet; horizontal scale same as vertical scale. Oam = Ammonoosuc volcanics; Opg = gneiss of Partridge formation; Opp = parashists of Partridge formation; Sf = Fitch formation; Dlg = gneiss of Littleton formation; Dlp = parashists of Littleton formation; ol = Oliverian magma series; big = Bickford granite; t = tuff and breccia of volcanic vents.

ITINERARY OF TRIP B

Geology of Northern Part of Mt. Washington
Quadrangle, New Hampshire

Sunday, October 6, 1946













Leader: Randolph W. Chapman

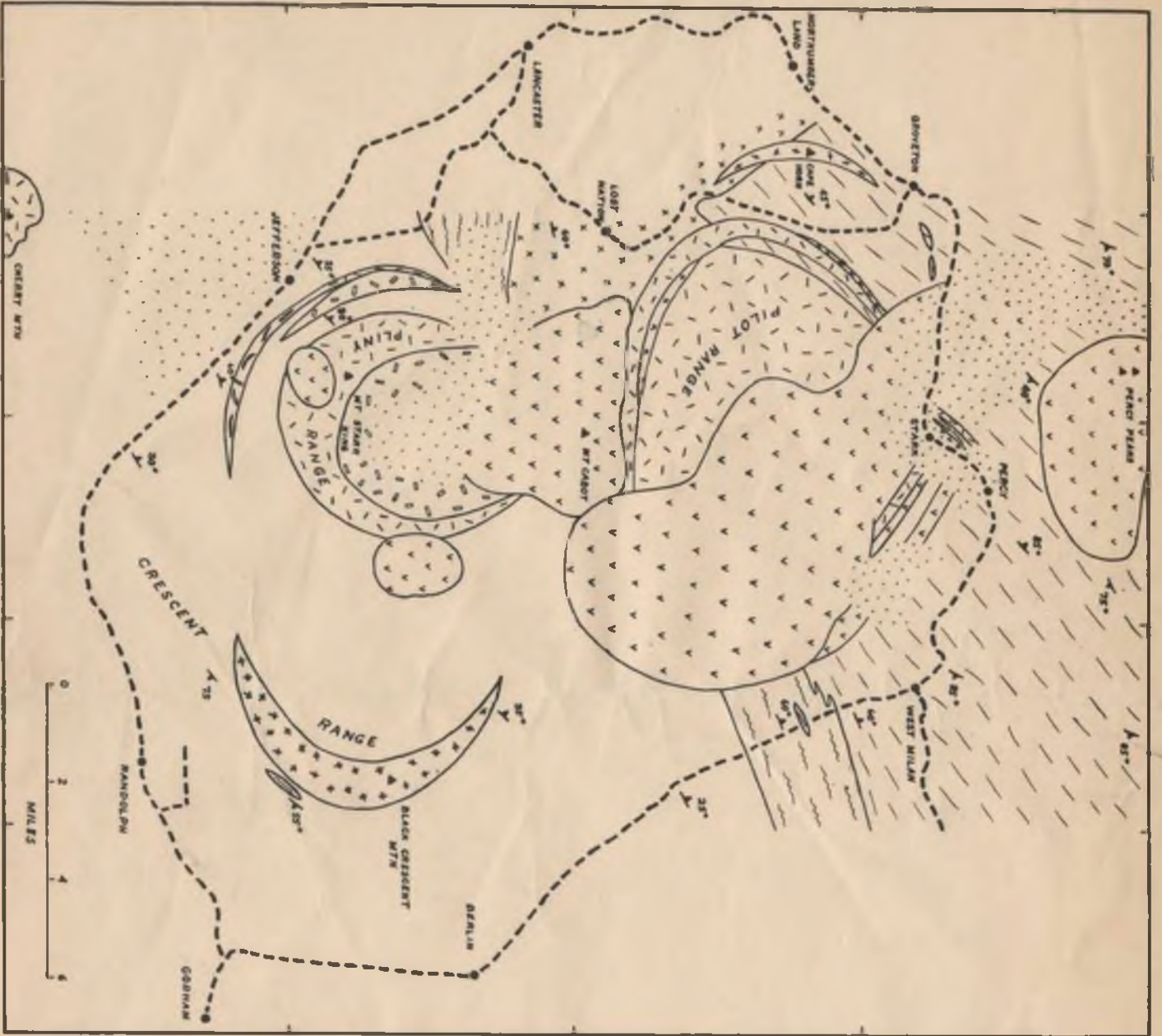
This itinerary is subject to change if weather is inclement.

Mileage

- 0.0 Assembly point. "Mobilgas" station in Jefferson, N.H. Group will assemble here at 9 A.M., headed northwest, and will move northwest along Federal Highway 2.
- 0.6 Junction. Turn around and proceed toward southeast.
- 0.8 Stop 1. Coarse syenite of Oliverian magma series (middle Devonian?).
- 1.3 Stop 2. Park in farmyard. Shatter zone illustrating one method of ring dike intrusion. Excellent view of Whitefield Basin. Continue along Highway 2.
- 4.9 Junction. Turn right on State Highway 115.
- 5.3 Stop 3. Old dam on right. Hornblende-quartz monzonite of Oliverian magma series (middle Devonian?).
- 5.9 Good view of Presidential Range on left.
- 6.1 Junction. Turn right, following Highway 115.
- 7.9 Junction. Turn left following Highway 115. Ahead is Cherry Mountain, a syenite stock of White Mountain magma series (Mississippian?).
- 8.9 Junction. Turn off onto gravel road.
- 9.2 Stop 4. Large dike of lamprophyre, showing chill borders and auto-liths, cuts coarse granite of Oliverian magma series (middle Devonian?).
End of Trip B.

