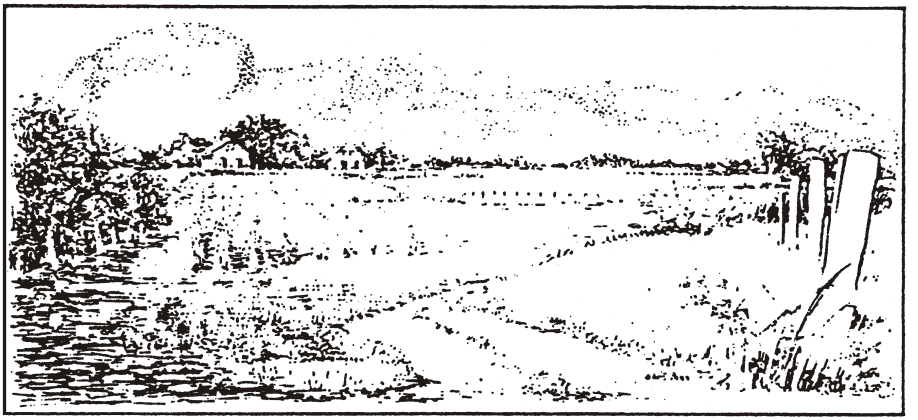
SELF-GUIDING NATURE TRAIL IN

SLEEPING GIANT STATE PARK



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for the Sleeping Giant Park Association

Sixth Edition 2013

SELF-GUIDING NATURE TRAIL

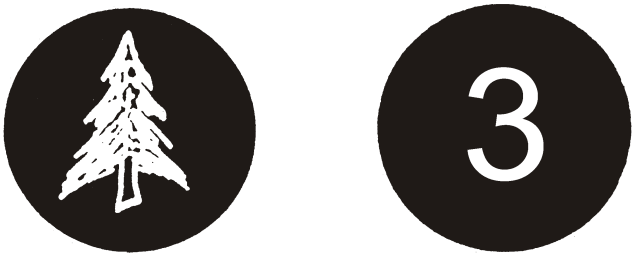
Many people visit the Sleeping Giant. It is hoped that you will be one of those who will gain more enjoyment from your visit by exploring the Nature Trail with this "Trail Guide", which will help you to interpret our natural world.

The trail requires over an hour to walk. The first part is relatively level walking. The second part of the trail, after the turn near number 17, is rougher, steeper and, in places, rocky. All trails require suitable shoes.

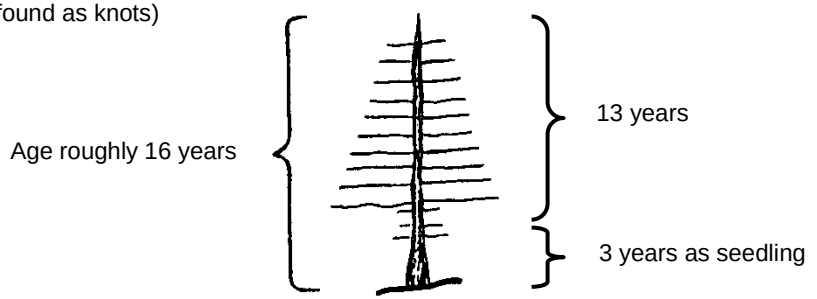
The numbered trees or rocks beside the trail are matched with the numbered paragraphs in this booklet. When you reach a numbered tree or rock, look up the matching number in this Trail Guide and read about the natural features around you.

The natural features covered in this guide have necessarily been limited to things than can be seen in all seasons. However, in the proper season look for the many flowers, birds, insects, and other wildlife which make their home on the Sleeping Giant. They will add to what is covered in this guide.

