THE GEOLOGY OF

MOUNT BLUE STATE PARK

By KOST A. PANKIWSKYJ

MAINE GEOLOGICAL SURVEY
DEPARTMENT OF ECONOMIC DEVELOPMENT

AUGUSTA, MAINE
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STATE GEOLOGIST

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STATE PARK GEOLOGIC SERIES NO. 3

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INTRODUCTION

Mount Blue State Park is located in the townships of Weld, Carthage, and Avon in Franklin County and is the third largest state park in Maine. It is easily accessible by automobile from State Highway 142. Though referred to as one park, Mount Blue State Park is in fact composed of three distinct, separate areas. The largest area contains Mount Blue itself, providing a climb to the top of the mountain by the Mount Blue Trail and a magnificent view from the fire tower on the summit. From the parking lot, the climb comprises a vertical ascent of 1800 feet and takes between one and two hours. The descent is accomplished in half that time. A cold brook offers a refreshing pause at the altitude of 2050 feet, approximately three-eighths of the way up the mountain. Another area of Mount Blue State Park contains Center Hill. There are picnic facilities at the edge of the parking lot, from which is also offered a superb panorama of the Tumbledown Mountain — Jackson Mountain — Blueberry Mountain range. A very short hike to the top of Center Hill will reward one with a splendid view of Lake Webb and the mountains to the south and west. The smallest area of Mount Blue State Park is on the west shore of Lake Webb. It offers a fine sandy beach, facilities for launching boats, and large tracts of land designed for tenting.

The purpose of this booklet is to give the visitor to Mount Blue State Park some idea of its geologic setting. What is meant by *geology*? Geology is the study of the earth, and especially of the matter that forms the surface of the earth. This matter is present in two distinct forms: as *bedrock*, that is attached to and thus part of the solid rocky crust of the earth; and as loose surficial material overlying the bedrock in the form of boulders, cobbles, gravel, sand, and clay. The problems which arise in the study of these two distinct forms are so different that geology is divided into two main branches, bedrock geology and surficial geology.

A bedrock geologist attempts to find out how rocks were formed, what they are composed of, and how they got to be where they are now. All rocks fall into two basic types, igneous and sedimentary. Igneous rocks formed from molten matter, named magma or lava. The difference between these is that whereas magma solidified into rock below the surface of the earth, lava was extruded onto the surface before solidification. Sedimentary rocks formed either through accumulation of sediments such as sand and mud, or through precipitation of substances out of sea water, in which they were dissolved. The term metamorphic or metamorphosed denotes that a rock, whether of igneous or sedimentary origin, has been subjected to very high temperature and pressure, which caused a change in its form. Such changes are noted by growth of *minerals* which would not have been present in the original rock. Most of the rocks present within Mount Blue State Park are metamorphosed sedimentary rocks.

A surficial geologist studies the topographic features of the land and learns of the processes that shape the surface of the earth. Among other phenomena he concerns himself with the erosional work of *glaciers* and with the deposits that were left after the glaciers melted and disappeared.

Of the bedrock that can be seen within Mount Blue State Park, the oldest was deposited about 330 million years ago at the bottom of a deep sea as sediments composed of black muds and clayey sands. They formed a sequence many thousands feet thick. A large part of these were deposited in thick even-textured beds, but commonly very thin layers of mud were alternated with thin beds of clayey sand, producing a feature known as cyclic bedding, similar to a many-layered cake. It was possible to produce such a great thickness of sediments because the bottom of the sea sank at a rate close to that of the rate of accumulation of sediments. This phenomenon is not as strange and extraordinary as it perhaps sounds, but constitutes a very important manner of deposition.

Following the deposition of the black muds and clayey sands came a period of reduced erosion of land masses from which the sediments were derived. As a result, 300 to 500 feet of limy material interbedded with some mud and clayey sand was deposited in this area of accumulation under the sea.

After the deposition of these calcareous rocks, there followed a

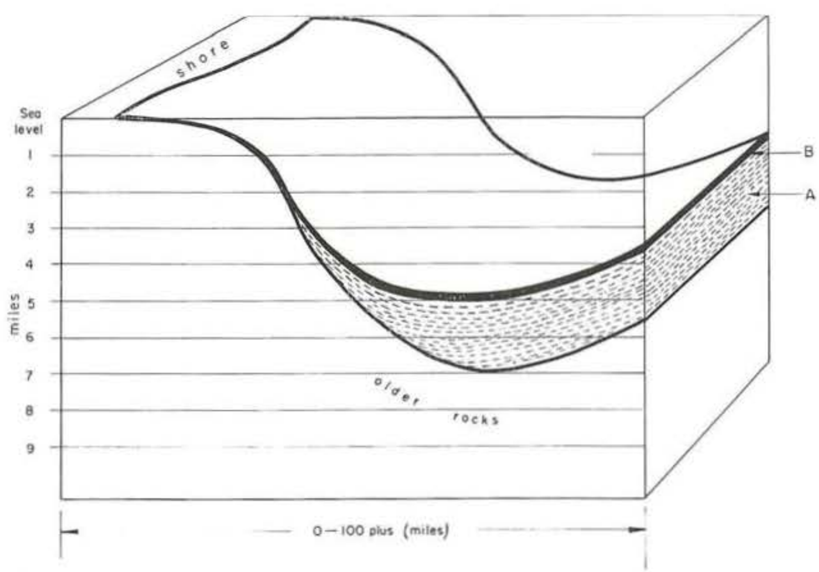


Figure 1a. Deposition of unit B after unit A has been deposited and downwarped.

