

NATURE DETECTIVES

FALL 1999

The Power of Water

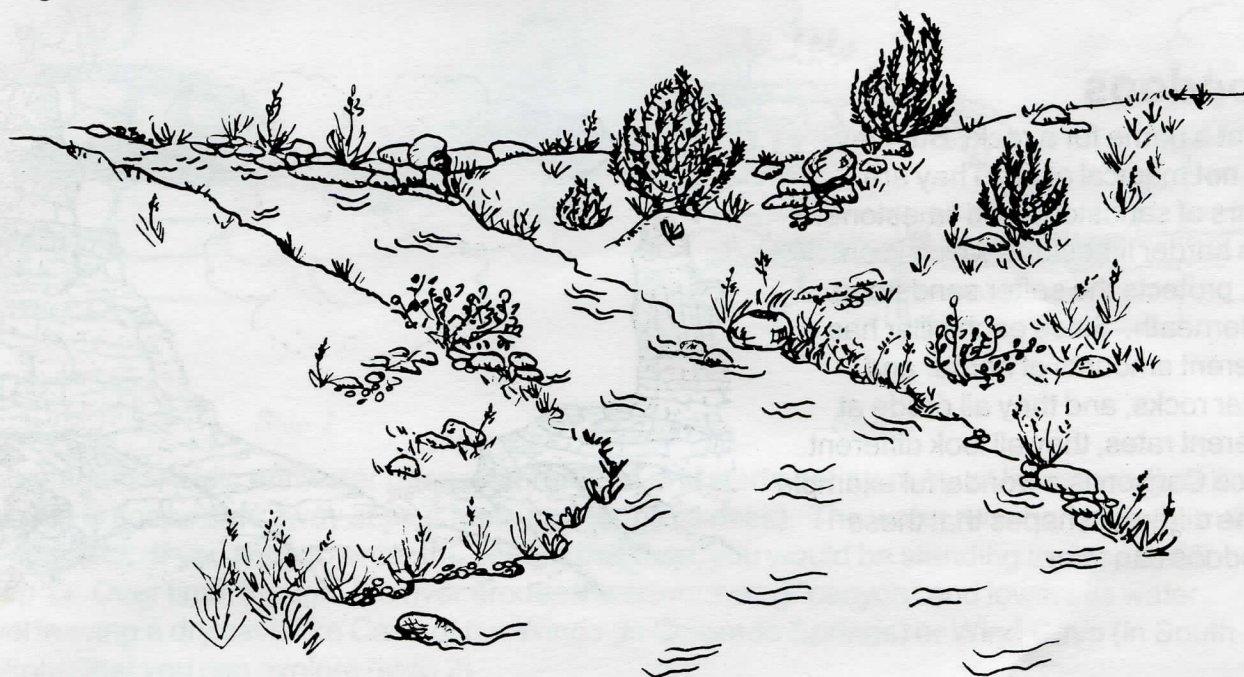
Hail Damages Rooftops!

Mud Slides Close I-70!

Flash Floods on Boulder Creek Damage Homes and Trees!

We often see and hear news about disasters like these. They all have one thing in common -- they are caused by water in one form or the other. At this time of the year, Boulder Creek is a sedate creek. Come spring, snow melting up in the mountains and a sudden thunderstorm can transform the quiet creek into a roaring monster that destroys everything in its path.

This same water that can destroy so much around it can also create the beautiful landscapes of the Rocky Mountain West -- the arches and canyons, the hoodoos and caves, the natural bridges and the sand dunes, and even the quiet stream scene shown on this page.



