Crack the News

A newsletter for kids by kids who love rocks, minerals, and fossils

Volume 1, Number 2 December 2023

Welcome to Crack the News, a newsletter for kids by kids who love rocks, minerals, and fossils. All the articles, photos, poetry, and artwork in this and every issue are created by teens and kids. We hope you enjoy the newsletter. Consider writing an article, creating poetry and artwork, or sending photos about rocks, minerals, or fossils to share with others. Details about submitting items can be found at https://www.juniors.amfed.org/juniors-newsletter.

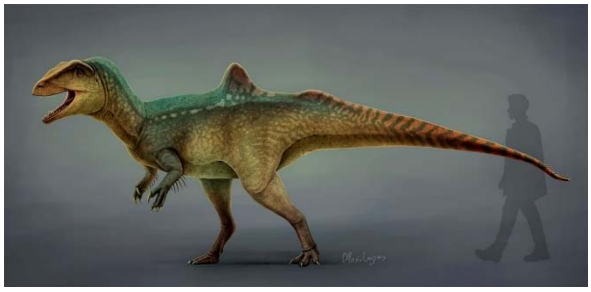
Concavenator and the Las Hoyas Lagerstätte

Sawyer Blizzard, Age 16, Colorado Springs Mineralogical Society, Colorado

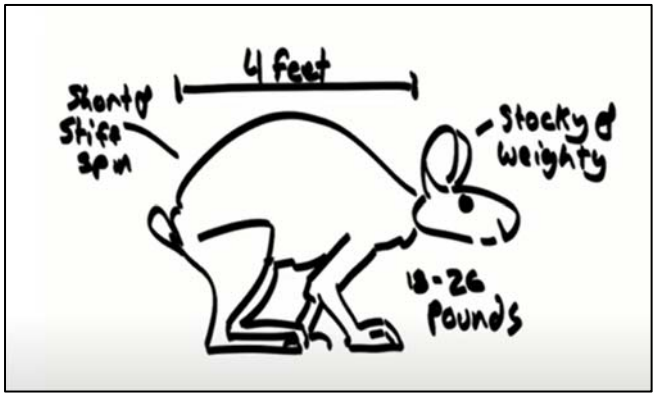
You find yourself on a large island during the Early Cretaceous. Around you are marshy wetlands; shallow water is dotted with various plants and other greenery. The lack of grass is apparent, but not as striking as the organic stench from the slimy microbial mats floating atop the water. Though unassuming, these mats of various microbes and bacteria will play a key role in preserving this ecosystem in the fossil record for millennia.

One hundred thirty million years later, what was once a thriving wetland is now the Las Hoyas fossil site in Spain. It is classified as a *Konservat-Lagerstätten* for the discovery of many incredibly well-preserved fossilized remains, one of these being a nearly complete skeleton of a medium sized theropod known as *Concavenator corcovatus*.

(Continued on page 7)



Artist's rendering of *Concavenator* with quill-like protofeathers on the forearm and the iconic "hump" on its back. By Mario Lanzas, Creative Commons license BY-SA 4.0 [https://creativecommons.org/licenses/by-sa/4.0/]



Giant Rabbits of the Eocene?

New video by Charlotte Small, age 15, Flatirons Mineral Club, Colorado

This video is a short introduction to rabbits in the Eocene, including issues like island gigantism, and how surroundings could directly impact the look of the rabbit. You can view my video at https://www.youtube.com/watch?v=FygdW_4jz9I.

Lubbock Gem and Mineral Society Annual Show

Micaden Steele, age 13, Lubbock Gem and Mineral Society, Texas

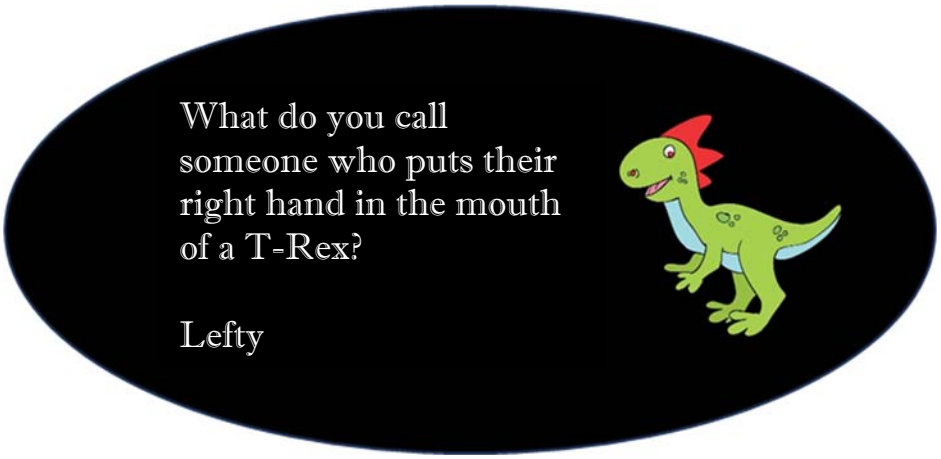
On September 27th and 28th, the Lubbock Gem and Mineral Society hosted our annual gem and mineral show.

