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The Geology of West River

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Background

Rivers and their tributaries are among the most familiar of all natural phenomena. Geologists cite evidence that many rivers have not always flowed in the beds they now occupy. Rivers have been one of the principal sculptural agencies responsible for the changes that shaped the landscape. Through millions of years of geologic time, rivers have been wearing down the land, and in that process have changed the appearance of many landforms.

Rivers are a product of water from the rain and snow that falls on the land and flows downhill under the influence of gravity. The form of rivers depends upon many factors. Water runs downhill under the influence of gravity, the flow of the water being characteristically turbulent, with swirls and eddies. The overall, long profile of a river valley is concave upwards, however much of its gradient may vary. The velocity of the stream increases with the gradient, but also depends on other factors, including the position within the river Channel, the degree of turbulence, and the shape and course of the channel, and the stream load. As the water makes it trek from the highlands to the sea, it collects in channels that coverage downstream to make progressively larger ones, forming an integrated network of water courses carved out by the flowing water itself. If there were no rain or snow, or if the temperature were always below freezing, there could be no rivers.

Erosion and transportation of rock debris by channels of flowing water gradually carve out river valleys. By eroding and transporting the products of erosion to the oceans, rivers constantly modify the land features of the earth.

The action of water is the principle erosive force on the earth’s surface and is responsible for much of the variety of the landscape. Can you picture West River dry and hot with no life form? As you look around New Haven you will see that West River would be an entirely different kind of place if there were no water in the soil and air.

Have you looked at the geologic processes of West River? It would be motivating to seek out the reasons why West River looks the way it does today. What are the reasons for its size and shape? What things are natural or what things are man-made? What kind of materials are in it, around or under it? Will it still be the same in ten or twenty years from now? Will it be different? Can we predict what changes will take place. These are just a few of the many questions that will be interesting to investigate.

For the purpose of this paper, I am going to investigate the vital role that West River plays in the geologic processes in New Haven. I will be dealing primarily with the section of West River that is located off Derby Avenue and the Boulevard and end at Blake and Whalley Avenue in Westville near the Mite Corporation. In order to expedite this task, I am going to use some of the resources available in outdoor laboratories, such as, Edgewood Park. I will use several topographical maps, as well as others, to discuss many of the findings made in the research. Some of the unit will be based on group discussions, teacher's input, seminar leader, fact finding information and experiences, as well as my own experiences and observations. I will seek out resource materials and plan field trips to confirm and validate the research.

It is my aim to provide students with information on the subject and to make them aware of career related fields.

It will be stimulating and refreshing for me to equip students with a real purpose or a motivation to explore and discover the world around them. It makes sense to do it with a real sense of involvement. Hand-on experiences and action are the only way for students to become involved in the learning process.

This curriculum is designed as a challenge to middle school students grades 5-8. The unit will include lesson plans, laboratory exercises, topographic maps, audiovisuals, a list of related careers, a reading list for teachers and students and a bibliography.

It is my hope that this unit will add dimension to the science curriculum and will be meaningful to both students and teachers. Teachers who teach history, can also effectively utilize the unit.

West River

West River is a part of the Western Highland. The surficial geology of the area expresses principally the effects of glaciation. Features made by glacial erosion include striations and grooves, streamline hills, crag and-tail features. Till covers a great deal of the area, although over many ridges and hills it is thin or absent.

During dissection of the glacial drift, streams deposited alluvium, some of which caps low stream terraces. Swamp and marsh deposits, mostly thin show evidence of past plant population (glacial record) in the form of fossil pollen. Most of the marshes along the shore are tidal marshes, a product of the most recent part of the past-glacial rise of sea level against the land. The soils of the area include (ground water) sand and gravel, humus, and clay.

Triassic rocks underlie the land around West River. The Arkose consists of pinkish, gray, brown and reddish arkosic sandstone and conglomerate, with interbedded layers of reddish siltstone. These rocks are variably and irregularly stratified.