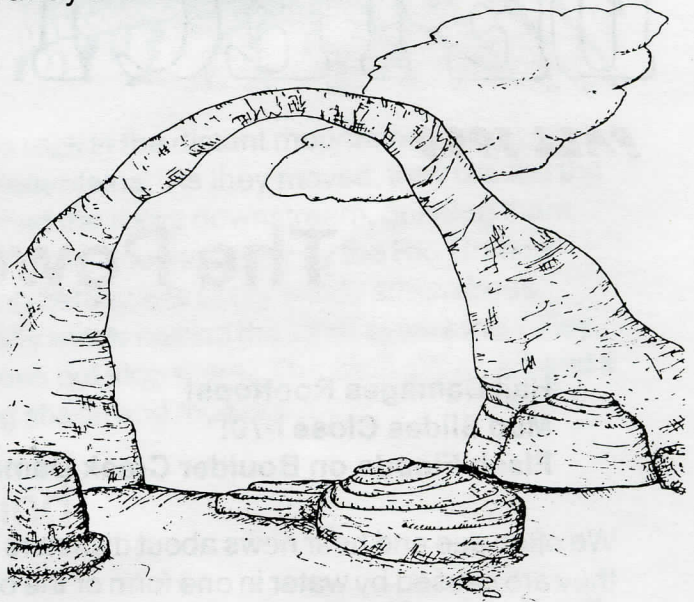
PULL OUT AND SAVE

Sculpted by Water

Utah, with Arches, Natural Bridges, and Bryce Canyon National Parks, is home to some spectacular stone arches, natural bridges and hoodoos. Although these features are very different, they were all made by water slowly eating away at sandstone.

Arches

How were the gigantic sandstone arches at Arches National Park formed? Underneath the sandstone was a thick layer of salt. Over time, the salt started bulging. As it lifted up the sandstone on top, the sandstone started cracking. Water filled the cracks, froze, widened the cracks, and crumbled the sandstone into rocks and sand. The sturdier, harder sandstone did not weather away so quickly and remained as an arch.



Natural Bridges

Arches and natural bridges look alike. But, natural bridges are formed by running water. This is called stream erosion. A river loops around a sandstone barrier for many thousands of years until one day, the sandstone can't hold the pressure any more and breaks at its soft spot leaving a natural bridge.

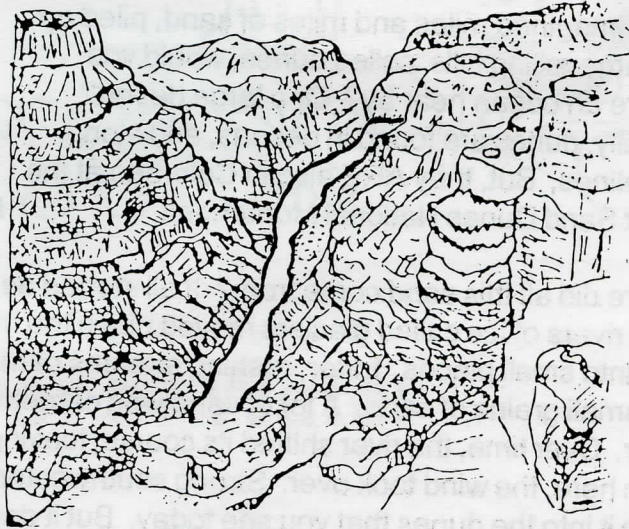
Hoodoos

What a name for a rock! But they are not magical at all. They are pillars of sandstone and limestone. The harder limestone which is on top, protects the softer sandstone underneath. Since each pillar has different amounts of harder and softer rocks, and they all erode at different rates, they all look different. Bryce Canyon is a wonderful example of the different shapes that these hoodoos can take.



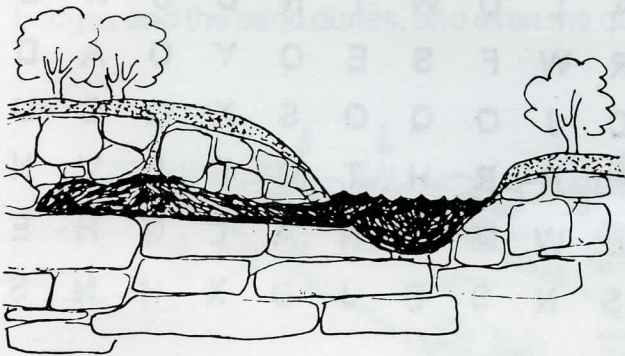
Canyons -- Water Slowly Alters the Landscape

The Black Canyon of the Gunnison, the Grand Canyon of the Yellowstone, and the Grand Canyon in Arizona are awe inspiring landscapes. The width, depths, and lengths of these holes make you feel tiny. Yet they were all made by rivers that stuck to their jobs. The rivers ran their courses. Over time they eroded any softer rocks on their banks and made their banks steep cliffs which kept getting steeper until we were left with some magnificent canyons.