LEGEND

-  Glacial drift and alluvium
(Concealing critical data)
-  Granite
(Various types)
-  Shatter zone
(Abundant granite dikes)
-  Granite porphyry
-  Syenite and quartz syenite
-  Syenite porphyry
-  Quartz monzodiorite and
quartz monzonite
-  Oligivarian magma series
(Monzonite, syenite, granite)
-  Lost Nation group
(Mainly quartz diorite)
-  Ammonoauk volcanics
(Amphibolite)
-  Albee formation
(Quartzite, slate, schist)
-  Attitude of foliation



GUIDE MAP OF GEOLOGY OF PERCY AND MT WASHINGTON QUADRANGLES

ITINERARY OF TRIP A

Geology of the Percy Quadrangle, New Hampshire

Saturday, October 5, 1946

Leader: Randolph W. Chapman

This itinerary is subject to change if weather is inclement.

Mileage

- 0.0 Assembly Point. Tall white brick chimney on right of road near city dump approximately 1 mile north of city of Berlin, N. H., on State Highway 110. (Note: 2 similar brick chimneys occur here; the one referred to is the one farther north along the road and immediately north of the city dump). Group will assemble here at 9 A.M. headed northwest and will move north and west along State Highway 110.
- 3.7 Stop 1. Entering Percy quadrangle from southeast. Brief discussion of physiography and geology of Percy quadrangle and plan of trip.
- 4.55 Stop 2. Foliated quartz diorite of Oliverian magma series (middle Devonian?) forming north flank of huge Jefferson dome.
- 7.0 Stop 3. Dark amphibolites of Ammonoosuc volcanics (upper Ordovician?).
- 11.1 Highway 110 crosses Upper Ammonoosuc River. Albee quartzite (upper Ordovician?) on left immediately beyond railroad track.
- 12.6 Turn right off Highway 110 onto gravel road toward Crystal Station. Cross tracks at Crystal Station and continue on gravel road to Crystal Village.
- 13.45 Stop 4. Crystal Village. Phillips Brook flowing over Albee quartzite (upper Ordovician?) showing good stratification. At top of upper falls is wide amphibolite dike. Return to Highway 110.
- 14.3 Junction. Turn right on Highway 110. Road follows Upper Ammonoosuc River Valley from here to Groveton.
- 16.8 Junction of Percy Road. Continue along Highway 110.
- 17.05 Prisoner of war camp on left. On right are Percy Peaks (twin knobs) composed of Conway biotite granite (White Mountain magma series; Mississippian?), and Long Mountain composed partly of Conway granite and partly of 2-mica granite (New Hampshire magma series; upper Devonian?).
- 18.7 Turn right near church onto gravel road, cross bridge into Stark Village, turn left in village, and continue along gravel road.
- 19.4 Stop 5. Park in farmyard. 300 to 400 foot climb to Devil's Slide ring dike. Return to Highway 110.
- 20.2 Junction. Turn right on Highway 110.
- 22.2 Stop 6. Conway biotite granite (White Mountain magma series; Mississippian?).

Saturday, October 8, 1938

Leader: Randolph W. Cushman

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- 24.4 Junction. Keep left on Highway 110. Note symmetrical shape of Percy Peaks on right.
- 26.75 Groveton. Groveton Paper Company on right. Turn sharp left near wooden bridge onto hard surface road.
- 28.1 Stop 7. View of Pilot Range and Cape Horn ring dike.
- 29.4 Stop 8. Side trip (2 to 3 hours) up brook to study structure and petrography of Pilot Range ring dikes.
- 30.75 Stop 9. View of Cape Horn ring dike showing crescentic shape.
- 37.85 Junction. Turn right near school house.
- 35.7 Junction. Turn right near school house.
- 37.1 Grange Village. Turn sharp left, cross small bridge, and continue up hill.
- 38.6 Stop 10. Marshall Road junction. Park at junction and walk 150 yards to observe Lost Nation quartz diorite (Highlandcroft magma series; upper Ordovician?). End of Trip A.

12.8 Turn right off Highway 110 onto gravel road toward Crystal Station. Cross brook at Crystal Station and continue on gravel road to Crystal Village.

13.4 Stop 4. Crystal Village. Phillips Brook flowing over Algonkian quartzite (upper Ordovician) showing good stratification. At top of upper falls is wide amphibolite dike. Return to Highway 110.

14.3 Junction. Turn right on Highway 110. Road follows Upper Ammonoosuc River Valley from here to Groveton.

16.8 Junction of Percy Road. Continue along Highway 110.

17.25 Outcrop of our camp on left. On right are Percy Peaks (two peaks) composed of Conroy diorite granite (White Mountain magma series; Mississippian), and long horizontal compressed partly of Conroy granite and partly of 2-mica granite (New Hampshire magma series; upper Devonian?).

18.7 Turn right near church onto gravel road, cross bridge into Stark Village. Turn left in village, and continue along gravel road.

19.4 Stop 5. Park in farmyard. 500 to 600 feet climb to Devil's Slide ring dike. Return to Highway 110.

20.8 Junction. Turn right on Highway 110.

22.2 Stop 6. Conroy diorite granite (White Mountain magma series; Mississippian).