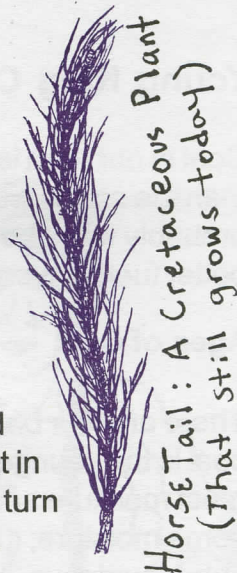


NATURE DETECTIVES

Fall 2005



Can a Plant Become a Rock?

Coal is rock that is made when rotting plants get squished for millions and millions of years under heavy layers of earth. If you stand on a rotting plant in your yard or even put a large stone on top, that rotting plant is not going to turn into coal, not even after millions of years. Conditions have to be just right.

Conditions that were perfect for making coal existed in our area about 80 million years ago. Looking at the land today, it is hard to imagine that millions of years ago there was a huge sea here. At the edge of the sea, towering trees and ferns grew in the warm, humid climate. (Scientists have found fossils of big palm leaves from that time along with dinosaur bones.) As the plants grew and died and fell into the swamp water, other plants grew up and covered them until there was a thick, soggy mat of dead plants. As millions of years passed, the spongy layer of dead plants very gradually got covered with layers of sand and clay. Each layer pressed down more weight, squeezing out more water until those dead plants hardened into coal. Coal proves plants can become rocks – but it takes longer than a long, long time.

Coal Rocks

Humans have been burning coal for fuel for at least 3000 years. Hopi Indians burned coal at least 1000 years ago. Coal is useful because it burns hotter than wood. How do you imagine people long ago discovered that coal would burn?



Scientists speak of thousands and millions of years, yet a mere 100 years past seems like a long time to most of us. A lot can change in 100 years. Around 100 years ago, coal was a really big deal in what is now Boulder County. Back then, miners dug millions of tons of coal from nearly 200 mines.

Today, no coal is mined in our area, yet coal is still being mined in places like Wyoming. No one is mining our millions-of-years-old coal because our coal isn't old enough!

Pull Out and Save

Young King Coal

Coal in our area isn't very old, not in terms of coal years. Mining young coal costs more money than the coal is worth. 200 million tons of coal may lay underground in our area today, and it probably won't be mined until a cheaper way of mining it or a low-cost way of turning it into better fuel is invented.

Ages of Coal

There are four basic types of coal: lignite, sub-bituminous, bituminous, and anthracite. **Lignite** coal is the youngest. With fewer millions of years of water squeezed out of it, lignite has the most moisture and is brown and crumbly. **Sub-bituminous** is older than lignite but still has some moisture; it is brown-black and crumbly. Coal underlying our area is lignite and sub-bituminous. Lignite and sub-bituminous coal crumble apart as the water in the coal starts evaporating when they are brought out of the ground. That crumbliness is a big part of why young coal is less valuable. **Bituminous** is black, hard coal. **Anthracite** is the oldest coal; it is shiny black and very hard. Because anthracite is the oldest coal, anthracite is usually deepest underground. Lignite, as the youngest coal, should be nearest the surface, but earthquakes can bring anthracite closer to the surface or bury softer coals deeper.

Coal Seams

Coal is formed in layers under thicknesses of other rock types. Layers of coal are called coal seams. The coal seams in our area vary from one foot to fourteen feet thick like giant uneven ribbons of hard candy. When our Rocky Mountains uplifted, layers of earth were broken and pushed up bringing some of the coal seams nearer the surface or even to the surface. Our coal is typically 50 to 400 feet below the surface, but one area farmer found coal long ago when he plowed his field! Sometimes streams and irrigation ditches wash away layers of earth exposing the coal seam.

When coal seams are opened up to air, they can catch fire. Something as simple as a grass fire or spark can start the coal burning.

Once it starts, it can burn for years. Near Marshall, coal seam fires have been burning underground for over a hundred years! Perhaps they will burn for a hundred more.