The identities and outcrop pattern of various types of bedrock are important in the study of the surficial geology of New Haven and Woodmont area. The presence in the glacial drift of rock fragments with identifiable area of origin makes possible the determination of the direction of movement of the former glacier ice. [1]

The depth of bedrock around West River from Derby Avenue to Whalley and Blake in Westville ranges from about 200 to 250 feet and greater above sea level (about 61 to about 76 metres). The most conspicuous

feature of the bedrock surface is the scarp, as much as 200 feet high, which rises from the valley of West River. Most of the topographic features of the area tend to be elongate, reflecting general South to Southwest trends in the structures of both the Triassic and the metamorphic rocks. [2]

The land elevation of West River at Derby Avenue and the Boulevard is 30 feet above sea level and at Blake and Whalley over by the Mite Corporation it is about 50 feet above sea level.

The very irregular shoreline and the abundant islands suggest that part of the Connecticut Coast has been submerged beneath the sea since the valleys and ridges were developed by erosion. There is a rather small depth of glacial erosion in the New Haven-Woodmont area. At no place is glacial diversion of drainage, a not uncommon feature of glaciated regions, clearly evident. Regardless, glaciation has influenced some stream valleys. The West River is now flowing in places at least, on thick deposits of glacial drift, and hence may now be at positions different from those occupied before glaciation. In a few places, also, there are ponds, some of them occupying shallow basins created by the irregular deposition of glacial drift. These basins are still present because of the recent glaciation. Time has been too short to permit the re-establishment of uninterrupted stream flow. [3]

The drainage pattern of West River is closely related to composition and structure of the bedrock. West River does not occupy a wholly natural basin. The natural sweep and curve of West River has been altered by fill. The original fill has sunk so that the fresh water marsh and the filled area co-exist somewhat uneasily. Along the River near Derby and the Boulevard is some marsh land. Thousands of yards of costly fill covered the marshland; a lake was dredged in the west bay of the marsh to provide some of the fill.

There has been little or no rechanneling done to West River near Derby Avenue and the Boulevard. Very little consideration has been given to the upkeep of West River.

Edgewood Park

For many years, the wilderness along the West River between the city of New Haven and the village of Westville lay quiescent. In the middle of the 19th century, an iceskating area was created by flooding the low meadow from the new water system. In 1870 an association for harness racing leased Hamilton Park, which is located east of the present park, and erected a new and beautiful track for pleasure teams. This earlier park was used for baseball games and sleighing as well as other activities. In the northeast corner of what is now lower Edgewood Park stood the City’s Almshouse. [4]

The city of New Haven in 1889 took sixty acres of upland and meadow and turned the property over to the New Park Commission for development. The first donations of land for Edgewood Park were made by Nicholas W. Hubinger, James Mason, and Donald Mitchell. Mitchell lived above Forest Road on his farm. After the Almshouse was moved to the Spring side neighborhood, work on the Park began. More land was purchased throughout the years and in 1910 Frederick Law Olmsted Jr. designed the present Park. The Park contained an extensive rose garden, a lily pond, an archery field, groves and glens, a bridle path over three miles long, trails, and carriage drives. A spring of cold, pure water at the corner of Stanley Street and the Boulevard was used by the residents in the summertime; and was later utilized as a drinking fountain. [5]

A bronze stature of a soldier honoring Spanish American War Veterans was placed on the south side of

Edgewood Avenue. It was cast from metal taken from the Maine, a ship sunk in Havana harbor, February 15, 1898. An athletic field was built on the west side of the river; playground equipment was installed on the bluffs. Under the auspices of the Holocaust Memorial Committee, an attractively landscape monument was placed in the park at the corner of Whalley and West Park Avenues to honor those who died at the hands of the Nazis. [6]

An adjunct to the park proper is a four-block mall on Edgewood Avenue and Winthrop Avenue to the West River. In this mall, facing Norton Street, the sculptor, Louis Benanto, carved a whimsical elephant and frog and also an imposing mother with two papoose on her back. Another tree figure, the Gentle Giant, is visible going North from the Duck Pond up the bluff towards the tot lot. This statue was carved by Harney Harendon in 1973. The Mall closest to Winthrop Avenue contains a boulder monument to Elizabeth Babbitt. The Park Commission has landscaped the malls with a bequest from Mrs. Babbitt's will.