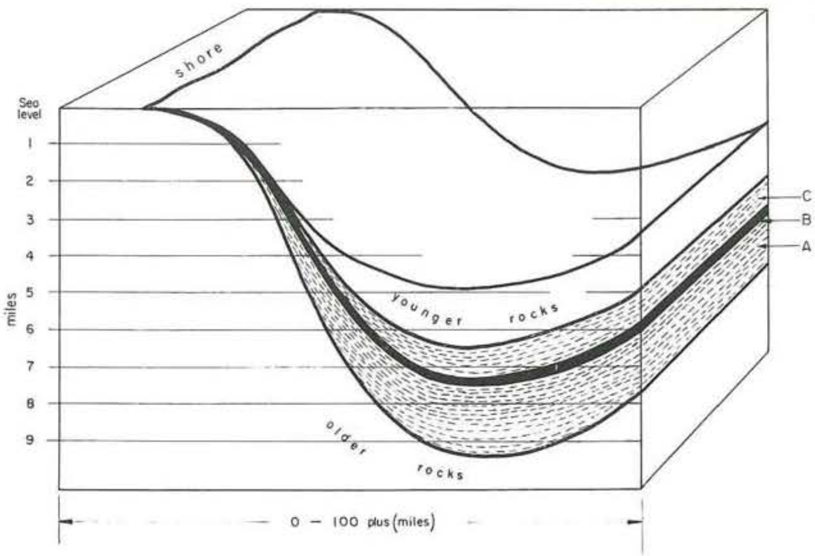


Figure 1b. Deposition of unit C and younger rocks after still further downwarping of the basin.

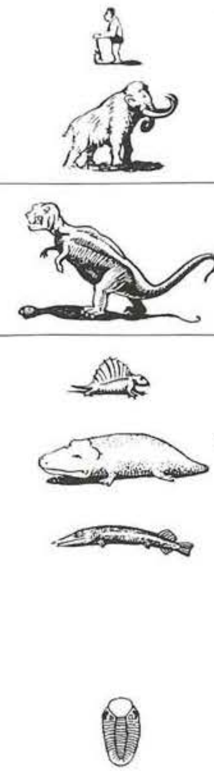
period similar to the earliest one, with the consequent deposition of approximately 5000 feet of cyclically bedded black mud and clayey sand. Younger sediments were deposited on top of these, but examples of these are not found within Mount Blue State Park. For a pictorial presentation of the events described so far see figure 1.

With time the loose sediments became compacted and consolidated into solid rock. This process was aided by precipitation of various materials out of solutions which seeped through the sediments, as well as by the downward force exerted by above-lying younger sediments. The muds became transformed into shale, the clayey sands into micaceous sandstone, and the mud and limy ooze into micaceous sandy limestone.

About 300 million years ago, several tens of million years after all of the above-mentioned sediments were deposited and consolidated into rock, New England was subjected to great stresses from the northwest and southeast. As a result of these stresses all of the rocks were deformed into a series of great folds trending from northeast to southwest. This time of deformation in the Devonian period (see figure 2 for breakdown of geologic time into periods) is known to geologists as the Acadian *orogeny* because it was first studied in Nova Scotia (Acadia).

Figure 2. Geologic Time Scale

Eras	Periods	Millions of years before present	Characteristic form of life	Major Geologic Events	Geologic Record in Mount Blue State Park
CENOZOIC	Pleistocene or Glacial	1	man	world wide glaciation	(Pleist.) Sculpturing of bedrock, deposition of drift, and formation of beaches
	Tertiary		primitive mammals	Alps Himalayas	
		70			
MESOZOIC	Cretaceous	125	Dinosaurs: first flowering plants	Rocky Mountains	(Cret.) Elevation of the New England Uplift
	Jurassic	165	first birds		
	Triassic			Palisades, N. J. Conn. Valley	
		200			
PALEOZOIC	Permian	230	reptiles	Appalachian Mountains	
	Pennsylvanian	260	coal forests		
	Mississippian	290	amphibians	"Acadian" Mountains	(Mid. Dev.) Intrusion of granodiorite, metamorphism, and folding
			land plants		
	Devonian	330 ?	fish		(Lower Dev.) Deposition of upper sequence of cyclically bedded mud and clayey sand
					Deposition of thin unit of limy ooze and clayey sand
	Silurian	360	marine invertebrates		Deposition of lower sequence of cyclically bedded mud and clayey sand
	Ordovician	420			
	Cambrian	500			



PRECAMBRIAN Origin of Earth—5 billion years before present

Figure 2. Geologic time scale.

Contemporaneous with the deformation, a hot liquid magma was intruded, i. e., injected, into the sedimentary rocks. With time this magma cooled and crystallized into a large mass of granite-like rock known as granodiorite. For this sequence of events see figure 3. Heat from the injected magma raised the temperature of the rocks and brought about their metamorphism, or rock change. The shale was transformed into schist, the micaceous sandstone into micaceous granulite, and the micaceous sandy limestone into calc-silicate granulite. In addition to metamorphosing the sedimentary rocks and forming a large body of granodiorite, the cooling magma was injected into the solid rock and formed into various shaped smaller bodies, such as dikes, sills, and lenses. Such small bodies typically contain the following minerals: quartz, feldspar, muscovite, biotite; and occasionally tourmaline, apatite, garnet, and beryl. The size of the individual minerals is commonly much larger than in ordinary igneous rocks. Such coarse-grained rocks are known as pegmatite, and it is from such pegmatites that our semi-precious gemstones are obtained.