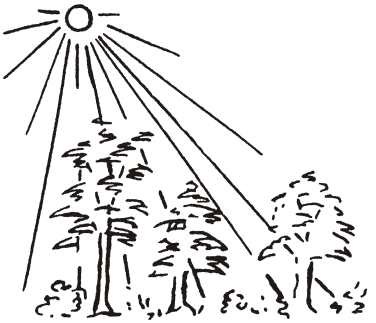
The trail is well marked with Nature Trail blazes (white pine trees on green circles) and the footprints of others who have explored this trail before you. We welcome you to the Nature Trail and ask that you leave our natural environment undisturbed.



1. AGE OF A PINE TREE – Downhill to the right of the trail is an eastern white pine (*Pinus strobus*) plantation. Are these trees about the same age? There is an easy way to estimate the age of pine trees. The limbs of a pine grow in whorls. Notice that these limbs come out of the trunk at regular intervals. Count these whorls. Add three years for years as a seedling and you have the approximate number of years the pine has been growing. (Note that many of these trees have had their lower branches removed, so look for the scars usually found as knots)



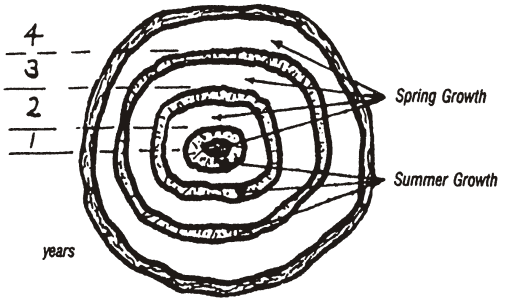
2. FOREST UNDERGROWTH - Did you notice how the forest floor of the pine forest below the trail differs from the forest floor of the broad-leafed forest above the trail? Which forest has the better developed undergrowth, such as small trees and shrubs? Sunlight is needed for undergrowth to develop. Which forest permits more sunlight to penetrate to the forest floor? During what season does the most sunlight reach the floor of the broad-leaved forest? Does this help to explain why so many of the small plants in this forest bloom in the spring?



Broad-leafed Forest
Canopy thick not more than six months of the year.

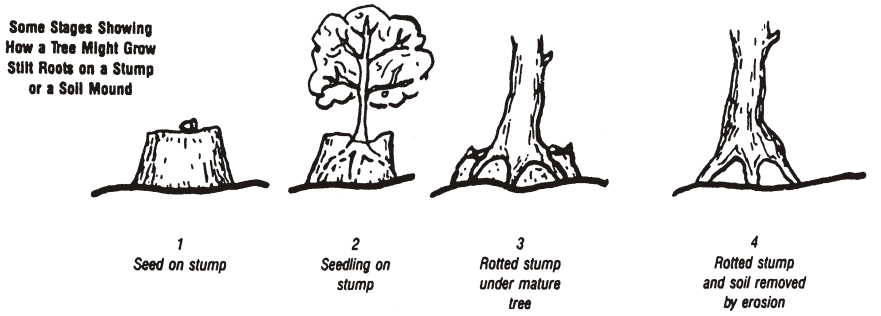
Pine Forest
Canopy thick twelve months of the year.

3. A TREE LEAVES A RECORD IN ITS STUMP – On the right 50 feet down the wide rocky path leading to the parking lot, look for a second tree marked with a 3. Next to this tree is a cut off tree stump. In the spring, a tree usually produces the widest part of its growth ring which is light in color. Late summer growth is slower and is shown by the narrower, darker part of the growth ring. Thus, one season's growth consists of one ring with two shades of color. Can you tell the age of this tree when it was cut down?



Note: Retrace your steps back to the Tower Path. When you reach the sharp left hairpin turn on the Tower Path, the Nature Trail leaves the graveled Tower Path and follows its own path.

4. STILT ROOT TREE – This black birch tree exhibits a condition known as stilt roots. The tree may have started as a seed sprouting on a dead stump or a small mound of soil from an uprooted tree (see number 6). As the tree grew and the roots reached down for nutrients and water, either the old stump rotted away or the mound of soil eroded away leaving the base of the young tree above the level of the surrounding forest floor. Continued erosion of soil eventually leaves the upper roots exposed as you see them.