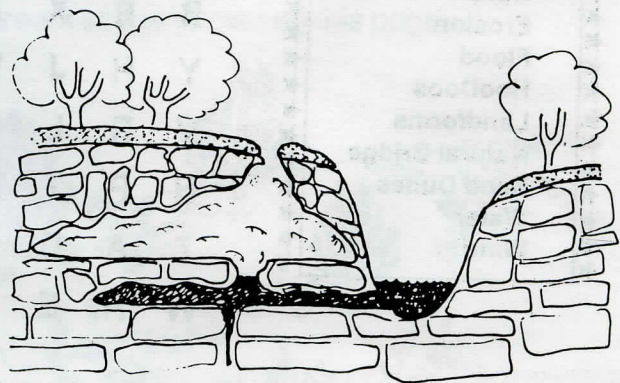


Caves -- The Power of Water Underground

Imagine hiking in the wild. Suddenly, your hat is pulled away from your head and disappears into a hole. You go in with a flashlight and find yourself in a cave -- it is dark, cold, and perhaps a little wet. As you shine your light, you see strange things hanging from the roof (stalactites) or growing up from the floor (stalagmites). How on earth did this cave get here?



Step 1

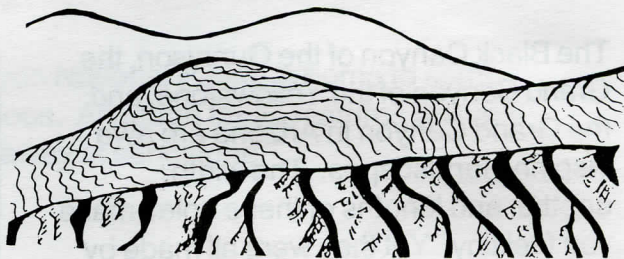


Step 2

Water again. Acidic rainwater goes underground and starts eating away at limestone (just like the acid in sodas eats away at your teeth and forms cavities). The water runs horizontally until it hits a river. If you were to enter the cave at this time, you would be standing in deep water (step 1). Over time, though, the river erodes the surrounding "canyon" and lowers its water level leaving a dry cave like Cave of the Winds (in Colorado Springs) or Wind Cave (in South Dakota) that you can explore (step 2).

Water + Wind = Sand in Colorado

If you imagined miles and miles of sand, piled up into large rolling hills, called dunes, would you picture an ocean near by? Or a large desert? Actually, dunes are found in deserts, and along shorelines. But, they ARE also in Colorado at the Great Sand Dunes National Monument!



Where did all this sand come from? It all started as rock in the distant mountains. Long ago, large rivers of ice called glaciers moved down the mountains. As they moved, they ground the rock into small pieces. Later, rushing streams carried the rocks downstream, grinding them into small grains of sand. A lot of sand was carried down into the valley by the Rio Grande River. Over time, the river shifted its course, leaving behind lots of dry sandy streambeds. From here, the wind took over. Strong southwesterly winds carried the sand across the valley, piling it into the dunes that you see today. But it does not stop there. The wind still blows and it moves the sand so the dunes are always changing shape and moving!

Word Find

- ★ Arches
- ★ Canyon
- ★ Cave
- ★ Erosion
- ★ Flood
- ★ Hoodoos
- ★ Landforms
- ★ Natural Bridge
- ★ Sand Dunes
- ★ Water
- ★ Wind

E	G	D	I	R	B	L	A	R	U	T	A	N	S
L	K	F	O	N	O	A	X	J	H	N	D	O	A
I	B	R	C	O	A	N	E	B	O	S	O	Y	N
B	B	X	A	A	L	D	W	I	N	D	B	N	D
Y	H	J	V	R	W	F	S	E	O	Y	O	A	D
V	R	L	E	C	J	O	Q	O	S	X	Q	C	U
H	P	T	M	H	R	R	H	T	Q	E	L	V	N
Z	A	D	K	E	W	M	R	N	A	L	G	H	E
W	H	E	A	S	N	S	B	J	D	X	H	N	S

Answer Key

Future Ideas

Nature Detectives, if you have ideas for articles you would like to see in the future or questions you would like to have answered, call Pascale at 303-441-4559 or e-mail us at phfpa@co.boulder.co.us