No younger bedrock than the granodiorite and related pegmatites is found within Mount Blue State Park. Following the igneous intrusion and deformation of rocks by folding, related to the Acadian orogeny, there was a long period of erosion. Any mountains that had been built were worn down to become hardly more than a gently inclined plain. Then about 100 million years ago, in the Cretaceous period (see figure 2), the central part of what is now New England was uplifted perhaps as much as one and one-half miles. Rejuvenated streams began to cut into this more steeply inclined land producing a rugged mountainous terrain. Finally starting about one million years ago, a series of four ice sheets, or glaciers, spread from the north over all New England. Between the times that the land was covered by ice, there were periods of warm, humid, almost tropical climate. The last ice sheet melted about 20,000 years ago, and we are now living at a time of warmer climate. Whether yet another ice sheet will come in the future, or whether the "Ice Age" is over, is a subject for speculation for most geologists. These glaciers came down laden with pieces of rock, which had been pried loose from the bedrock by the scraping action of the ice. Using these as one would use an abrasive, the glaciers scraped and shaped the countryside until the topography had the appearance that it has today. When the last ice sheet melted it left behind an accumulation of sand, gravel, cobbles, and boulders, some of the last measuring more than 100 feet in diameter. The general name given to these loose sediments is *drift*. If these sediments were deposited directly from the foot of the glacier, without being subsequently washed by running water, the drift would lack stratification, that is bedding. It is then referred to as *unstratified drift* or *till*. Sizes of particles in till range all the way from clay to boulders. These particles were dumped by the melting glacier without being sorted as to size, so that clay-sized particles typically are found next to large pebbles and boulders. Water running over loose sediments tends to sort the sediments as to size and to deposit them in beds in which different strata are composed of particles of similar size. Thus wherever melt water from the remnants of the glacier flowed over drift, it imparted to it stratification and sorting. Such deposits are known as *stratified drift*. The rock fragments imbedded in drift or lying on the surface, after being eroded out of the drift, are known as *erratics*. This term implies that they did not originate at the place where they are found, but were brought, possibly from a distant place, by the glacier. Most of the erratics in Mount Blue State Park are granodiorite or metamorphic rocks which look very much like the local bedrock. However, one occasionally finds blocks of unmetamorphosed sandstone, shale, volcanic rocks, or other types of igneous rock, which form the bedrock in areas tens of miles to the northwest. These constitute final proof of the carrying ability of glaciers.

After the last remnants of the glacier were melted and all of the glacially derived sediments deposited, young rivers began incising into the masses of drift. Some of the best exposures of drift are found in cuts produced by the erosive action of running brook and stream water. This running water removed the finer-grained material and left behind the pebbles, cobbles, and boulders which typically constitute the beds of streams in hilly terrain. The fine-grained particles, sand and clay, were carried downstream and deposited in the lower reaches of the brooks and in lakes. Typically sandy deltas form at the mouths of streams as they enter a lake. The wave action of the waters in the lake, prompted by wind, removes the sands from the deltas and redistributes them around the peripheries of the lake. If wind conditions are favorable, fine sandy beaches are produced.

The present-day scenery of Mount Blue State Park is the result of the sculpturing action of the glaciers. The valley stretching from north of Lake Webb to the Village of Dixfield in the south was formed by the abrasive action of the glacier. The bedrock underlying the valley is granodiorite, which proved to be softer and easier to erode than the metamorphic rocks that hold up the mountains surrounding the valley.

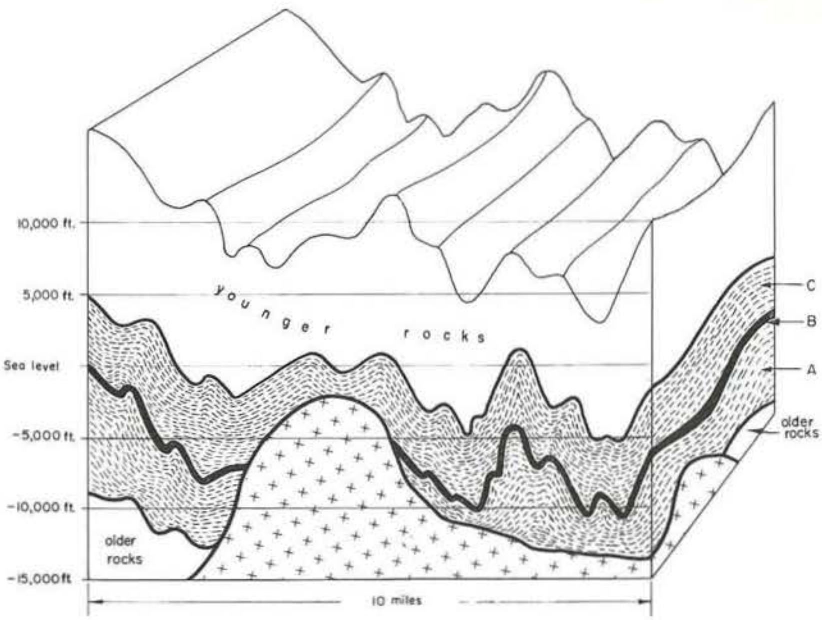


Figure 3. Folding, intrusion and metamorphism of the Acadian orogeny.

Many outcrops within the park show evidence of glacial erosion, in the form of grooves and striations that were dug out and etched as loose rocks at the bottom of the ice were dragged across the surface of the bedrock. Excellent examples of this can be seen on the summit of Center Hill.

Outcrops of granodiorite are rare. When the glacier melted it left in many places on the floor of the valley as much as several hundred feet of drift. Consequently there is not one outcrop of granodiorite within the area of the lake in Mount Blue State Park. Instead one finds unstratified drift, locally dissected by erosion to a depth of as much as 20 feet by streams and brooks such as Swett Brook, which flows next to the winding drive to the beach in the park.

