



Bryce Canyon National Park located in southwestern Utah



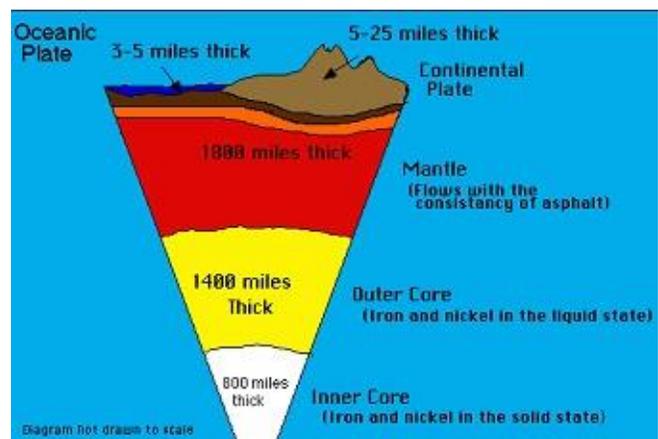
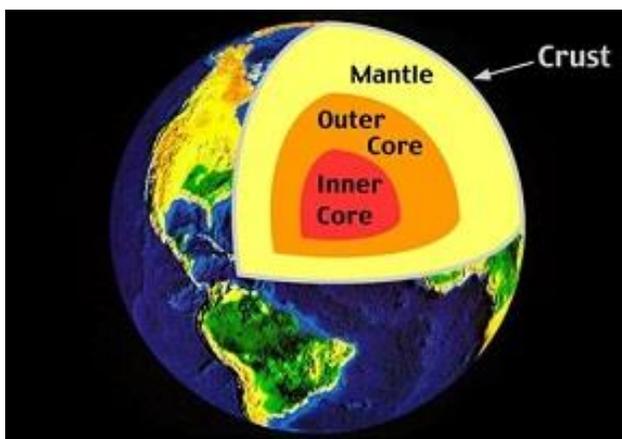
Rocks

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I have been told that some of my recent articles are a little bit too “deep – The Meaning of Life” or too “complex – The Quantum Computer” or too “argumentative – Reincarnation and Religion”. So, I decided to write about “Rocks”! Rocks are pretty generic and something we all can relate to and enjoy. After a brief introduction to the different types of rocks, I will provide pictures of some of the most scenic natural rock formations found around the world.

I guess you know that planet Earth is mostly made up of rocks? Right? Wherever you are living, just dig down a few feet and you find rocks. The Hawaiian Islands where I live are made of lava rocks. Mililani, the town I live in, is sitting on red lava rocks and we have some of the reddest dirt on earth.



The Earth's Crust is like the skin of an apple. It is very thin in comparison to the other three layers. The crust is only 3-5 miles thick under the oceans and about 25 miles thick under the continents. The temperatures of the crust vary from air temperature on top to about 1600 degrees Fahrenheit in the deepest parts of the crust.

The crust of the Earth is broken into many pieces called plates. The plates "float" on the soft mantle which is located below the crust. These plates usually move along smoothly but sometimes they stick and build up pressure. The pressure builds and the rock bends until it snaps. When this occurs, an Earthquake is the result!

The crust is composed of two basic rock types - granite and basalt. The continental crust is composed mostly of granite. The oceanic crust consists of a volcanic lava rock called basalt.

The mantle is the layer located directly under the crust. It is the largest layer of the Earth, about 1800 miles thick. The mantle is composed of very hot, dense rock. This layer of rock even flows like asphalt under a heavy weight. This flow is due to great temperature differences from the bottom to the top of the mantle. The movement of the mantle is the reason that the plates of the Earth move. The temperature of the mantle varies from 1600 degrees Fahrenheit at the top to about 4000 degrees Fahrenheit near the bottom.

The mantle is made of much denser, thicker material, because of this the plates "float" on it like oil floats on water. Many geologists believe that the mantle "flows" because of convection currents. Convection currents are caused by the very hot material at the deepest part of the mantle rising, then cooling, sinking again and then heating, rising and repeating the cycle over and over.