5. NATURAL FOREST DESTRUCTION – All around this area dead, toppled trees and branches litter the forest floor. This is one of many places along the Nature Trail that shows the result of natural forces on forest trees. In recent years, Connecticut and all of the New England area have experienced unusually severe storms which have broken and destroyed many of the trees in our neighborhoods and forests. Many of the affected trees had already been weakened by destructive fungal and insect diseases such as the Hemlock Woolly Adelgid discussed at station 7.

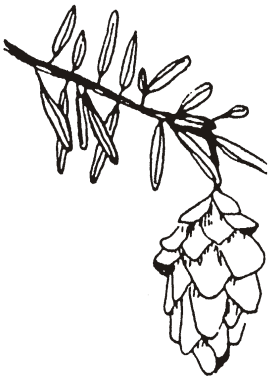
Despite the destruction resulting from these events, over time decomposition will allow these fallen trees to add nutrients to the soil, and openings in the canopy will allow light to filter through encouraging young trees and other plants to grow.

6. UPROOTED TREE WITH EXPOSED ROOTS --Turn to the right on the Red Hexagon Trail and follow the trail downhill for 130 feet to the white number six in a green circle. Turn to the left off the trail and follow the white arrows in the green circles for 65 feet to a large toppled tree.

Note the massive amount of trapped soil and rock that was lifted by the roots of the tree as it fell down. The large depression left by the uprooted tree leaves an earth scar. Station number 21 further along the trail will show an old earth scar that has begun to fill in and will show the decaying dead tree and its now deposited soil and rocks that were trapped by the toppled tree roots.

Retrace your steps back to the Red Hexagon Trail and then back up to the Nature Trail to continue on the Self-Guiding Nature Trail.

7. HEMLOCKS AND THE HEMLOCK WOOLLY ADELGID – Here on the left are three large hemlocks. The hemlocks of Connecticut have been under threat from the Hemlock Woolly Adelgid, which was introduced into the United States in 1924 and is closely related to aphids. The insect was first discovered in Connecticut in 1985 and has since caused extensive damage and death to both ornamental and native hemlocks. One of these three hemlocks has succumbed to the Woolly Adelgid. You can clearly see that the dead hemlock has broken branches and no foliage, while the other two living hemlock still have foliage at the very top. These hemlocks will be replaced naturally by the oaks and hickories characteristic of the forest on the Sleeping Giant.



This hemlock drawing by Pam Fairclough is the courtesy of the White Memorial Conservation Center; Litchfield, Connecticut.

8. ROTTING LOG SUCCESSION (STANDING DEAD TREE STAGE) – All living organisms which die in nature will either be consumed by scavengers or will undergo decomposition in a series of stages. One of the most conspicuous decomposition processes in the forest is that involving dead trees. This dead hemlock, which was snapped off by Hurricane Gloria in 1985, is in the first stage of decomposition, which means that it is a standing dead tree with much of the bark still intact. On close inspection, however, you will note that insects and fungi are already at work breaking down the wood of the tree. When the insects and fungi have decomposed a significant portion of the tree, the tree will be toppled by a windstorm (as seen in number 6) and the next phase will begin. But before a dead tree falls to the ground, it often provides homes in the form of nesting holes for birds and squirrels. Look for such holes in dead trees along the trail.

9. ROTTING LOG SUCCESSION (FALLEN TREE STAGE) – Notice the dead fallen trees to the left and right of you and also the large fallen hemlock tree behind you. After a dead tree has fallen and is in full contact with the forest floor, a new series of decomposing organisms begin to invade the log. Insects such as beetles and grubs cut lacy patterns of holes in the wood. This allows water to permeate the wood, which aids the deeper penetration of fungi. This series of different decomposing organisms will eventually break down the wood and return the organic matter and nutrients to the soil. What would happen to the forest if dead trees did not decay? Would there be any room left for new trees to grow? We can learn from nature's recycling, that many of our increasingly scarce resources can be reused.