The Mount Blue Trail. The Mount Blue Trail starts at the parking area at the west base of the mountain, at an altitude of 1380 feet. There is no exposure of bedrock near the trail until one ascends to the altitude of 2050 feet, which is approximately three-eighths of the way to the top of the mountain. Here, if one follows the sign labeled "Spring," he will find a waterfall cascading over an outcrop of metamorphic rock and pegmatite. On the north (far) side of the brook are outcrops and large loose blocks of micaceous granulite. Very little of the texture in the rock can be seen due to the buff color produced during weathering. Bedding can be seen with difficulty and appears as a layering produced by bands, each about 1/16 inch thick, which contain varying amounts of the mineral biotite. The *strike* of the bedding is northwest, and the *dip* is steep to the northeast. These two terms are used to describe the attitude of an inclined plane such as bedding. Strike is the direction of the intersection of the plane with a horizontal plane; dip is the angle at which the plane is inclined from the horizontal (see figure 4).

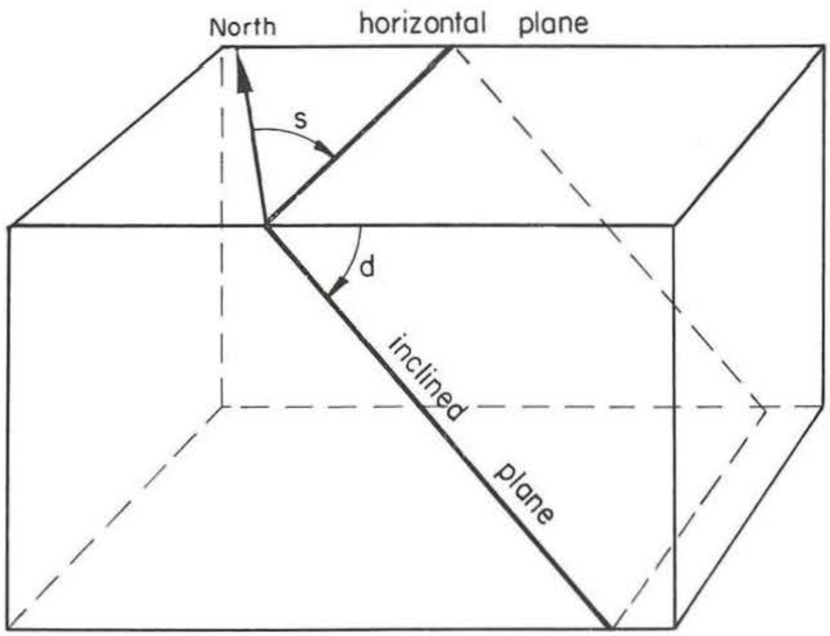


Figure 4. Measurement of the attitude of an inclined plane; s—strike measured east or west from the north arrow, here about N 30° E; d—dip, measured from the horizontal plane, here about 50° to the SE.

The pegmatite, best seen in blocks at the foot of the falls, is in place right in the middle of the falls. It is composed of *quartz, feldspar, muscovite,* and much smaller amounts of *biotite, apatite,* and black *tourmaline*. The outcrops of pegmatite show a feature known as *sheeting,* which is a set of *joints,* or fractures, having a low angle of dip. In this case the sheeting dips slightly to the west, which is downstream.

Starting at the altitude of about 2800 feet, approximately four-fifths of the way to the top, one first begins to come across abundant loose blocks of the cyclically bedded rocks that are exposed on the summit. If one takes a close look at this rock, he can see that it is made up of alternating bands of two types of rock. One of these is light in color and is composed of fine-grained quartz, feldspar, and some mica. In a number of cases, within these layers of micaceous granulite there is a banding roughly parallel to the bedding. This is produced by very thin layers, or *laminae*, within the rock, containing varying amounts of mica. The other, darker band of the rock is schist. It is coarser-grained than the micaceous granulite. In this layer are tiny pink crystals of garnet; narrow slit-like holes on the surface of the rock indicating places where biotite flakes have weathered out; shiny, clear, platy crystals of muscovite; and the everpresent quartz and feldspar. If a fresh, unweathered piece of this rock is examined, biotite is seen as shiny, dark brown, platy crystals. In addition to these minerals the schist contains *sillimanite,* which usually forms in colorless, needle-like crystals too small to be seen without the aid of a magnifying glass.

At an altitude of approximately 2950 feet, or only 150 feet in altitude from the summit, the climber finds the first outcrops on the trail of the cyclically bedded rocks. These appear as thick slabs dipping into the mountain. The strike of the beds is northeast, and the dip is moderate to the southeast. Here in outcrop are all of the features that have been mentioned in the description of the loose blocks lower on the trail. In addition, a vertical joint set striking N. 15° E. may be noted.

Between here and the top of the mountain are numerous outcrops of cyclically bedded rocks. A number of these show well-developed folds. Very good exposures of these rocks are found on the summit of Mount Blue. At the base of the stairs to the fire tower is an excellent outcrop showing a fold in the bedrock. The dip of one of the *limbs* of this fold is steep, the other is quite shallow. The *axis* of the fold *plunges*, that is, makes an angle with the horizontal, toward the northeast at 25°. See figure 5 for a sketch of a fold with all the parts of the fold labeled.