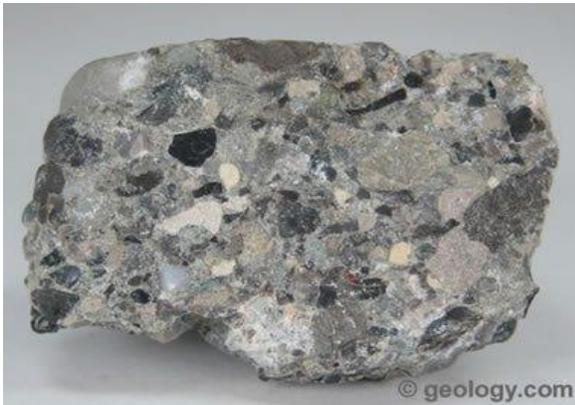
The outer core of the Earth is like a ball of very hot metals. (4000 degrees F. to 9000 degrees F.) It is so hot that the metals in it are all in the liquid state. The outer core is located about 1800 miles beneath the crust and is about 1400 miles thick. The outer core is composed of the melted metals nickel and iron.

The inner core of the Earth has temperatures and pressures so great that the metals are squeezed together and are not able to move about like a liquid, but are forced to vibrate in place as a solid. The inner core begins about 4000 miles beneath the crust and is about 800 miles thick. The temperatures may reach 9000 degrees F. and the pressures are 45,000,000 pounds per square inch. This is 3,000,000 times the air pressure on you at sea level!

Types of Rocks

The minerals and metals found in rocks have been essential to human civilizations throughout history. The three main types of rock are sedimentary, metamorphic, and igneous. The scientific study of rocks is called Petrology, which is an essential component of Geology.

Sedimentary rocks are formed from particles of sand, shells, pebbles, and other fragments of material. Together, all these particles are called sediment. Gradually, the sediment accumulates in layers and over a long period of time hardens into rock. Generally, sedimentary rock is fairly soft and may break apart or crumble easily. You can often see sand, pebbles, or stones in the rock, and it is usually the only type that contains fossils. Examples of this rock type include conglomerate and limestone.



Conglomerate



Limestone

Metamorphic rocks are formed under the surface of the earth from the metamorphosis (change) that occurs due to intense heat and pressure (squeezing). The rocks that result from these processes often have ribbonlike layers and may have shiny crystals, formed by minerals growing slowly over time, on their surface. Examples of this rock type include gneiss and marble.



Gneiss



Marble

Igneous rocks are formed when magma (molten rock deep within the earth) cools and hardens. Sometimes the magma cools inside the earth, and other times it erupts onto the surface from volcanoes (in this case, it is called lava). When lava cools very quickly, no crystals form and the rock looks shiny and glasslike. Sometimes gas bubbles are trapped in the rock during the cooling process, leaving tiny holes and spaces in the rock. Examples of this rock type include basalt and obsidian.



Basalt



Obsidian

What is the difference between Minerals, Rocks, and Gemstones?

Minerals occur naturally within the earth's surface and are solid formations. They are defined by their shape and their crystalline makeup. They are formed when magma, which is molten rock, cools. They can also be formed by water in caverns under the sea. Minerals are usually found between sediments or in areas that contain lava flows. There are more than 4,000 minerals that are formed naturally within the earth, and each one has a specific crystal structure.

Rocks are made from two or more minerals and can come in every size from tiny pebbles, big boulders, to mountains big enough to climb or drive your car over. Rocks do not have a special chemical or mineral makeup.

A **gemstone** is usually a mineral, but it is one that has formed crystals and then been cut and polished professionally to be made into a piece of jewelry. Gemstones are usually measured by their hardness, size, and rarity. Unpolished gemstones simply look like ordinary rocks; cutting and polishing allows them to have brilliance and sometimes color leading to their value that can't be found in other types of stones. Gemstones are usually classified as semiprecious and precious stones.