Edgewood Park is an 121-acre park in the western section of the city. It is divided into two parts by Edgewood Avenue. The southerly part is bounded by Boulevard, Chapel Street, Yale and Edgewood Avenues. The duck pond is in the lower park off Chapel Street; the skating rink is located off West Rock Avenue in the upper park.

The terrain includes wooded bluffs, drives, trails, cultivated areas, and marsh lands along the West River which winds through the park. The White Peking Duck, brought to the pond by man, spends the year there. [7] Sometimes they are visited by black and mallard ducks. Oak trees dominate the woods, with maples, sycamores, and tulip trees in various places around them. Along the river are pockets of cattails, homes for redwing blackbirds and pheasants. Some evergreens, mostly hemlock, provide nesting sites for crows and mourning doves. The undercover is predominately spicebush, silky dogwood, and nannyberry, providing excellent cover for nesting cardinals, thrashers, thrushes and towhees. The wet bottom lands are wealthy with spring flowers, including blood-root, Dutchman's breeches, Virginia beauty, and trillium. The water courses are frequently outlined with the blues of iris. Chipmunks, grey squirrels, opossum and raccoon, along with brown bats, represent the mammals fauna.

December 8, 1952, in the New Haven Register, the city was urged to establish a zoo in the park, but the proposition was voted down because it was an expensive project and there were more urgent projects. According to an article in the Journal Courier 2/22/56 the New Haven Park Department was scheduled to open a fly and bait-casting pool at Edgewood Park in 6/56. The dredging plan included the possibility of making a natural pond opposite the lily pool in the park, which was to be squared off by dredging, with a wooden platform in the center, so casters could operate regardless of the direction of the wind.

In the New Haven Register of 9/21/58 it was reported that improvements were underway for the Edgewood site. The beautification work was to provide flood protection. The Edgewood Park Improvement Program was centered around dredging channel widening work on a portion of the West River. The aim of the overall program was to beautify isolated sections of the park and to create additional facilities for the public, a direct result of the dredging work was to lower any flood threat in the area surrounding the park. Besides dredging the section of the river that runs through the Dark from Whalley Avenue to Derby Avenue, the New Haven Park Department built a new drive from West Rock Avenue into the archery field, rebuilt the old road to the Park's athletic field; terraced the widened banks of the river and planted wild flowers on them, and developed areas for picnicking. An eighth to 16 inch drop in water level of the West River resulted from the dredging operation.

The Journal Courier of 1/6/61 carried an article that reported loss of 55 trees after Hurricane Carribean Lady. It

was reported that Edgewood Park was hit hardest. Several trees felled and other severe damage took place. Two large oaks were removed from the park.

Edgewood Park is popular and widely used. There is a young children's playground on Edgewood Avenue in the upper park, farther over is the older children's playground. In cold weather, the James E. Coogan-skating rink draws crowds. In warm weather, the rink is used for summer theater and art exhibits, picnickers, pedestrians, bicyclists and benchsitters, which are constantly seen throughout the park. Since the recent installation of new tidal gates in the river, the soggy athletic field is once again popular for sports. Edgewood Park ends directly across Derby Avenue.

The section along the West River that is located near Blake Street ending at Whalley Avenue is heavily populated. There are houses, factories, a school and stores. On the corner of Whalley Avenue and Goffe Street is Beecher Elementary School and on the corner of Fitch and Blake is Beaver Hill Shopping Center. At the corner of Valley on Blake Street is the Westville Park. The Westville Park on the Stone Street side has a small playground. The park also houses an athletic field where baseball and some softball are played. The Hard Street side of the Park once housed a green house at the corner of the athletic field and now on that corner is recently built houses for the elderly. At the corner of Stone and Hard Street there was a match factory and in recent years a house was there; now the complex for the elderly occupies that entire corner. To the Valley Street side of the park you have the Geometric Tool Company and directly in front of the park is the Mite Corporation. West River runs through the park and there are several bridges located in the park.