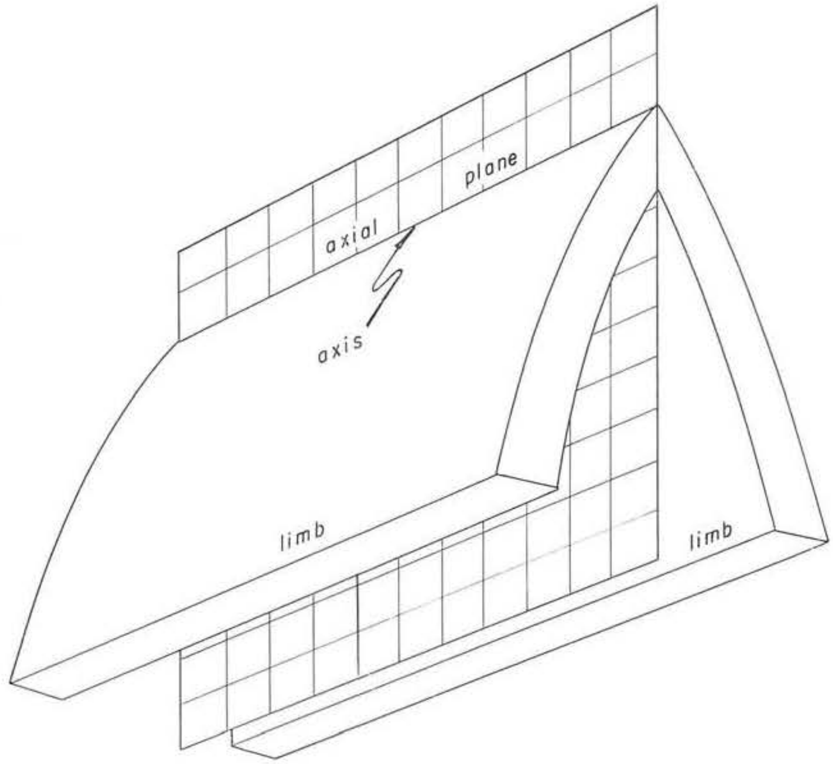


Figure 5. Parts of a fold.

The large outcrop at the summit has several joints. These are all steeply dipping, and their strikes are: N. 25° E., N. 25° W., East, and N. 75° E. This last joint set is developed in the plane of bedding (see figure 6).

Thirty-five feet east from the fire tower is a good exposure of a pegmatite dike in metamorphic rock. The minerals making up the dike are typical: quartz, feldspar, muscovite, garnet, and sparce crystals of black tourmaline (see figure 7). This dike can be traced toward the fire tower and is clearly thinning in that direction. It is represented in the large exposure on the very summit only by several thin *veins* which die out altogether farther to the southwest. At the base of this large outcrop is another pegmatite dike, somewhat thicker than the one previously described. The former mentioned pegmatite is nearly parallel to the bedding in the metamorphic rock, and thus can almost be called a sill, this latter one very definitely cuts across the bedding (see figure 8).

Figure 6. Bedding plane joints in an outcrop at the summit of Mt. Blue.

Figure 7. A pegmatite dike in metamorphic rocks east of the fire tower.

Center Hill Area. The Center Hill area of Mount Blue State Park has, in addition to a magnificent view and fine picnic facilities, many features of geologic interest. Along the twisting driveway to the picnic area, on the right (south) side of the road, about 125 feet from the parking lot, there is a large erratic of folded cyclically bedded metamorphic rock and pegmatite (see figure 9). The pegmatite had been injected into the rock before folding took place, as the pegmatite vein itself has been folded in the same manner as the metamorphic host rock. The pegmatite is composed of quartz and feldspar. The bedded metamorphic rock contains quartz, feldspar, muscovite, biotite, garnet, and sillimanite. All but the sillimanite can clearly be seen on the surface of the rock. Looking closely at the surface of this boulder, one can see that the limbs of the various folds are symmetrically disposed to little ridges on the surface of the rock, which are made of flat crystals of muscovite oriented parallel to each other. These thin ridges, which in three dimensions, are planes, define a structure called "axial plane schistosity," because these planes are parallel to the axial plane of the folds (see figure 5). These muscovite flakes are symmetrically oriented with respect to both limbs of folds and grew in such an orientation during the folding of the rock. The flat faces of the crystals are perpendicular to the compressive forces which were responsible for the folding.

Several outcrops can be seen on the south edge of the parking lot, they are mostly pegmatite. The glassy, slightly bluish crystals are quartz; the milky to buff crystals are feldspar; the small, spherical, pink grains are garnet; the shiny, platy, deep brown crystals are biotite; the shiny, platy crystals which are either colorless or are slightly rusty stained are muscovite. In a number of places, quartz and feldspar are seen mutually intergrown, forming what is called "graphic granite," because this effect suggested to an early investigator the appearance of an early Babylonian cuneiform writing.

Forty-five feet uphill (to the south) of these last outcrops is a boulder of a rock which before metamorphism was composed of thinly bedded pure limestone and micaceous sandy limestone. During metamorphism, the layers of pure limestone were converted to a light gray marble and the layers of micaceous sandy limestone into calc-silicate granulite. This latter rock has a distinct greenish color from the presence of the calcium, iron, magnesium, and silicon rich minerals, *diopside* and *actinolite*. The marble beds erode much more easily than the calc-silicate granulite, because the mineral *calcite,* which forms the marble, is more readily dissolved by running water than the more resistant calc-silicate minerals

Figure 8. A pegmatite dike cutting across the bedding in the large outcrop near the fire tower.

Figure 9. Folded cyclically bedded metamorphic rocks and pegmatite in a large erratic near the parking lot near Center Hill.