10. CARPENTER ANTS – Approximately 30 feet uphill to the left is a standing dead stump of a tree. Walk to the uphill side of the stump and you will observe that the stump is hollow with an intricate network of passageways in the remains of the wood. This is the work of carpenter ants, but is often confused by some as the work of termites. While termites are also active in dead trees, they are almost always found in moist, rotting logs, and seldom give any evidence of their presence. Carpenter ants, on the other hand, are usually found in very dry dead trees, and often betray their presence with tiny holes in the trunk and piles of sawdust at the base of the tree. Carpenter ants use the dead tree primarily as a home for the colony, but do not feed on the dead wood as do termites.

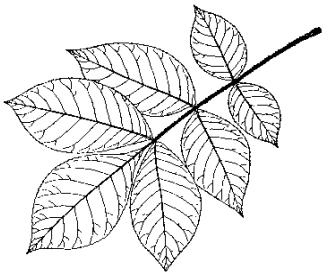
11. TREES WITH FORKED TRUNKS – This is a black birch tree with three trunks. Several trunks on the same tree often produce an interesting pattern. When a tree grows from a seed it will, under normal conditions, produce just one trunk. However, under certain other conditions several trunks might occur. For example, if the main trunk is cut off, a number of new sprouts may come up from the stump. If an insect

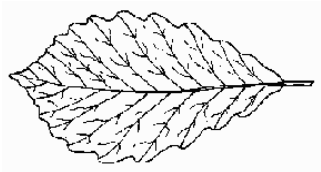
damages the terminal bud, a tree with two or more trunks may grow. And, if disease kills the main trunk, the stump may put up several sprouts, some of which will grow into new tree trunks.

12. SANDSTONE SLABS – Look closely at the rocks lying to the left above the trail. You can see that they are composed of sand and pebbles. The material from which this sandstone was made was deposited in layers by water 300 million years ago. Time, pressure and mineral cement have consolidated them into rock. This type of rock is weak along the lines of the layers and it splits easily. In the surfaces of the large slabs are half-buried pebbles and holes from which other pebbles have been pulled out. The face of the smaller rock nearest the trail contains pebbles which have been broken across even with the surface. This smaller rock was broken across the grain; the sand and pebbles are held much more firmly in this direction which is why the pebbles were broken. Sandstone is one of the two kinds of rock under the soil of central Connecticut (Station 25 discusses the second type). Various types of sandstone can be found among the rocks strewn on the slopes along the trail.

13. HOLLOW LIVING TREE – Uphill to the left of the trail is a hollow oak tree. It is often difficult for people to believe that the entire core of a living organism can be absent and yet the organism remains alive. Such is the case here. The vital living tissues of a tree are located just beneath the bark in a region known as the cambium layer (or sapwood). The older central portion of a tree, sometimes called heartwood, has lost its ability to transport nutrients and water and so is not functional. This leaves the heartwood of a tree vulnerable to destruction by organisms such as insects and fungi. The result may be a tree such as this, which because of its functioning sapwood is still alive even though most of its heartwood is gone.

14. MOCKERNUT HICKORY – This tree is a mockernut hickory. Hickories are found mainly in drier habitat in the eastern United States. The hillside forest along the lower section of the Nature Trail is an ideal habitat for hickories because of its drier southerly exposure. Hickory trees have compound leaves. Compound leaves are made up of leaflets attached to a flexible, greenish main stem. The mockernut hickory is one of four species of hickories found in this region and is characterized by deeply furrowed bark and compound leaves containing 7 or 9 leaflets. The nut is edible.





15. CHESTNUT OAK – Notice the trio of trees to your right. Also characteristic of drier forests are the oaks, represented here by the chestnut oak. This tree has mature, deeply furrowed bark with long vertical fissures and a broad, characteristically shaped leaf. The chestnut oaks form a subsection of the white oak group and are one of the major trees of drier hillsides in southern New England. Notice the tiny chestnut oak seedlings scattered around the base of their parent tree.