The park has experienced great destruction from vandalism. It has a big problem with rodents and other smaller insects. Some work was scheduled to be done to the park, but has not been done yet. There has been no dredging or rechanneling of the river in this area. The river lies undisturbed.

In 1982 the Westville section of West River was heavily hit. The record indicates that this was the worst flooding problem that the area has suffered. Many persons who have occupied the area for more than 60 years were devastated at the effects that the flood left on this area. The flood was totally unexpected and New Haven was not ready to handle the task which laid before them. Many persons, especially on Blake Street had to leave their homes. Businesses, such as, the Mite Corporation, Geometric Tools Company and 500 Blake Street had to close their doors.

The people of this area had no flood insurance on their property and had to turn to the city for public assistance. The State was alloted about $2,000,000 from the Federal Government to help rebuild this section of the city. Flood money was available to individual home owners at a high interest. The people of this area was faced with a serious problem. Many could not afford to indebt themselves to replace destroyed property. The flooding problem has not been properly addressed and at this time there is no research plans to indicate that the flooding problem in this area is a priority in the city's planning and budget.

I have contacted the Corps of engineer in Waltham Massachusetts and the Department of Environmental Protection, as well as, the Mayor of the city to seek out the plans for flood control in this area with no success. However, it is my hope by the end of the year or by the time I am ready to teach this unit, I will be able to discuss this problem with a solution to this massive problem.

Floods occur when a river is full carrying a heavy load of water that fills the channel from bank to bank. In the flood of 1982 the water eroded the land because of heavy rainfall in a very short period of time. The water had no place to empty therefore, causing a flooding of the nearby land around it.

Floods have taken a terrible toll, not only in property destruction but in human life as well. Engineers have learned that floods can be prevented by the building of diversion floodways, dams and reservoirs to carry off and store excess water. In West River there has been some talk of altering channels or dredging the river, but there are no known definite plans at this time.

The new philosophy of flood control holds that flood prevention should begin near the headwaters of the rivers and not when the flood are already out of control down in the flood plains and near the river deltas. By the proper management of farm, ranch and forest lands in the watershed near the river's source, much of the excess water, from heavy thunder storms and torrential rains can be induced to run back into the ground where it will be available as subsurface water when needed. Engineers advocate the use of small storage reservoirs from which the waters can be released when there is an inadequate supply in the rivers. In this way, the water is not just slowed to overflow the river banks and waste itself, at the same time doing an incalculable amount of damage. Flood-control programs are inextricably linked with proper conservation practices. [8]

Career Awareness

There are many opportunities in the field of Geology. Students must become aware of the work world around them and the opportunities that are available to them. Proper motivation and training are very essential in the real world of work. Many people develop an awareness for careers at an early age.

One of the roles that teachers play in helping students to become career conscience is to provide the students with opportunities to learn about various careers. The following is a list of careers in Geology. It is my goal to create an awareness and motivation for students to seek out a hands on approach to investigating some of these careers.

It was evident throughout my research on this particular project that there is a real need to train children in seeking out the geology of the earth.

Careers In Geology

Economic Geologists —find and sometimes supervise the development of mineral and solid fuel resources.

Petroleum Geologists —specialize in the discovery and recovery of liquid fuels—oil and natural gas. Some petroleum geologists spend much time near drilling sites, while others interpret regional geologic data to provide a broad framework of petroleum-related geologic knowledge.

Engineering Geologists —apply geological knowledge to engineering problems in the construction of roads, airfields, tunnels, dams, and other large structures. They determine, for example, whether underground rock layers will bear the weight of various structures and buildings, and advise industrial and residential planners.

Petrologist —classify and determine the origin of rock masses.

Mineralogists —examine, analyze, and classify minerals and precious stones according to composition and structure.

Geochemists —study the Chemical Composition and changes in minerals and rocks to better understand the distribution and migration of elements in the earth's crust.

Groundwater Geologists —specialize in the sources, movement, quality reserves, and availability of subsurface water for human consumption and for industry and agriculture.

Limnologists —may be classes as life scientists as well as geological scientists. Their work involves the study of fresh-water rivers and lakes, particularly the detection of pollutants in them.