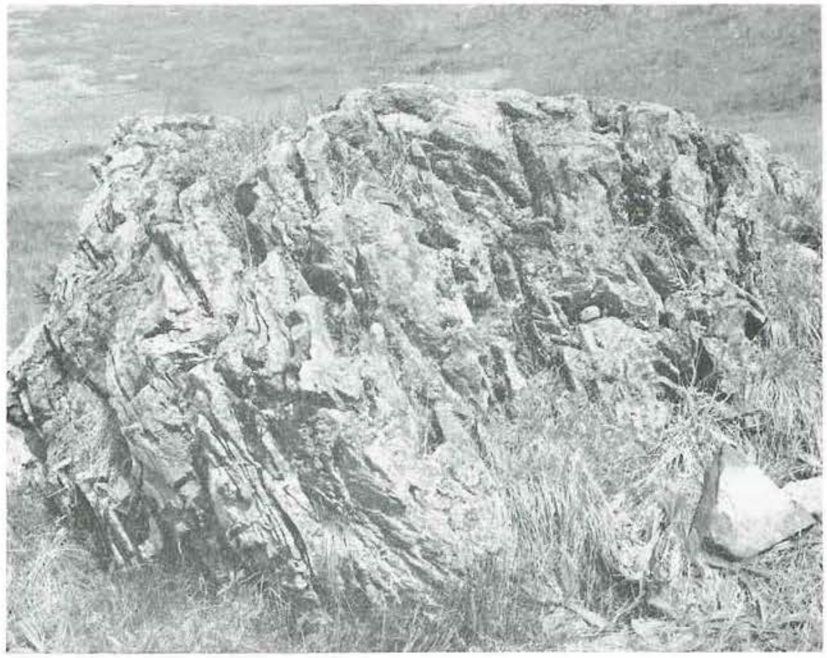


Figure 10. A boulder of folded gray marble and green calc-silicate granulite intruded by a pegmatite vein (about 50′ uphill to the south from the parking lot).

diopside and actinolite. This type of rock was flexible during deformation and folded rather easily, as can be seen by its characteristic tight folds. Subsequent to folding, this rock was intruded by a vein of pegmatite (see figure 10).

The large outcrops about 150 feet uphill are composed of pegmatite. They are thoroughly covered by lichens and moss, and only in a few places can one see the minerals. To the south of this outcrop, in back of the shelter — lookout hut, is a large outcrop of cyclically bedded metamorphic rock and some pegmatite. The surface of this outcrop is also covered by vegetation, but on this surface may be noted a set of grooves and striations, which were scraped out by rocks dragged at the base of a glacier. These striations run downhill, generally in the direction of the parking area.

Were one to follow the trail which starts at the parking lot, to the "Overlook Ledges," he would be rewarded not only with a magnificent view of the whole of Lake Webb and a more than 180 degree wide vista of the mountains, but also with outcrops more free of lichens than most

Figure 11. Glacial grooves and striations in the outcrop on the highest knob of Center Hill.

in this area. The rocks are folded, cyclically bedded schist and micaceous granulite, injected by numerous veins of pegmatite. As elsewhere, the pegmatite is easily identified by its light color. The metamorphic rock is indistinguishable from that found on top of Mount Blue. However, a glance at the geologic map will show that it is stratigraphically below, i. e., older, the thin unit composed of calc-silicate granulite and micaceous granulite. The rocks on top of Mount Blue are stratigraphically above, i. e., younger, than this calcareous unit. Glacial grooves and striations are prominent in the outcrop on Center Hill, especially near the highest knob (see figure 11). Another feature which is the result of erosional, grinding action of the moving glacier is the steep wall, facing toward the southern part of Lake Webb, on a portion of the main outcrop not far from the high knoll (see figure 12). As the glacier moved over Center Hill, from northwest toward southeast, it "pulled" on the southeast sides of outcrops, loosening blocks and plucking out pieces that were not firmly attached to the bedrock. In this case parts of the outcrop were not firmly bound to the bedrock due to a joint set. Such

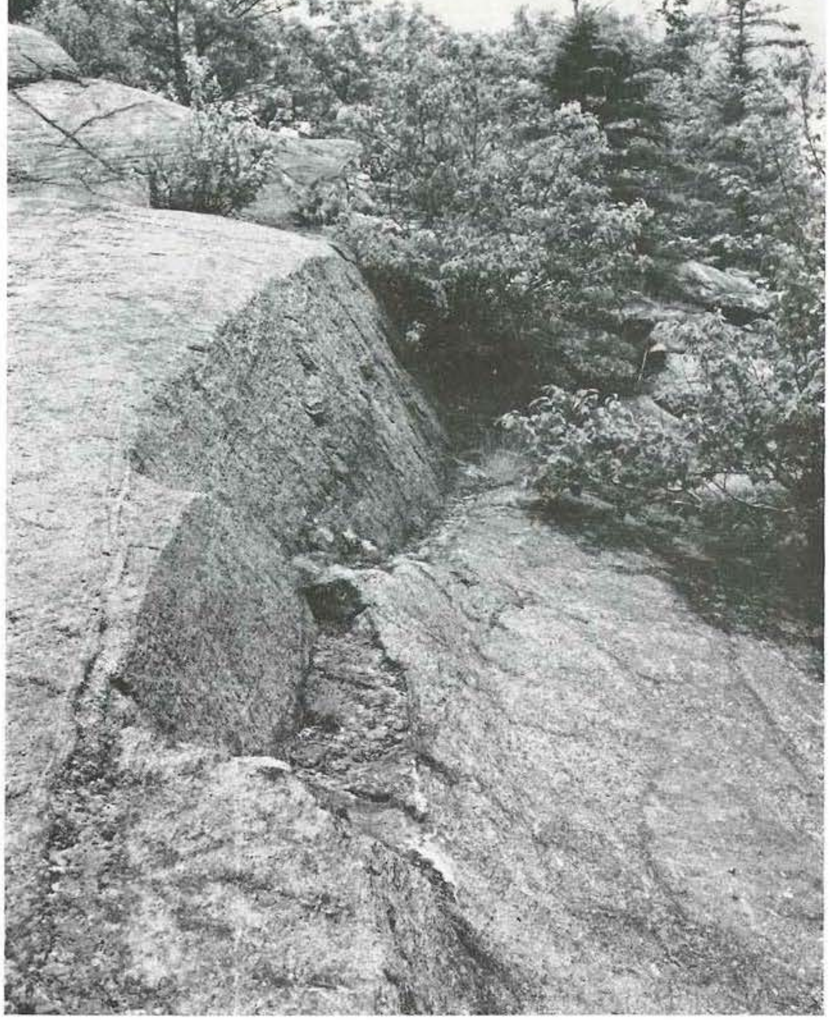


Figure 12. The outcrop at the top of Center Hill showing the results of the "plucking off" action of the glacier.

examples of "plucking off" of rock on sides of hills in the direction of the motion of the glacier (the lee side) are very common in once glaciated terrain.