16. DRAINAGE GULLY – The rocks in the gully were deposited by the continental glacier approximately 15,000 years ago. Since that time, water draining off the Sleeping Giant has washed away sand and small stones with which these large rocks were mixed. The soil on either side of the gully, like the soil all over the highlands of New England, is a mixture of large and small rocks, pebbles, sand and clay. The glacial ice was a thousand feet thick over this region. As it pushed slowly southward, the ice swept up the soil, scoured away loose rock, and tore pieces of bedrock from the hills. When the ice began to melt, it dropped this material, all mixed together, to form our present soil.

17. OLD FORKED PINE – This is the farthest point of the Nature Trail from the starting point, and about one-third the total length. From here on the trail is steeper and rougher, but interesting. You may return the way you have come, or continue if you choose. White pines are evergreen trees. They are an ancient line of trees that were present on Earth long before today's common oaks and maples. Their needles grow in bundles of five, easy to remember as there are five letters in "white". This is the common native pine in Connecticut. Once America's most valuable lumber tree, it is used today for trim inside most houses. Could this tree be the parent of the younger pines nearby?

NOTE: The Nature Trail makes a very sharp turn to the left, uphill, at the junction of the Yellow/ Nature Trail and the Red Triangle Trail.

18. SANDSTONE BOULDERS – These large sandstone boulders were once part of the bedrock of the Sleeping Giant. The glacier tore them loose and moved them to the present location. The bedrock from which the boulders came is called sedimentary rock because the materials from which it was made were deposited by water. These materials were eroded from ancient mountains to the east and washed into the lowland which is now central Connecticut. This process took millions of years, and thousands of feet of material were piled in the valley and compressed and cemented together. The evidence that proves the origin of the rock is visible in the layers of the boulders. Running water will deposit sand in just such layers and, at times, swifter currents carry and deposit heavier pebbles.

19. BEECH – One of the most handsome deciduous trees in the forest is the American beech. Its smooth blue-gray bark is unmistakable, but so often shows the scars of thoughtless persons who carve their initials on the trunk. Acts of vandalism such as this detract from the natural beauty of our forests, and the wounds leave the tree open to infection and invasion by fungi, bacteria and insects.

20. HEARTWOOD ROTS FIRST – The object of interest at this number is a hollow stump. As a tree increases in age, often two distinct regions will appear in the inner part. The outer layers, called sapwood, are lighter in color and primarily responsible for the transport of water and nutrients. The inner layers, called heartwood, are darker in color and primarily used for storage. When a tree dies or is cut down, the stump or log that remains will decompose. Sometimes, however, the heartwood will decompose more rapidly than the sapwood, leaving a hollow stump (as you see here) or a hollow log. Sometimes the heartwood in a living tree will decay and the tree will become hollow, but will continue to thrive (Station Number 13).

21. UPENDED DEBRIS FROM A FALLEN TREE – You may have noticed holes with mounds of soil next to them at various locations in the forest. Often, when a tree is toppled by a windstorm, such as the uprooted tree with exposed roots at Station 6, the roots will dislodge soil and rocks trapped within the root network. In time, when the tree is decomposed and becomes part of the forest floor, only the depression and a small mound of soil and rocks will remain. This fallen tree is not completely rotted yet, but you can clearly see the many rocks dislodged by the roots.

22. CHRISTMAS FERNS – Ferns have leaves (called fronds), stems and roots, but no flowers. They reproduce by spores which form on the undersides of the fronds, or on separate special fronds or stalks. If you are present at the right time of the season, you will see dot-like structures on the undersides of these Christmas ferns. They are like pillboxes that are full of minute spores which will form new plants. The Christmas stocking shape of the pinna (leaflet) will help you to identify this fern again. This fern is evergreen, so look for it in all seasons.

Pinna, shaped like a Christmas stocking

23. BLACK BIRCH – Black birch (sometimes known as sweet birch) is the most common birch of southern New England. Black birch may be easily recognized by its smooth, nearly black lustrous bark on smaller trees, and the very scaly and plated bark on old trees such as this one. Its twigs are very aromatic, hence its other name, sweet birch.