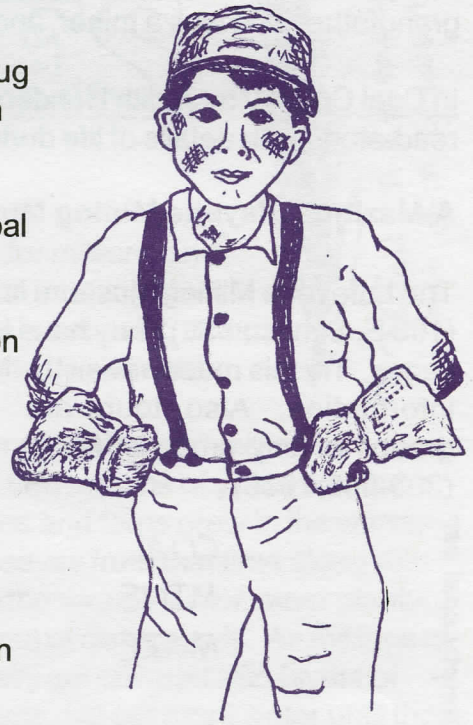
SMOKE FROM COAL SEAM FIRES NEAR MARSHALL

Coal Creek

Coal Creek flows through what was once a bustling coal mining region. Early settlers named Coal Creek for the exposed coal they saw along the creek banks. Some men dug out small amounts to burn for heat. The first mining operation opened near Coal Creek in 1856. Marshall, Lafayette, and Louisville had the most mines in Boulder County. When you travel down South Boulder Road today, you cannot tell that coal mines were once numerous all over that area.

1907 was the peak of coal mining activity here – over a million tons were mined in one year. That amount didn't even count coal from the many so-called "dog holes" where individuals dug up coal for their own use. Those were the days when a family would shovel 300 pounds of coal a week into their cook stove.

Our lignite and sub-bituminous coal couldn't be shipped very far without crumbling to bits so when oil and natural gas began to replace coal as a local fuel, mines began to close. By 1955, Boulder County mines had all shut down.



Young Mine Worker

Kids in Mining

Boys from age 11 or 12, and sometimes as young as 8, were used to sort rocks from the coal or to open doors in the mine to let the mine carts through. The jobs were hard and the days were long. Work started at 5:30 in the morning and every day except Sunday was a work day. There was a saying that if a boy could carry a lunch bucket without it dragging on the ground, he was big enough to work in the mine.

Girls stayed home to help their mothers with the washing, cooking, gardening, and water hauling. Sometimes they were sent to dig through the rocky discard pile outside the mine to look for useable chunks of coal for the family stove.

Mine Critters

Mules were kept in the mines to haul the carts filled with coal, and the boys treated some of them like pets, bringing them pieces of apple or lumps of sugar. Canaries were taken into mines in little wooden cages. If the canaries acted panicky, or worse, fell off their perches, the mine workers knew there were poison gases in the mine. Miners even liked to see rats and mice in the mine because they felt safer with them there. If the rats started fleeing the mine, it might be a sign the mine was going to cave in or there were deadly fumes seeping in or there was a fire in the mine.

Coal Families

People moved to Boulder County a long time ago from far-away places to work in the mines. Many of their families are still living here. Ask around; maybe your friend's mom or dad had a grandfather who was a miner, and you might hear an interesting mining tale or two, if you ask.