Official State Rocks, Minerals, and/or Gemstones

State	Rock, Mineral, or Gemstone	State	Rock, Mineral, or Gemstone
Alabama	Marble	Montana	Montana agate
Alaska	Gold	Nebraska	Prairie Agate
Arizona	Turquoise	Nevada	Sandstone
Arkansas	Diamond	New Hampshire	Granite
California	Gold	New Jersey	(None)
Colorado	Yule Marble	New Mexico	Turquoise
Connecticut	Garnet	New York	Garnet
Delaware	Sillimanite	North Carolina	Granite
Florida	Agatized Coral	North Dakota	(None)
Georgia	Quartz	Ohio	Ohio Flint
Hawaii	Black Coral	Oklahoma	Barite Rose
Idaho	Star Garnet	Oregon	Thunderegg
Illinois	Calcium Fluoride	Pennsylvania	(None)
Indiana	Limestone	Rhode Island	Cumberlandite
Iowa	Geode	South Carolina	Blue Granite
Kansas	(None)	South Dakota	Black Hills Gold
Kentucky	Freshwater Pearl	Tennessee	Limestone
Louisiana	Agate	Texas	Petrified Palmwood
Maine	Tourmaline	Utah	Coal
Maryland	Patuxent River Stone	Vermont	Slate
Massachusetts	Granite	Virginia	Nelsonite
Michigan	Petoskey Stone	Washington	Petrified Wood
Minnesota	Lake Superior agate	West Virginia	Bituminous Coal
Mississippi	Petrified wood	Wisconsin	Red Granite
Missouri	Mozarkite	Wyoming	Jade

That was your brief introduction to rocks. Now for the interesting and most unusual natural rock formations found around the world.

I may be a bit prejudice but I think the state with the most interesting natural rock formations is my home state of **Utah**. Most of Utah's National Parks are located in South and Southeast Utah where they are referred to as the "The Grand Circle". It encompasses the Arches, Canyonlands, Bryce Canyon, Capitol Reef, Zion National Parks, and the Grand Canyon (which is mostly in Arizona). If you have never been to this part of the world, you are missing some great sights. These are only a few of thousands of interesting rock formations you will see in Utah. Oh, the header picture at the top of this article was taken at Bryce Canyon National Park. Starting on the next page, I have picked 80 of the most scenic natural rock formations from the United States and around the world. They are listed alphabetically by the rock formation name. I hope you enjoy them.



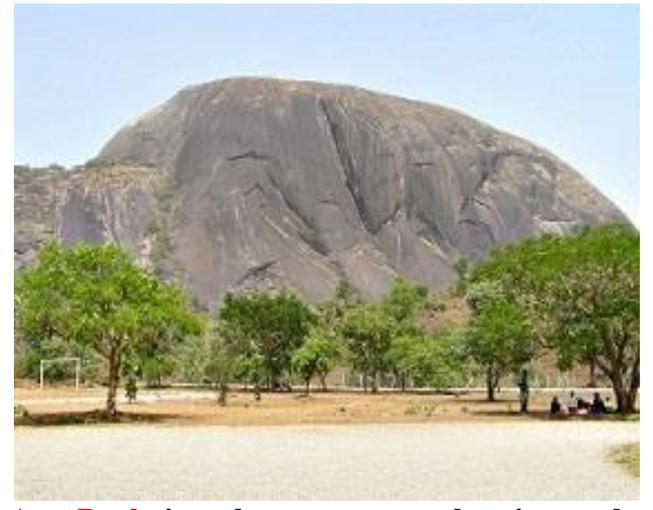
Antelope Canyon is located near Page on Navajo Nation land, just outside Glen Canyon National Recreation Area in **Arizona**.



Árbol de Piedra ("Stone Tree") is an isolated rock formation in the Eduardo Fauna National Reserve of Sur LÍpez Province, **Bolivia**.