Sedimentologists —investigate sedimentary rocks to determine their characteristics and formation processes, such as erosion and deposition.

Geomorphologists —study land forms on the earth' s surface and changes in them, including the effects of erosion and glaciation.

Geologists —specializing in earth history-try to understand and explain the earth's development by determining the age, position, and nature of its fossils.

Paleontologists —a classification which includes paleobotanists and paleozoologists, trace the evolution and development of past life by studying fossilized remains of plants and animals in geologic formations.

Geochronologists —study time in relationship to the earth's history. They determine the ages of rocks, ore deposits, and various land forms. Scientists who establish the ages of trees by the wing-dating method are known as *dendrochronologists* .

Stratigraphers —study the distribution and relative arrangement of sedimentary rock layers by analyzing their fossil and mineral content.

Astrogeologists —are concerned with the geology of extraterrestrial bodies. They apply knowledge of earth' s geology to studies conditions on other planets and the moon. Scientists concerned with the origin, evolution, and nature of the moon are known as *selenologists* .

Computer geologists —use computers and statistical analysis to solve geologic problems.

Photogeologists —study aerial and satellite photographs of ground features and interpret them as to their geological significance.

Marine Geologists —who study geological formations and structures of the ocean floors, are generally classified as geological oceanographers.

Vocabulary

Altitude—vertical elevation above any given point especially above mean sea level.

Basin—a depression in the earth's surface, as a valley, or the region drained by a river.

Bedrock—the solid rock underlying the looser materials of the earth's surface.

Channel—the bed of a stream or any groove or passage.

Drainage—that which is drained off; waste water. In a drainage basin a large surface area whose waters are drained off into a principal river system.

Dredging—to clear or widen by means of a dredge.

Elevation—height above the sea level.

Geology—the science that treats of the origin, history, constitution, and structure of the earth, including the operation of the physical forces affecting its development and appearance and the history of living or extinct forms as recorded in the rocks.

Gradients—rising or descending gently or by degrees.

Outcrop—the exposure at or above the surface of the ground of any stratum.

Quadrangle—a tract of land as represented by the United States Geological Survey on one of its atlas sheets.

River—a large, natural stream of water, usually fed by converging tributaries along its course and discharging into a larger body of water.

Till—an unassorted, commingled, and chiefly instratified mass of clay, sand, pebbles, and boulders deposited by masses of ice.

Lesson Plan I

Discover For Yourself The Effect of Running Water on Rocks

Purpose To show how water carries on erosion. To develop the skills of observation, comparison and stating a hypotheses You Need: Several small pieces of rocks with sharp edges, a plastic container with lid, water, cheesecloth or filter paper.

A. Put the rocks in a container and fill it with water, put the lid on tightly and shake the container rapidly for about ten minutes.
B. Remove the lid. Pour the water through the cheesecloth or filter paper.
    1. What remains in the cloth?

2. Is there anything similar in the bottom of the container?
3. Is there any changes in the original rocks?
4. What caused the change?
5. Relate this to the action of running water in a river.

C. Answer the following:

1. What is erosion?
2. What are the three causes of erosion?
3. What is a glacier?
4. What happens to the bottom of a glacier as it moves?

Lesson Plan II

Build A Stream Table

Objective To construct a scale model, which duplicate natural processes realistically so that they may be studied in the laboratory. See figure 1, 2, 3 and 4 at the end of Lesson 3.
The materials and plan for constructing a stream table 5 feet long, 32 inches wide and 4 inches deep are as follows:

Material Needed Provide yourself with a piece of exterion or marine plywood, 5’ x 4’ x 5/8”. You will also need 1 1/2 pounds of 1 1/2” galvanized or coated nails and one piece of plastic sheeting 6’ x 4’ (available in paint and hardware stores as paint dropcloths or plastic store windows). The plastic is to be used as a liner so that the box will hold water without leaking. If you wish to make the box water tight without using plastic liner, you can coat all joints with boat caulking or roof-patching cement. The interior can then be painted with waterproof paint such as porch enamel or boat paint.