GLOSSARY OF GEOLOGIC TERMS

Actinolite — a prismatic mineral, typically dark green, containing calcium, iron, magnesium, silicon, oxygen, and hydrogen; commonly found in calc-silicate granulite.

Apatite — a mineral, typically light green, containing calcium, phosphorus, oxygen, and fluorine; commonly found in pegmatites.

Bed — the smallest subdivision in a stratified series of rocks, marked by a more or less well-developed plane, which separates it from adjacent beds above and below.

Bedding — a collective term signifying the existence of beds.

Bedrock — the solid rock that is part of the crust of the earth, commonly overlain by soil, gravel, etc.

Beryl — a mineral, typically pale blue-green, containing beryllium, aluminum, silicon, and oxygen; found in a number of pegmatites.

Biotite — a platy mineral, typically dark brown, containing potassium, aluminum, iron, magnesium, silicon, oxygen, and hydrogen; one of the mica minerals.

Boulder — a fragment of rock, not attached to bedrock, and larger than 10 inches in diameter.

Calcareous — containing calcium carbonate.

Calcite — a mineral, typically white, containing calcium, carbon, and oxygen; the most common form of calcium carbonate.

Calc-silicate — pertaining to a rock or mineral that is predominantly composed of calcium, silicon, and oxygen.

Clay — two implications may be understood:
(1) material of very fine particle size, with the individual grains less than 0.002 inch in diameter;
(2) a material composed of minerals that are essentially composed of aluminum, silicon, oxygen, and hydrogen.

Coarse-grained — of large particle size.

Crystal — a polyhedral form, bounded by plane surfaces which are the outward expression of the regular arrangement of atoms which make up a mineral.

Dike — a tabular body, typically of igneous rock, which cuts across the structure of another older rock.

Diopside — a mineral, typically light green, containing calcium, magnesium, iron, silicon, and oxygen; commonly found in calc-silicate granulite.

Dip — the angle at which a planar feature, such as bedding or schistosity, is inclined from the horizontal.

Drift — any rock material transported and deposited by a glacier.

Erratic — any rock material that had been transported prior to being deposited, and thus not merely eroded out of the bedrock immediately beneath it.

Feldspar — one of the most common minerals; white, tan, buff, even pink or greenish; typically not showing a crystal form; containing potassium, sodium, calcium, aluminum, silicon, and oxygen.

Fine-grained — of small particle size.

Fold — a bend or flexure in some originally planar feature, such as bedding.

Garnet — a near spherical mineral, typically pink to purplish-red, containing iron, aluminum, silicon, oxygen, and commonly other components.

Glacier — A thick body of ice originating from compaction of large amounts of snow, showing evidence of movement.

Grain — the particles of discrete minerals which comprise a rock or sediment.

Granite — a particular type of igneous rock, composed essentially of the minerals quartz and potassium-rich feldspar; commonly a general term for any igneous rock containing quartz and feldspar.

Granodiorite — a particular type of igneous rock, composed essentially of the minerals quartz and sodium-rich feldspar.

Granulite — a term commonly used to indicate a metamorphic rock that does not possess a well-developed schistosity.

Gravel — a mixture of sand and pebbles.

Igneous — pertaining to a rock that has crystallized out of a melt.

Joint — a fracture which interrupts the physical continuity of a rock mass.

Joint set — a group of more or less parallel joints.

Limestone — a sedimentary rock composed chiefly of calcium carbonate.

Magma — a naturally occurring subterranean mobile mass of molten rock.

Marble — a metamorphosed limestone.

Metamorphism — the process of change of the texture and mineral content of a rock, caused by subjection of the rock to temperatures and pressures other than those under which it was originally formed.

Mica — one of a number of platy minerals, of which the most common examples in the park are muscovite and biotite.

Micaceous — containing mica.

Mineral — a naturally occurring inorganic crystalline substance.

Mud — a common term for a mixture of clay and water.

Muscovite — a platy mineral, typically colorless or slightly greenish-yellow, containing potassium, aluminum, silicon, oxygen, and hydrogen; one of the mica minerals.

Orogeny — the process of mountain building.

Outcrop — that part of bedrock that is exposed at the surface of the earth.

Pebble — a particle of rock, the dimensions of which range between 1/10 inch and 2½ inch in diameter.

Pegmatite — igneous rock of coarse-grain size, typically found in bodies of smaller size than the main bodies of igneous rock.

Plunge — the angle made by a linear feature, such as an axis of a fold, with the horizontal plane.

Quartz — one of the most common minerals, typically clear or slightly milky or smoky, containing silicon and oxygen.

Rock — any naturally formed aggregate or mass of mineral matter, typically consolidated and coherent.

Sand — particles of rock or mineral grains, the dimensions of which range between 0.002 inch and 1/10 inch in diameter.

Sandstone — a sedimentary rock composed of sand-sized particles. Typically quartz is the most abundant constituent.