As Catedrais beach which translates as 'Beach of the Cathedrals' is located near the town of Ribadeo in **Spain**.



Aso Rock is a large outcrop that is on the outskirts of Abuja, the capital of **Nigeria**.



South of Buhl in the Salmon Falls Creek Canyon in **Idaho** stands the famous **Balanced Rock**.



Ball's Pyramid is part of the Lord Howe Island Marine Park in **Australia**.



The **Basaltic Prisms** of Santa María Regla **Mexico** are tall columns of basalt rock that line a ravine.



The **Bass Rock** is an island in the outer part of the Firth of Forth in the eastern part of **Scotland**.



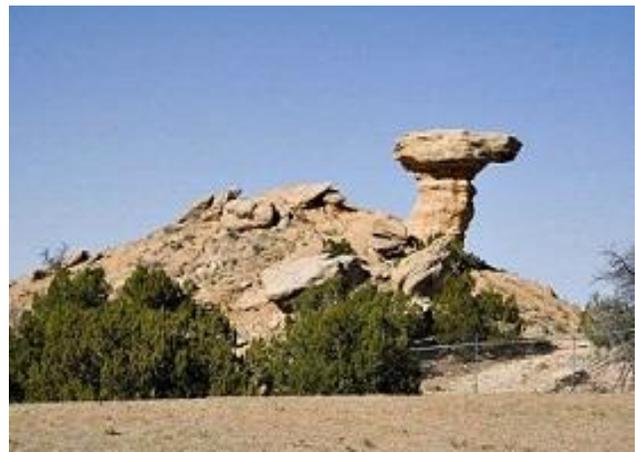
The **Belgradchik Rocks** are a group of strange shaped rock formations located in the Balkan Mountains in northwest **Bulgaria**.



The **Bucegi Sphinx** is a natural rock formation in the Bucegi Natural Park which is in the Bucegi Mountains of **Romania**.



Bungle Bungle Range is a distinctive beehive-shaped landform located in the Purnululu National Park in Western **Australia**.



Camel Rock is a distinctive rock formation located along interstate 84/285 between Santa Fe and Espanola, **New Mexico**.



Chimney Rock was a famous landmark for pioneer travelers. It is located in the North Platte River Valley in **Nebraska**.



Chiricahua National Monument consisting of extensive **hoodoos and balancing rocks** is in southeastern **Arizona**.



Coyote Natural Bridge is in Coyote Gulch Canyon that is part of the Grand Staircase Escalante National Park in **Utah**.



Colorful rock formations in the Zhangye **Danxia Landform** Geological Park located in Gansu Province **China**.



The **Delicate Arch** is in the Arches National Park in eastern **Utah** adjacent to the Colorado River about 4 miles north of Moab.



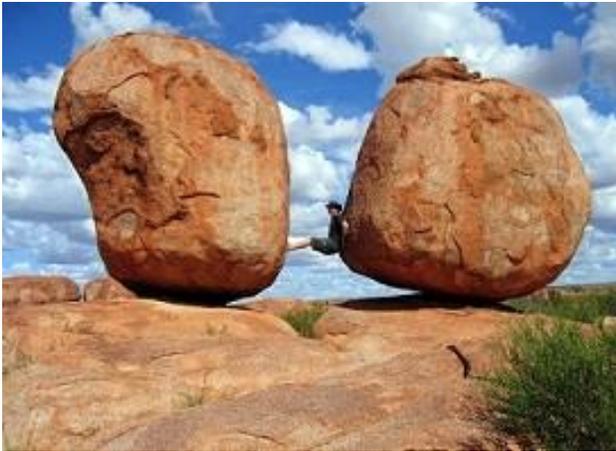
The **Devil's Punchbowl** is a hollow rock formation shaped like a huge punch bowl. The surf churns and foams as it mixes a violent brew. It is located at Otter Rock in **Oregon**.