Construction Saw four pieces 4” wide and 5’ long from one side of the 5’ x 4’ sheet of plywood. Place the plywood sheet, now 5’ x 32”, over two of the 4” x 5’ pieces as shown in figure 2 and nail through the bottom into the side pieces. Coat with caulking or roof cement before nailing if you do not plan to use a plastic liner. Space the nails about 1 1/2” apart in nailing the sides on the bottom of the box. After the side pieces are in

place, carefully measure the end spaces and cut pieces from the other two 4’ x 5’ strips so that they will fit snugly. Nail ends in place in the same way that sides are nailed.
Cut a v-shaped notch 1” wide (at the top) and 1” deep in the top edge of one of the end pieces. Cut the notch about 3 or 4 inches from one side of the box as shown in B and D, in figure 1.

After setting up a stream table you need to collect sand, pebbles, and gravel to simulate the environment of the beach you are going to study. You will need road maps of coastal or inland lake areas. Topographic maps will usually give better information on landscapes. These maps are available from the State Geological Department in Hartford.

* ’ means foot, ” means inch

Activities Using Your Stream Table

1. How does a given beach in the summertime compare with the same beach in winter?
2. What effect would be produced on the beach and on the sand in the shallow part of the water if a breakwater were to be added to the shoreline?
3. What happens to beach if the average sea level were lower or higher than it is now?
4. What changes take place if one end of the beach is raised?

Lesson Plan III

Mass Movement Of Earth Materials

Build a model landscape consisting of a variety of shapes and sides of hills and valleys in the stream table. Shape a shallow stream channel through the landscape and into a lake at the outlet end of the table. Allow water to flow through the stream and observe the movement of materials as the stream erodes and undercuts its banks, you should be able to observe small landslides and slumping of materials into the stream.

These are just a few of the many experiments and observations that can be carried through. The teacher can work out many interesting and exciting experiments.

Building a Stream Table

1. Four sketches of the stream table construction.

A. One of the sidepieces.

(figure available in print form)
B. Endpiece, assembled, with V-shaped notch.

(figure available in print form)

C. Top view of the assembled table.

(figure available in print form)

D. View, in perspective, of table

(figure available in print form)

2. How to position and nail down the bottom of the stream table.

(figure available in print form)

3. In the stream table shown here, there is no V-shaped notch. Holes have been drilled through the outlet end of the box and short pieces of piping have been fitted into them. Plexiglass windows have been inserted at the outlet end and at each side.

(figure available in print form)

Lesson Plan IV

1. Using a topographical map, tell what types of physical features exist around West River.
2. What type of bedrock?
3. List other important things on the map that might be interesting, such as specific names of houses and buildings surrounding the West River.

EDGEWOOD PARK

(figure available in print form)

Lesson Plan V

1. List three important sites in West River Memorial Park that is located close to Derby Ave. and the Boulevard.
2. What types of problem the park have in the event of too much rain? Explain.

WEST RIVER MEMORIAL PARK

(figure available in print form)

Activities

Visiting West River

West River is an interesting place to visit. Students can explore and seek out the geology of the river. The part of West River that is discussed in this paper starts at Derby Avenue and the Boulevard and ends at Blake and Whalley near the Mite Corporation.

Activity I

Use a topographical map and tell what type of features are located around West River. Discuss some of the following features.

A. bedrock
B. landmarks
C. swamp deposits
D. sand or gravel
E. alluvium
F. till
G. artificial fill

Activity II

Use an old map to discuss how West River was then and a recent map to discuss how West River is now. Consider some of these questions to stimulate a discussion.

1. Is the river in its natural basins?
2. What has been done to change the river in anyway?
3. What type of landmarks are different?
4. What about structures such as houses, factories or schools?

Activity III

1. List some ways you can help with the upkeep of the river.
2. Write a letter to the Park Department asking for information on the river. What are the advantages or disadvantages of the river?

Field Trips

Derby—Route 34 up the Housatonic 1 1/4 miles; the next crossroad lead north in 3/4 mile to a good view of the river. The first 100 yards beyond this turn is interesting to geologists for the rock exposures, which shown an unusual mixture of gneiss, schist and granite.

