GRAND LEDGE FIELD TRIP
LANSING TEACHERS

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PROBLEMS

Geology
Land Use
Stream Pollution

There are several field trips planned during the year. A log, such as this will be furnished for each field trip. It is suggested that you keep a notebook of these logs as they contain valuable material that you will be able to use in your teaching.

Upon Leaving Lansing — We follow Highway 43 West crossing a TILL PLAIN. A till plain is an area with a gently undulating (rolling) surface or topography. A till plain has fair to good soil, in places somewhat stoney with a few very scattered boulders. On this till plain most of the soil is a loam mainly Conover. The till plains of Michigan are the good agricultural lands of the state. They are the result of deposition of rock debris as the glacier slowly retreated by evaporation. (ablation)

Notice as we drive how good AGRICULTURAL LAND has been utilized for SUBURBAN DEVELOPMENT. The more rugged part for a municipal golf course.

After crossing the railroad tracks just as we leave Lansing we cross a low swail in the till plain. The swail was formerly a very shallow lake bed which is now muck land. Notice how it is completely filled with vegetation.

Note — At 5 miles from Lansing the highway crosses Carrier Creek. Note that the creek channel is much too wide for the small creek flowing in it. The main channel was made by a larger stream which one time was a glacial spillway to the south.

As we approach the Adventist Camp Ground and Grand Ledge notice the LARGE BOULDERS. Such concentration of large .boulders indicates the contact between the TILL PLAIN and the MORAINE and hill country. Notice that many of these boulders have been used in foundations and buildings. They are mainly glacial borne igneous and metamorphic rocks derived from rock ledges north of Lake Superior.

As we turn north we enter the GRAND LEDGE MORAINE. (A moraine is made of the same materials as the till plain – clay, sand, boulders, jumbled together. It represents a halting place of the retreating glacier.) Note the steeper slopes and the steeper depressions, the more rugged topography of the moraine.

As we turn left and enter the town note the deep valley cut by a post glacial tributary to the Grand River.

Turn right at the “Stop” light, cross bridge, noting width of the Grand River. Here the river channel is broken by 7 small islands once the mecca of excursionists. A side-wheeler once plied the river in the “Gay Nineties.”

Two blocks beyond the bridge turn left. The street and succeeding gravel road is built on the TILL PLAIN north of the Grand Ledge Moraine and overlooks the channel of the Grand River which here flows along the line of union of moraine and till plain. The steep walled banks of the GRAND RIVER shows that it is a very YOUNG STREAM and its course has been determined by the glacial topography. (Until a geologically recent date, perhaps less than 3,000 years ago, the Grand River flowed past Charlotte and was a tributary first of the Battle Creek and later of the Thornapple before taking its present course to the Looking Glass and from its union with the Looking Glass becoming the main stream.)

The land between the road and river is at times used for field, training of hunting dogs.

Continue on graveled road to Grand Ledge Face Brick Company Plant. Leave cars.

Follow trail along narrow gage rail line into SHALE pit or quarry. Along the way notice the outcropping ledges of sandstone; NOTE the SOIL PROFILE at the. top of the SANDSTONE; note that the stone is rapidly disintegrating and forming RESIDUAL SOIL. (Soil in place made of the local bed rock.) Note IRON STONE concretions (brown nodular masses) near the top of the sandstone. These concretions were formed by the action of ground water in dissolving the iron from the sandstone and redepositing it in a concentrated mass. This is the type of iron ore used in colonial times in the iron foundries of Massachusetts and New Jersey, and similar to the ore used at Union City.

Enter the pit proper. Note that the GLACIAL CLAY COVERING (overburden) - the till plain that once covered the rock. Note that this rock is different from the sandstone above. This rock is SHALE. (Shale, sandstone and limestone are sedimentary rocks or sediments deposited in water that compact or solidify to rock.) Note that it is very finely divided into

thin levers (laminae.) SHALE is solidified CLAY MUD a SANDSTONE is SOLIDIFIED SAND MUDS. Sandstones may grade into shales by a decrease of the sand content and an increase of the clay. You can discover fossils in the shale and in the sandstone. Fossils of shelled animals like clams, snails may be found in the shale. Plant remains and impressions can he found in both sandstone and shale. Some of the plant remains have been changed to coal. Then coal seams are found in the Grand Ledge shales.