Along the San Joaquin River at 7,600 feet on the west slopes of the Sierra Nevada in **California** lies the **Devils Postpile** National Monument.



The 867-foot high **Devils Tower** is in the Bear Lodge Mountains near the towns of Hulett and Sundance in northeastern **Wyoming**.



Devils Marbles rock formations are located 65 miles south of Tennant Creek, Northern Territory, **Australia**.



Drangarnir is the collective name for two sea stacks between the islet Tindhólmur and the island Vágur in the **Faroe Islands – Denmark**.



In the **Ireland** town of Knockaun, 80 meters off Downpatrick Head stands a colossal, 50 meters in height, sea-stack called **Dun Briste**.



Durdle Door is a natural limestone arch on the Jurassic Coast near Lulworth in Dorset, **England**.



El Capitan (Spanish for The Captain) is a vertical rock formation in Yosemite National Park, **California**.



Elephant Rock with its large, trunk-like arch is made up of red sandstone boulders. It is in the Valley of Fire in Overton, **Nevada**.



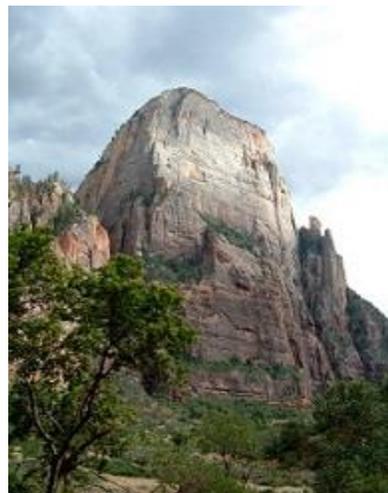
Natural Arches of the **Ennedi** Range are a beautiful part of the Sahara Desert in the northeastern section of **Chad**.



Located in the Normandie region of north-western **France**, **Étretat** is best known for its chalk-like cliffs and three natural arches.



The **Giant's Causeway** is an area of about 40,000 interlocking basalt columns, the result of an ancient volcanic eruption. It is located on the north coast of **Northern Ireland**.



The **Great White Throne** is a 2350-foot mountain of white Navajo Sandstone in Zion National Park of southwestern **Utah**.



Fiery sandstone fins and bizarre shaped hoodoos leap from the desert floor in the Gold Butte area on a remote section of the Mojave Desert in **Nevada**. It is called **Hobgoblin's Playground**.



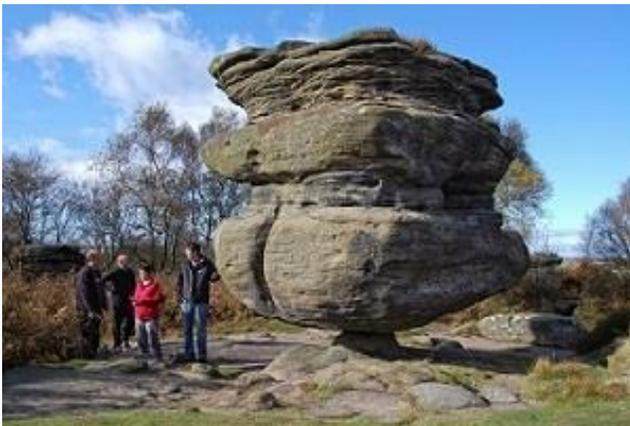
These **Hoodoos** (also called Tent Rocks) are found on the Pajarito Plateau in north-central **New Mexico**. They are the products of volcanic eruptions that occurred 7 million years ago.



Just outside of Page, **Arizona** is one of the most spectacular views on the Colorado River. You will be looking down 1000 feet of the sandstone to the **Horseshoe Bend** below.



Hvítserkur is a 15-meter high basalt stack along the eastern shore in northwest **Iceland**. The rock has two holes at the base, which give it the appearance of a dragon drinking water.



Idol Rock is a 200-tons balancing rock located at Brimham Moor in North Yorkshire, **England**.