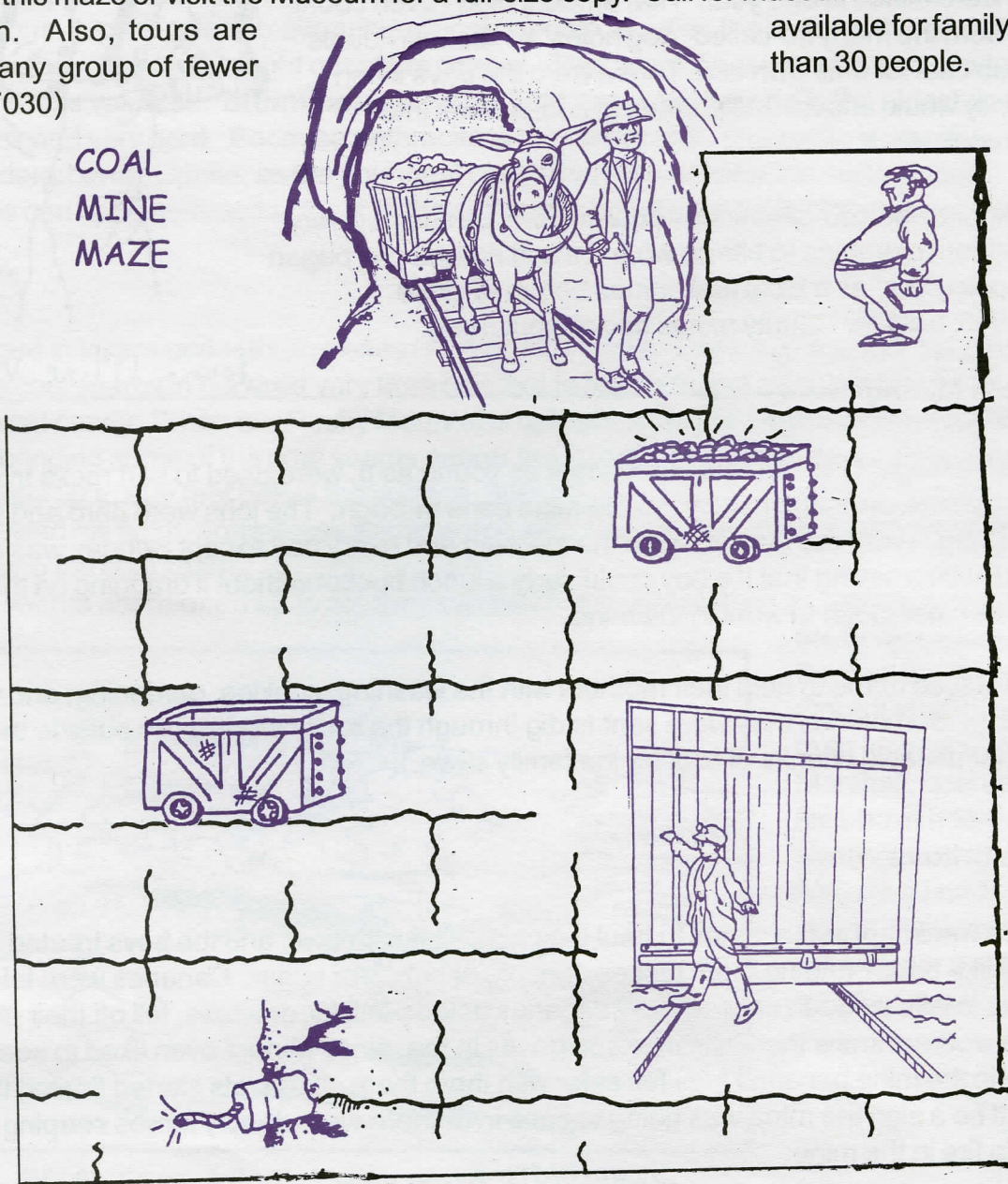
In Coal Country by Judith Hendershot, illustrations by Thomas Allen, makes a wonderful read-aloud with details of life during coal mining days.

A-Mazing Lafayette Mining Museum

The Lafayette Mining Museum is a terrific place to learn about coal mining in Boulder County. (108 E. Simpson St.) They have tools the miners carried; they even have the little canary cages. Try this maze or visit the Museum for a full-size copy. Call for museum hours and information. Also, tours are available for family groups or any group of fewer than 30 people. (303-665-7030)

1. Check with mine boss
2. Pick up filled coal car
3. Drop off empty coal car
4. Go through the mine doors
5. Check out the dynamite!

COAL
MINE
MAZE



LAFAYETTE MINERS MUSEUM

Go to