I am a Junior Rockhound member in our club and worked at the kids booth. I helped kids with games and crafts.

We had a lot of vendors who sold their products that included everything from wire wrapped necklaces to carved obsidian. One vendor even showed fluorescent stones under a UV light.

In addition, members of our group created displays of their chosen rock. The public got to view the displays and vote for their favorite. The winners received their own award.

This show was a record-breaking year for our club because we had over 1,000 people attend. At the end of the weekend, I was extremely tired, but I had a lot of fun helping kids with activities.



My Collection

Mihai Nicolaev, age 8, Flatirons Mineral Club, Colorado

I just started collecting rocks and minerals, so my collection is still small.

One of my favorites specimens is lapis lazuli - a semi-precious stone that I received as a gift during my trip to Moldova.

I like to collect quartz.

During the club field trip to collect magnetite, I was hammering on the top of the rock to get out a big piece of magnetite. On one of the hits, the magnetite just flew out of the rock without breaking. By the way, this was my first field trip.

One day my dad asked me to come to the garage, and he gave me a heavy case with a lot of rocks. Those rocks were collected in the late 1950's in the Black Hills and Badlands of South Dakota, US. It was a big surprise to me.

Sacramento Mineral Society Jr. Rockhounds Display

Bo Breidenstein age 6 (right side of picture) and Ricky Breidenstein age 5 (left side of picture) are members of the Sacramento Mineral Society Junior Rockhounds (California). For the annual show, they chose to display their fossil collections, their "favorite specimen" collections, and a large plate full of Apache Tears, surrounded by rocks they had painted and some of their favorite books about rocks, volcanos, and dinosaurs.

The Trilobite vs. The *Opabinia*

A short story by Charlotte Small, age 15, Flatirons Mineral Club, Colorado

The shiny, rounded trilobite slowly slid through a narrow gap between a brightly colored horn coral, and a soft swaying sponge. It had been a good day for the trilobite, he had successfully plucked fat *Ottoia* out of a nearby sand bed. Later, he had swam around a nearby cluster of brachiopods, selecting only the tiniest to snack on. (They're juicier anyway.)

Trilobite, unknown species

Just now, he returned, exhausted, to the homely *Dictyophycus*, where he would sleep for the night. Like many trilobites of this species, he would cling onto this plant until morning. However, as he crawled onto the plant, his instincts told him something was wrong. His little feet stopped, and he slowly glanced up and down. With a pang of regret, he realized he was not climbing up his plant. Instead, he had mistakenly waddled halfway up an oddly shaped creature with thick ominous spines. The massive body suddenly thrashed, and the small trilobite was violently thrown off. As it turned, it whipped around its spherical head, its five glittery eyes stared deep into the soul of the terrified bugger.