Kannesteinen Rock is an unusual mushroom shaped rock formation located in the rural village of Kannesteinen Vågsøy, **Norway**.



Kata Tjuta is a group of large domed rock formations located 230 miles southwest of Alice Springs in the Central **Australia**.



Katskhi Pillar is a 130-foot natural limestone monolith that overlooks the small river valley of Katskhura in the country of **Georgia**.



Kjeragbolten is a wedged boulder located on the mountain Kjerag in Forsand, **Norway**.



Ko Tapu is an small island rock in Phang Nga Bay northeast of Phuket, **Thailand**.



Kyaiktiyo is a well-known Buddhist pilgrimage site in Mon State, **Burma**. A small pagoda sits on the top of a large gold colored granite boulder.



New Mexico's San Juan Basin Lybrook Badlands are the ultimate expression of sandstone alternating with siltstone and Shale hoodoos and other rock formations.



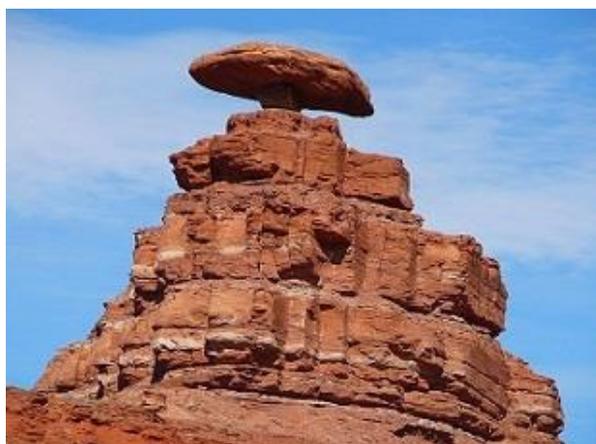
Machu Picchu is in the Cusco Region, Urubamba Province, Machupicchu District of **Peru**.



The **Manpupuner** rock formations are a set of 7 gigantic abnormally shaped stone pillars located west of the Ural Mountains in **Russia**. They are 30 to 42 meters high.



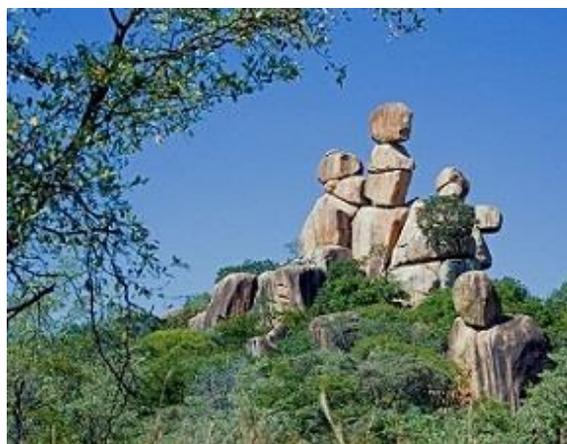
Massif de la Chartreuse is a rare rock formation located near Grenoble in **France**.



The name "**Mexican Hat**" comes from a sombrero-shaped 60-foot wide by 12-foot thick rock outcropping. It is on the San Juan River in south-central San Juan County, **Utah**.



Moon Hill is a hill with a natural arch through it located near Yangshuo in southern **China**.



Mother and Child Rock is a unique balancing rock formation in Matopos Park, **Zimbabwe**.



This **Musical Ringing Rocks** are located near Butte, **Montana**. Boulders make a musical ringing noise when hit with a hammer.



The **Twin Navajo Rocks** are made up of two parallel vertical columns of about thirty meters each located near Bluff, **Utah**.



Old Harry Rocks are three chalk formations, including a stack and a stump, located at Handfast Point, on the Isle of Purbeck in Dorset, southern **England**.



The **Old Man of Hoy** is a 449-foot sea stack on the island of Hoy, part of the Orkney archipelago off the north coast of **Scotland**.