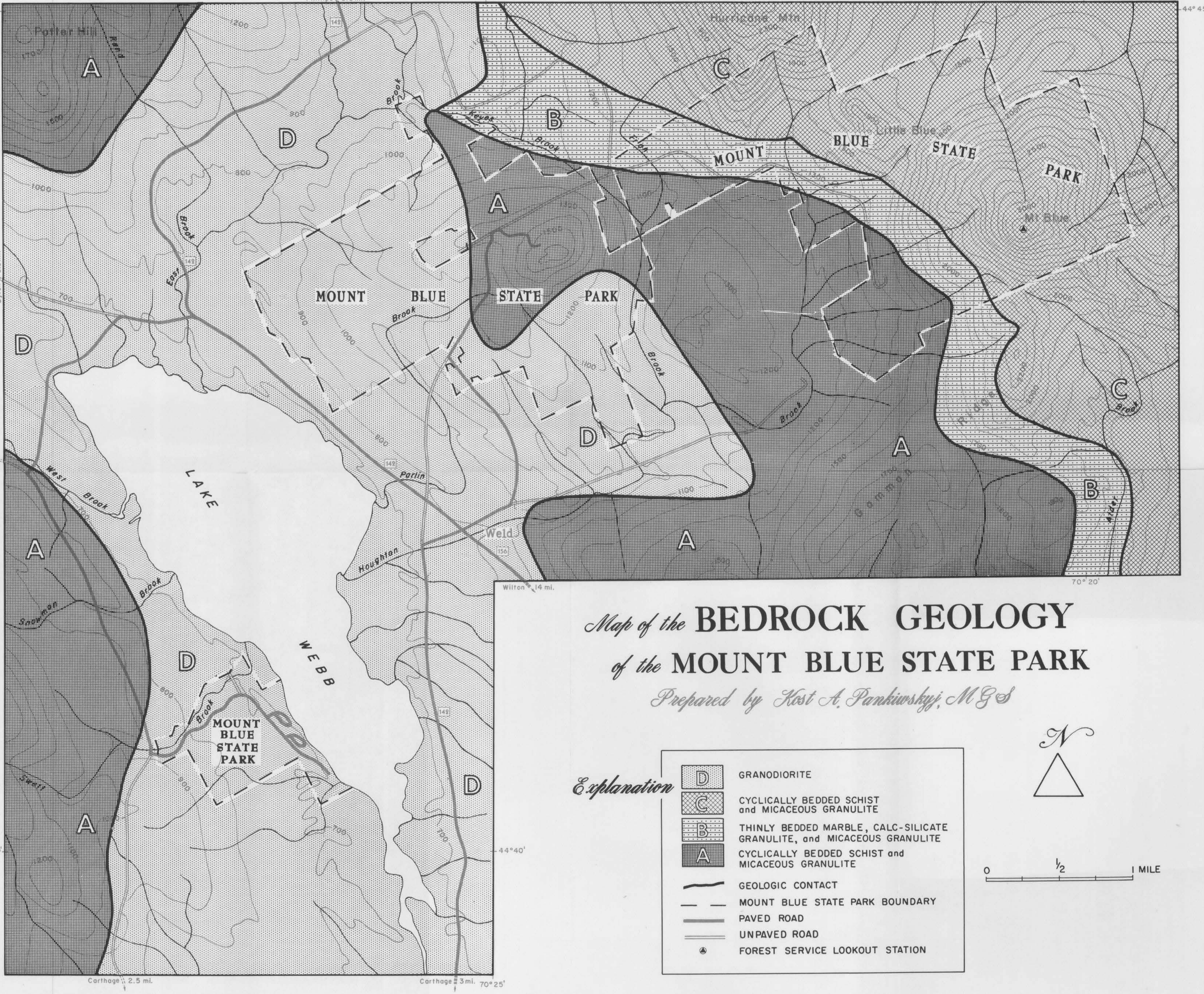
Schist — a metamorphic rock characterized by parallel orientation of platy minerals, such as mica.

Schistosity — the prominent foliation in schist produced by parallel orientation of platy materials.

Sediment — a descriptive term for particles that had settled down from suspension in water.

Sedimentary — pertaining to a rock that had formed through consolidation of sediment.

Shale	— a rock composed of consolidated mud.
Sill	— a tabular body, typically of igneous rock, which is parallel to the bedding of the rock into which it had been intruded.
Sillimanite	— a needle-like mineral, typically colorless, containing aluminum, silicon, and oxygen.
Strike	— the direction of the intersection of an inclined plane, such as bedding or schistosity, with the horizontal plane.
Till	— common term for unstratified drift.
Tourmaline	— a mineral of long, thin form; typically black, but sometimes pink, green, or yellow; containing boron, aluminum, silicon, oxygen, and many other elements; commonly found in pegmatites.
Vein	— tapered bodies of minerals which formed from melts or solutions.


Map of the BEDROCK GEOLOGY
of the MOUNT BLUE STATE PARK
Prepared by Kost A. Pankiwskyj, MGS
Explanation
D GRANODIORITE
C CYCLICALLY BEDDED SCHIST and MICACEOUS GRANULITE
B THINLY BEDDED MARBLE, CALC-SILICATE GRANULITE, and MICACEOUS GRANULITE
A CYCLICALLY BEDDED SCHIST and MICACEOUS GRANULITE
GEOLOGIC CONTACT
MOUNT BLUE STATE PARK BOUNDARY
PAVED ROAD
UNPAVED ROAD
FOREST SERVICE LOOKOUT STATION
N
0 1/2 1 MILE
MOUNT BLUE STATE PARK
LAKE WEBB
Weld
Potter Hill
Hurricane Mtn
Little Blue
Mt Blue
Phillips 8.5 mi.
Byron 8.5 mi.
Wilton 14 mi.
Carthage 2.5 mi.
Carthage 3 mi.
70° 25'
70° 20'
44° 45'
44° 40'
East Brook
West Brook
Keyes Brook
Alder Brook
Parlin Brook
Houghton Brook
Snowman Brook
Gammon Ridge