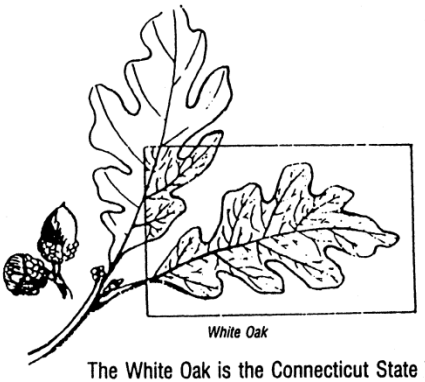
24. MICROHABITAT – In the crotch at the base of this trio of trees note the tiny reservoir of water. This is present most of the year and serves as a perfect breeding site for mosquito larvae.

25. TRAP ROCK BOULDER – The large greenish-grey boulder is trap rock. This is the second of the two kinds of rock found under the soil of central Connecticut. It is the rock that forms the body of the Sleeping Giant. This rock is hard and dense and does not erode as easily as the softer, weaker sandstone. Most of the higher elevations of central Connecticut are formed from this rock. Trap rock, or basalt, originated miles deep in the earth as molten, fluid material. It is known as igneous rock because it was formed by fire or heat. The molten rock was forced up through cracks in the sandstone. Some of it reached the surface and flowed out, hundreds of feet thick. Some forced its way between layers of sandstone to form a huge sandwich. The material forming the Sleeping Giant welled up through a great crack and pushed up overlying layers of sandstone which wore away exposing the trap rock and giving the Sleeping Giant its present form.

26. SUGAR MAPLE – The sugar maple is almost synonymous with New England because of its autumn color and maple syrup. The sugar maple is not characteristic of drier hillsides of southerly exposure such as this, but would be found more often on hillsides of northerly exposure, such as the other side of the Sleeping Giant. It is an important source of lumber for the manufacture of fine furniture and for the production of maple syrup.

27. WHITE OAKS AND RED OAKS – All oaks belong either to the white oak group or the red oak group. If you can learn to place an oak into one of these two groups, you have taken your first step in identifying the oaks. The oak on the left side of the trail is a red oak and the oak 10 feet back on the right side of the trail is a white oak. For greater ease in identification, learn the following.

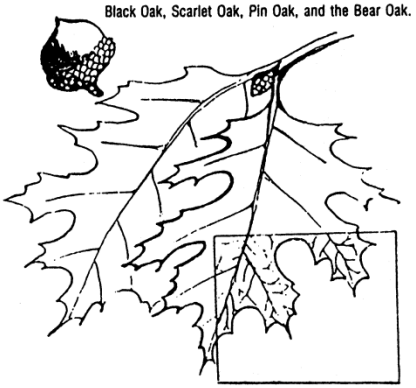
White Oaks
Leaves have rounded lobes. Bark is light gray.
Acorn long and pointed. Includes:
Chestnut Oak, Post Oak, and the White Oak.



White Oak

The White Oak is the Connecticut State Tree.

Red Oaks
Leaves have pointed lobes. Bark is dark colored.
Acorn shorter and fatter. Includes: Red Oak,
Black Oak, Scarlet Oak, Pin Oak, and the Bear Oak.



Red Oak

These oak drawings are by Pam Fairclough and are the courtesy of the White Memorial Conservation Center; Litchfield, Connecticut.

28. SHAGBARK HICKORY – At the far side of the overlook clearing is a shagbark hickory. The shagbark hickory is one of the easiest trees in the forest to identify. The bark of the tree has a most distinctive shaggy appearance of thin, narrow scales curved outward at the ends. The shagbark hickory has compound leaves usually containing 5 leaflets. The nut is edible.