Omak Balance Rock is on the Colville Indian Reservation in the state of **Washington** near Omak Lake.



The **Painted Cliffs** of **Maria Island** are beautifully colored and patterned sandstone, carved and colored by iron oxides.



Percé Rock is a huge sheer rock formation in the Gulf of Saint Lawrence on the tip of the Gaspé Peninsula in Quebec, **Canada**.



The **Pinnacles** are limestone formations within Nambung National Park, near the town of Cervantes in Western **Australia**



This Natural **Rock Face** is an unusual stone formation located in the Wrangell-Petersburg Census Area, **Alaska**.



The **Rock of Gibraltar** is a limestone promontory located in the British territory of **Gibraltar**, near the southwestern tip of Europe (borders Spain) on the Iberian Peninsula.



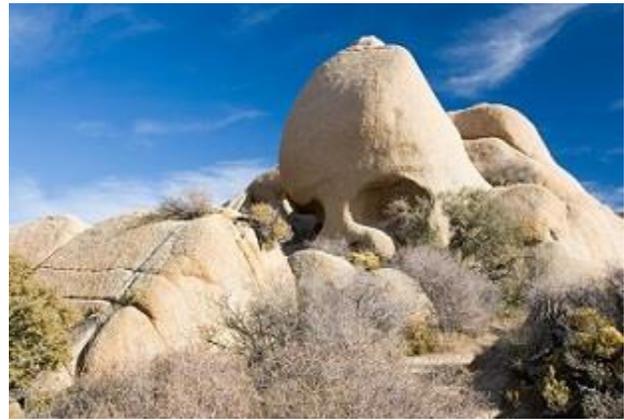
Sail Rock is a natural sandstone monolith located on the shore of the Black Sea, in Krasnodar Krai, **Russia**. It resembles a ship's sail, hence its name.



These **Sea Cliffs** and Bridges were formed by volcanic lava flows on the Big Island of **Hawaii**.



Shiprock or "winged rock" is a monadnock rising nearly 1,583 feet above the high-desert plain of the Navajo Nation in San Juan County, **New Mexico**.



Water and erosion over time caused two hollowed-out eye sockets to form and the rock began to look like a Skull. **Skull Rock** is in Joshua Tree National Park in **California**.



Split Rock is a geological rock formation in The Tasman Bay off the northern coast of the South Island of **New Zealand**. Made of granite, it is in the shape of an apple which has been cut in half.



Standing Tall is a balancing rock located on the coastline of Nova Scotia in **Canada**.



The **Stone Forest** is in Yunnan Province, **China**. The tall rocks look like petrified trees thereby creating the illusion of a forest made of stone.



Sugarloaf Mountain is a rock peak situated in Rio de Janeiro, **Brazil**, at the mouth of Guanabara Bay.



Torres del Paine National Park in southern **Chile** has spectacular mountains, glaciers, lakes, rivers, and rock formations.



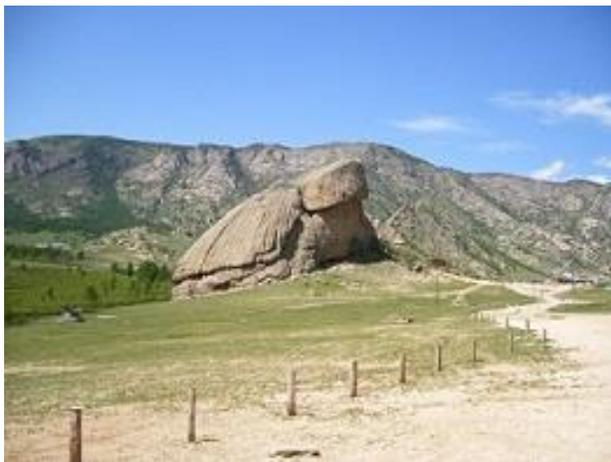
Trolltunga Cliff is a piece of rock jutting out of a mountain about 2,300 feet above the north side of the lake Ringedalsvatnet in Hordaland county, **Norway**.