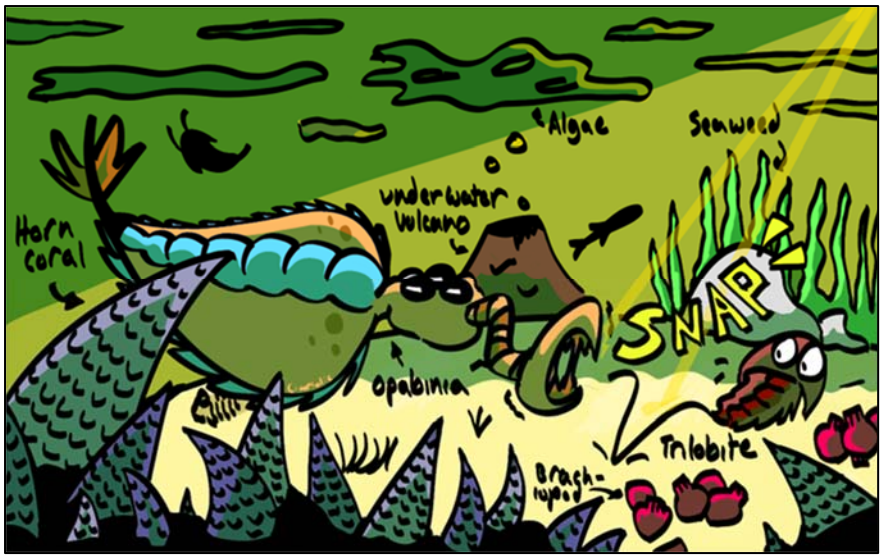
The trilobite scrambled frantically on the caked seafloor, but the sand started to slip under him, creating a sinkhole. *Opabinia regalis* made a sudden mad dive at the sinking trilobite, white, and foamy bubbles blinding both of them. But a millisecond before the attack, one of the trilobite's feet hit a small brachiopod shell, who had also been pulled into the sinkhole. Petrified, he kicked off of the shell, and shot out of the cavity, saving him.

Opabinia regalis. Credit: Nobu Tamura, GNU Free Documentation License

The *Opabinia* was very annoyed. He may have lost this round, but he was not going to give up yet. The crispy trilobite was a far too beautiful prize to lose. The *Opabinia* shot after him, and in a few seconds, he had nearly caught up. Madly, the trilobite tried to accelerate, his little heart beating so fast it could burst. He swished his tail from side to side, hoping to catch a current, but he never did. The *Opabinia* approached at a rapid rate, licking its lips evilly, as his spines rippled in a smooth aerodynamic movement. The *Opabinia* made a sudden grab at the trilobite with its long skinny claw, desperately grasping at the water until it finally came into contact with the tiny body. The *Opabinia* had caught the trilobite.

The trilobite finally gave up and fell limp as the *Opabinia* began to slowly crush the life out of the spent body. He lay there watching the *Opabinia's* mouth-claw open again to take the killing chomp. As the teeth slowly closed around him, he screwed up his calcite eyes. Without warning, he had a sudden inspiration. He raced to get out of the rapidly shutting mouth, using all the energy left in his weak body.

With a second to spare, he slipped his head through two of the teeth. The teeth slammed down, and a sharp pain shuddered through his tail. Ignoring the pain, he pulled his body out of the teeth. A cold gush of water greeted him, swirling around him and lifting his spirits. He had made it! He darted under the appendages of the *Opabinia*, and glided under the tail, quickly disappearing in a mass of tangling hemichordates. He floated down, under the



cover to catch his breath, and his feet touched the soft, muddy surface. After a few minutes' rest, he opened his eyes, and blinked twice. He blinked again. A thick, dark red substance was swirling around the water, coming from his tail. The *Opabinia* had killed him after all, but at least he didn't get to keep the prize. He died peacefully in a soft, muddy bed, surrounded by a ring of beautiful red and teal hemichordates.

RIP trilobite.

Badge of the Month: Rocks and Minerals

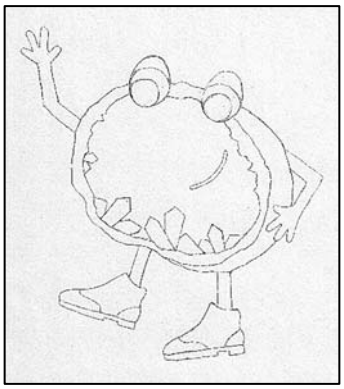
The AMFS has 20 badges you can earn with your friends in your club's junior program. In each CRACK THE NEWS we will feature one badge that you can earn.

Most of us joined our rock club because we like to collect rocks, minerals, and fossils. You can earn the Collecting Badge by doing what we like to do – collect! To earn this badge, you need to do three of the following:

- Learn the characteristics of minerals.
- Make and use a mineral ID kit.
- Build a mineral collection.
- Learn about the three rock types.
- Learn about the different crystal shapes.
- Grow crystals or make a geode.
- Learn your state rock, mineral, and gemstone.
- Find out about the elements.
- Play Name That Mineral!

Talk to your juniors club leader about how you can earn this badge. To learn more about the badge program, go to the AFMS Juniors website at https://www.juniors.amfed.org/fra-badge-program.

Who is this strange creature? Check out the next edition of CRACK THE NEWS to find out.



Awards from the Contest to Name the Newsletter Contest

Here are two of the winners from the newsletter naming contest.