29. AMERICAN CHESTNUT – Four feet ahead on the left with a white and green strip painted around the trunk is a small dead American chestnut tree. Small trees such as these are all that are left of one of Connecticut's finest forest trees. The chestnut blight (a tiny parasitic fungus) was introduced in 1919 and almost exterminated the American chestnut because the tree had no resistance to it. Many old roots survive and still send up sprouts, although the original trunk may have been dead and gone for over half a century. These young sprouts may reach a height of 10 to 20 feet before succumbing to the fungus.

Note that a new sprout is already growing at the base of this dead trunk. Across the trail to the right from this dead American chestnut tree, 6 feet from the trail is a clump of new sprouts around another short, dead 2-inch trunk. One of these sprouts is already showing the infection.

30. LIFE ZONES – Ten feet beyond, take the side path on the left to the knoll. This little knoll demonstrates, in a small area, three of the life-zones or communities of the Sleeping Giant. You can actually mark the boundaries of three communities:

1. A south facing slope that dries quickly after a rain.
2. A comparatively level upland with poor, shallow soil unable to support a diverse group of plants.
3. A steep north slope retaining moisture from rain to rain. Here plants grow that require this constant moisture and can subsist with a minimum of sunlight.

In the future when you encounter different life-zones or communities, you may be able to determine why they are found where they are, if you consider the following factors:

1. The amount of moisture retained in the soil after a rain.
2. The depth and type of soil.
3. Whether a slope faces north, south, east, or west.
4. The elevation.
5. The latitude.

Note: Retrace your steps back to the point where the Nature Trail joins the Tower Path and proceed uphill to the right.

31. BARE ROCK SUCCESSION (LICHENS AND EARLY MOSSES) – Succession is a series of continuous changes which occur in a community over a long period of time. The process is an orderly change in which groupings of plants and animals are replaced gradually by new and different groups, until the whole character of the community is changed. Eventually, a stable group of plants and animals will be reached which is called a climax. In a climax community the same kinds of plants and animals simply replace themselves. Each successive stage is able to appear only because the previous organisms have, in essence, provided a suitable habitat for them.

Under normal circumstances the time needed for a complete successional series to take place in one location can be longer than a human lifespan. However, we are fortunate to be able to see most of the stages for this type of forest (oak-hickory) within a distance of only a few hundred feet. This is possible because the soil on the bedrock that makes up the Sleeping Giant is very thin, and is periodically removed in small landslides. The result is a series of rock exposures of different ages that represent different stages of succession.

Here we see the earliest stage, which consists mainly of blue-grey patches of lichens and small, low-growing clumps of mosses. Only these plants can survive here; there is no soil for larger plants to take root.

32. BARE ROCK SUCCESSION (LATER MOSSES AND EARLY GRASSES) – In this second stage we see much larger mosses and small grasses. These can now take root because enough eroded material has been trapped by the lichens and small mosses of the first stage to allow a deepening of the soil.

33. BARE ROCK SUCCESSION (LATER GRASSES, SHRUBS AND SMALL TREES) – In this third stage more soil has accumulated and been enriched by the addition of organic matter from the previous plants. Larger grasses, shrubs, and small trees have replaced the previous plants, and little of the bare rock is left uncovered. The importance of soil to a community can't be shown any better than in these stages of succession. Not only does the increased depth and quality of soil provide for the physical establishment of higher plants, but the value of the soil as a reservoir for moisture is demonstrated. In the first stage there is no place for storage of moisture, but with each successive stage, the moisture content of the soil increases.

34. BARE ROCK SUCCESSION (LARGE TREE) – In this final stage we see the larger trees of the climax forest. Enough soil has accumulated to permit their growth. However, if you look carefully at the exposed roots of this tree, the frailty of this climax forest can be seen. Note that actual depth of soil between the bedrock and the base of the tree is really very shallow. For this reason, trees usually do not grow to their potential height where the land slopes. The root system is simply too shallow and eventually strong winds in a storm may topple the tree when the height to root system has been exceeded. As you continue on the trail, note how the taller trees are usually located on more level sections of land.