Haddam—Shopboard Rock—3/4 mile on the right of Route 9 past Higganum Station, a huge boulder with a flat

top, where an early tailor is supposed to have cut out a suite for a customer. Close to the Middletown line, on the east of the highway, are Seven Falls, in a roadside park. Directly opposite, about 50 feet west of the old highway, is Bible Rock, where several layers of stone standing on end gives the appearance of an open book.

Meriden—A striking set of hills formed by two successive lava flows; has parks, trails and numerous geologic and natural features for the hikers, camper and visitor.

Montville—Cochegan Rock—A mass of granite, probably the largest glacial erratic in Connecticut, 50 feet square, 600 feet high and weighing 6,000 tons. Uncas used it as a retreat.

New Haven—East Rock Park—647 acres of natural beauty on a rock 359 feet high which overlooks the entire city of New Haven. The peak was formerly used by Quinnipiac Indians to make smoke Signals. A Soldiers and Sailors Monument of Civil War and Pardee Rose Gardens are also in the Park.

Picnic facilities—free

New Haven Colony Historical Society—114 Whitney Avenue. 24 rooms of exhibits of early history and art and relics.

West Rock Nature Center—Wintergreen Avenue, West Rock Park, zoo, nature house, 40 acres of trails, ponds and picnic area; historic Judges' cave. Some part close to public. Please check before planning to visit.

Yale University Peabody Museum of Natural History—Whitney Avenue and Sachem Street, Geologic and biologic displays.

Edgewood Park—a look at the geology of West River and changes made in the Park.

North Haven—Brick Yards—U.S.S.A., South beyond the rr crossing a side road leads to a good exhibit of the varied clays utilized in brickmaking. They were deposited in a glacial lake and show alternate light and dark layers, each double layer representing one year of deposit. The clay is from 10 to 30 feet in depth.

West Haven—Burwell Hill—off Derby Turnpike, a drumlin or rounded mass left by the glacier, with a good view of New Haven and the Sound.

Hamden—Eli Whitney Arms Factory—across Lake Whitney to the east, made of trap rock.

Resource List

Police Department

200 Orange Street

Department of Engineer

Attention: Mr. Leonard Smith

Telephone: 787-6316

New Haven Colony-Historical Society

114 Whitney Avenue

New Haven, Connecticut

Telephone: 562-4183

Corps of Engineers

Waltham Massachusetts

Department of Operations

Telephone: 1-617-647-8320

Department of Environmental Protection (Natural Resources)

165 Capitol Avenue

Hartford, Connecticut

Telephone: 1-566-5599

National Cartographic Information Center

U. S. Geological Survey

507 National Center

Reston, Virginia 22092

Telephone: 703/860-6045

Geologic Inquiries Group

U.S. Geologic Survey

907 National Center

Reston, Virginia 22092

Map I—Geological Map of New Haven and Woodmont Quadrangles, Connecticut. Surficial Geology, by Richard F. Flint, 1960-1963

(figure available in print form)

Map II—New Haven Quadrangle Connecticut—New Haven Co. Mapped, edited, and published by the Geological Survey

(figure available in print form)

Notes

1. Richard F. Flint, *The Surficial Geology Of The New Haven and Woodmont Quadrangles* (State Geological and Natural History Survey of Connecticut, A Division of Agriculture and Natural Resources,. Quadrangle Report No. 18,. 1965), p.4.
2. Ibid., p.37.
3. Flint, p. 7.
4. Philip H. English, *New Haven Outdoors A Guide To The City Parks* (Citizens Park Council, The New Haven Foundation, 1977), p.22.
5. Ibid., p.22.
6. English, p.23.
7. Ibid, p.21.
8. Grolier, *The Book of Popular Science* (Grolier Inc.,1974) vol p. 409.

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New Haven Journal Courier, Park Department, “Open Edgewood Fly Casting Pool”, 2/22/56.

New Haven Journal Courier, Park Department, “Edgewood Park Rink Started In April”, 1/6/61.

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