The rocks in the pit are the youngest of Michigan's bed rock and were laid down on the floor of a shallow swampy sea in a time known as Pennsylvanian or the end of the coal age. They are about 300,000,000 years old. These and similar shales are used in the manufacture of face brick, brick tile, vitrified brick and clay products.

The clay products companies are the main industries of Grand Ledge. Here we find a mineral resource furnishing a livelihood for a community -- making products that are sent all over the Midwest.

Other clay pits are located on the south side of the Grand River.

Return to Grand Ledge at Highway 43. Go west on Highway 43 to Fitzgerald Park. Notice the American Vitrified Brick and Tile plant on the left before entering the park. (These plants do not operate on Saturday but may be visited during the week.)

Drive through the park to the Grand Ledge SEWAGE DISPOSAL PLANT. The Grand Ledge Disposal Plant is the type that disposes of sewage by separating the solids -- sand, clay and organic material -- by screening, settling and skimming from water, chlorinates the water and disposes of it in the river. The dried organic matter is used for fertilizer. The Milorganite Fertilizer on the market is the product of a similar sewage disposal plant of Milwaukee.

This sewage disposal plant is 40-45% efficient. However, it is adequate for the size of this community of about 3,000 people and small Industrial wastes. The disposal water is chlorinated in summer in order to protect the people down stream. Chlorination is not necessary in winter as the stream is not the source of a water supply, people do not swim in it.

This type of disposal plant not only disposes of objectionable sewage but protects fish and wild life, spawning beds of fish and nesting grounds of birds.

If the air has an objectionable odor it is probably caused by raw sewage from Lansing held up in the settling pond above the dam. The Lansing plant, built in 1938 is 95% efficient for a disposal of 9,000,000 gallons of sewage a day. However, war increased industries and population of Lansing have created the problem of a daily disposal of 20-25,000,000 gallons of sewage a day! Therefore, from 11-14 million gallons of raw sewage by-passes the plant daily and is dumped into the river to the detriment not only of the riparian owners, fish and wild life, but scenic and aesthetic beauty. The dirty color of the Grand as you see it shows how industrial wastes and sewage from a large city can pollute a river! Would you expect good fishing here?

A prime objective of sewage disposal, in addition to the protection of wild life, is to decrease the problem placed upon a river that can naturally absorb oxygen that will destroy organic contaminations.

Across from the Sewage Disposal Plant note the SANDSTONE CLIFFS cut by the river after it took Its present course. At the base of the cliff there Is a limestone stratum.

Return to the Picnic Grounds. East of the Picnic Grounds is the valley of sandstone creek. A steep sandstone walled gorge cut in the easily eroded sandstone by a little stream made swift by the lowering of its mouth through downcutting of the Grand.

If you descend into the gorge you can note that the sandstone is all in LAYERS - some beds are thick - others are thin. In some LAYERS (STRATA) the beds are slanting. Such slanting is known as cross bedding and shows that the sands were deposited in shallow water. On the east side of the gorge caves have been weathered or man cut in the softer sandstones. These sandstone beds are underlaid by shale which is quarried by the Vitrified Brick and Tile Plant.

The Fitzgerald Park is a nature made recreation spot

Suggested classroom activities that you could carry on as a result of this field trip.

1. Discuss manufacture of bricks, materials used, uses of brick, etc.

   Discuss and study glacial deposits - till and moraine. Distinguishing characteristics and agricultural value of each.

2. Become familiar with the 4 general soil types (clay, sand, sandy loam, muck.) Classify soil types in the area. Indicate uses and crops grown.

3. List industries in a community that are the result of the direct use of a local natural resource. Economic value to a community.

4. Study the causes of stream pollution. Means of preventing.

5. Visit you local sewage disposal plant.

6. Study and report on the influence of the Grand River in Michigan history.

7. Distinguish between sedimentary and igneous rock«, Study rock formations.

8. Report on Famous Michigan Rivers.

9. Make exhibits of shale, sandstone, limestone. Illustrate and discuss the uses.

10. Build a soil profile,

11. Show how rock becomes soil. Influence of plants in building soil.

12. Discuss floods. Their causes and results.

13. Plan math problems involving tonnage of shale made into bricks - value of bricks - number of people employed - wage - tax industry pays, etc.

14. Discuss value of parks for recreation. Branch into study of State Parks and Recreation Areas.

15. Discuss wild life in Eaton and Ingham counties. Discover problems and ways of overcoming them. Discuss benefits derived from the wild life population, etc.