NOTE: At this point the Nature Trail now leaves the Tower Path and follows the Red Hexagon Trail down steeply to the left for about 20 feet. Watch your footing at the beginning of this section.

35. TALUS SLOPE – The apparently solid rock of the cliffs is laced with a network of tiny cracks opened by shrinking of the trap rock as it cooled. Water enters these cracks and near the surface this water freezes during the winter. The expansion of the freezing water forces the rock apart and loosens the surface blocks. Through many seasons of alternate freezing and thawing the rock is moved to the point where gravity can operate, and the great blocks tumble down. This is part of the process of erosion which has gone on since the glacier retreated. The fall of rocks is not often observed, but you can see where recent blocks have fallen as the face of the rock will be noticeably lighter in color where a rock has been dislodged.

NOTE: The Nature Trail turns to the left at this point continuing down on the Red Hexagon Trail to the junction of the Orange Trail, where you will turn to the right.

36. TRAIL EROSION – To the left, erosion like this is like a cut in your skin. Plants help heal over this cut in the soil as part of their natural growth. Here the oak tree holds back water runoff as well as larger particles of rock and soil. If undisturbed, plants would grow in the soil-pockets formed by this root and they, with their roots, would help hold more soil. The decay of falling leaves caught in the soil-pockets would help make the soil richer and deeper. This would create better growing conditions. Here, however, constant footsteps will prevent this process from occurring as long as this is a trail. There are specific measures that are employed by maintainers of hiking trails to control or prevent erosion, such as:

1. Build trails on contours.
2. Build check dams.
3. Detour around eroded area.
4. Let trails rest when signs of erosion appear.

At this location the trail has been re-routed to parallel the old eroded section on your left to allow natural repair.

37. MOUNTAIN LAUREL – Mountain Laurel is the state flower of Connecticut. It is a beautiful, broad-leaved evergreen, with masses of pink and white flowers which bloom in June.

38. INTERMITTENT STREAM – Note how much water is flowing in this small stream at this point. Later, note how much water is flowing in this stream as you pass it (on your left) just before the Nature Trail reaches the picnic area. Except at times following heavy rainfall there will be little or no water further downstream. This is due to the fact that the streambed contains many rocks and gravel. The small amount of water present simply percolates into the streambed and “disappears” into the ground.

39. CANKER ON TREE – The canker is located on a maple tree, which is approximately 30 feet to your left, downhill, toward the stream. A canker is a large mass of scar tissue on a tree, resulting from either a bacterial or fungal infection on the cambium and the bark. Sometimes the effect of the canker will be to girdle the tree, resulting in its eventual death. The blight on the American chestnut operates in this manner. Often, however, the canker does no appreciable damage to the conducting tissues and the tree continues to grow, as with this maple.

40. INTERMITTENT STREAM – Walk over to the edge of this normally dry stream-bed. This is the same stream that you walked over at station 38. The water in the stream percolates into the very rocky stream-bed about 200 feet upstream from this point and becomes part of the underground water system that follows the course of the larger Mill River. Only during periods of heavy rainfall will this stream have water in it at this point.

We hope that you have enjoyed this Self-Guiding Nature Trail. Tell your friends of its possibilities. Further explore other items of nature, as this trail guide provides only a taste.

There are 32 miles of hiking trails on the Sleeping Giant which have been established and maintained by the Sleeping Giant Park Association. The trails are often steep and rough. They should be undertaken only with the proper footwear and after being sure that you are in good physical shape. We provide a folder describing the trails which is available free from the Park Ranger.

The Sleeping Giant Park Association schedules 7 official group hikes in the spring and 7 in the fall. The dates are posted on the bulletin board near the beginning of the Tower Path or on the Sleeping Giant Park Association's web site at www.sgpa.org.

The Sleeping Giant Park Association, ever since 1924, has been acquiring land on the Sleeping Giant and giving it to the State of Connecticut for this park. We invite you to join us in this on-going endeavor.