The **Tsingy de Bemaraha** is in the Melaky Region of northwest **Madagascar**. The superposition of vertical and horizontal erosion patterns has created dramatic "forests" of limestone needles.



Turnip Rock is a small rock stack formation in Lake Huron near the extreme tip of Pointe Aux Barques, a small peninsula in **Michigan**.



Turtle Rock is a surprising granitic formation (79 feet) high whose form looks like a turtle. It can be found in Gorkhi-Terelj National Park in **Mongolia**.



El Valle de la Luna (Valley of the Moon) is located 8 miles west of San Pedro de Atacama in **Chile** in the Atacama Desert. It has various stone formations carved by wind and water to look like the surface of the moon.



Valley of Fire State Park covers 46,000 acres and is located 16 miles south of Overton, **Nevada**. The state park derives its name from red and Aztec sandstone rock formations.



Waimea Canyon is a 10-mile long canyon that is up to 3,000 feet deep. It is located on the western side of Kaua'i in the **Hawaii**. Waimea is Hawaiian for "reddish water".



The Wave is a sandstone rock formation located on the slopes of the Coyote Buttes in the Paria Canyon-Vermilion Cliffs Wilderness of the Colorado Plateau in **Arizona**.



The Wave Rock is a 46-foot high and 360-foot long granite inselberg. It forms the north side of a solitary hill near the town of Hyden about 184 miles east of Perth, **Australia**.



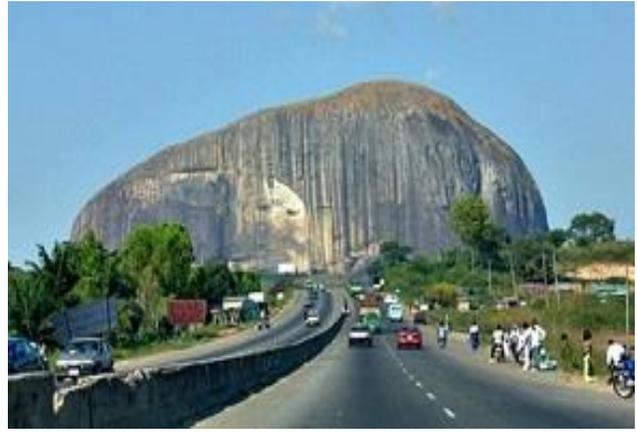
The main attraction in Farafra, **Egypt** is its **White Desert** with its massive chalk white rock formations that have been created by multiple sandstorms.



A distinctive feature of the **Yehliu Geopark** Cape (located near Wanli, **Taiwan**) are the hoodoo stones that dot its surface.



Zion National Park is in Southwestern **Utah** near Springdale. The most prominent feature of the 229-square-mile park is **Zion Canyon**, which is 15 miles long and a half a mile deep, cut through the reddish and tan-colored Navajo Sandstone by the North Fork of the Virgin River.



Zuma Rock is a large 2,400-foot high monolith igneous intrusion composed of gabbro and granodiorite that is in Niger State, **Nigeria**. It rises spectacularly north of Nigeria's capital Abuja, along the main road from Abuja to Kaduna.

Well, there you have it, 81 of the most spectacular natural rock formations in the world. In the United States, Utah has the most rock formations with 7 pictures, Arizona and New Mexico have 4 each, Nevada and California have 3 each. Worldwide, Australia has the most with 6 pictures followed by Norway, China, and England with 3 each.

Which one(s) do you like the best? Here are some of my picks:

Most colorful: Antelope Canyon in Arizona and Danxia Landform Mountains in China.

Most beautiful rock formation: Delicate Arch in Utah.

Beautiful canyons: Bryce and Zion Canyons in Utah - Waimea Canyon in Hawaii.

Most unique: Trolltunga Cliff and Kjeragbolten (wedged boulder) in Norway.

I hope this article gives you a little better appreciation of rocks.