Sydney Thornton from the North Mississippi Gem and Mineral Society with her megalodon tooth prize.

Jonah Palumbo from the Penobscot Mineral and Lapidary Club in Maine with his prize.

Did you get a nice rock, mineral, or fossil gift for the holidays? If so, send us a photograph of you and your gift for the next edition of CRACK THE NEWS. You can email your photo to youth@amfed.org.

Concavenator and the Las Hoyas Lagerstätte

(continued from page 1)

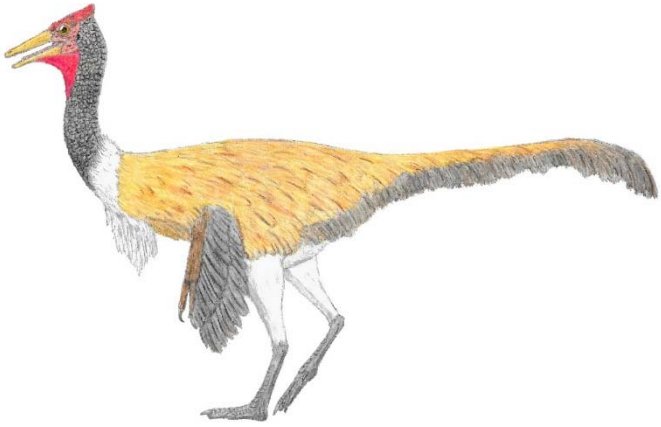
Concavenator was a charcharodontosaurian dinosaur that lived during the Barremian stage of the Early Cretaceous (Ortega, et. al., 2010). At around 5 meters (18 ft) long, it was smaller than others in its family, but no less interesting. Paleontologists have found only one specimen to date, but thanks to the almost perfect preservation, the skeleton is incredibly detailed, even including fossilized skin impressions.

The most defining feature of this dinosaur is the triangular hump on its back. Located just in front of the hips, it is held up by two tall vertebrae. It is not entirely known what this hump would have been used for, but it has been hypothesized to be a fatty hump used to store energy, a thermal regulator, or a vibrant and colorful sail for display (Ortega, et. al., 2010).

Another much smaller but still significant feature is the possible presence of quill knobs on its ulna (Ortega, et. al., 2010). Quill knobs are little bumps found on fossilized bones that act as an anchor for quill-like protofeathers. They have been found on the fossilized remains of several other dinosaurs. This could suggest the presence of protofeathers on *Concavenator's* forearm, similar to those found on another dinosaur called *Psittacosaurus*. But the presence of protofeathers has been disputed, and there has been good evidence against it. As of now, the presence of protofeathers on *Concavenator* is uncertain.

Concavenator was not alone in this wetland of course; two other dinosaurs have been discovered that lived alongside *Concavenator: Pelecanimimus polyodon* and *Mantellisaurus atherfieldensis*.

Pelecanimimus was a small ornithomimid that lived in the wetlands of the Las Hoyas fossil site with *Concavenator*. The fossilized skin impressions around *Pelecanimimus*' skull show it had a flap of skin beneath its lower jaw. It is thought that this flap of skin was a throat pouch, much like the throat pouches of modern-day pelicans. It is thought that it would have used this pouch in the same way pelicans do - using it to hold the fish it caught. It would have caught the fish in the same way a modern-day crane or stork would, wading through the water and waiting for the right opportunity to strike.



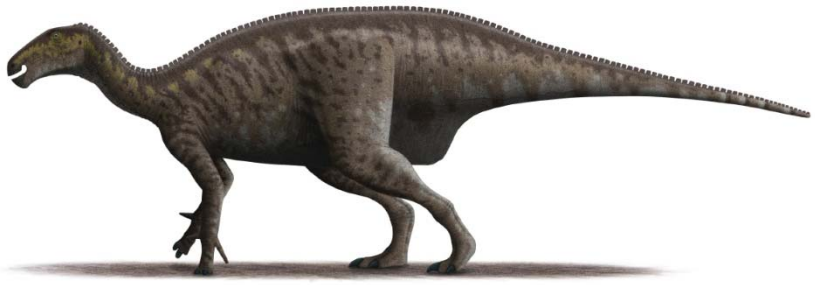
Artist's rendition of *Pelecanimimus* including the prominent throat pouch. By El fosilmaníaco, Creative Commons license BY-SA 4.0 [https://creativecommons.org/licenses/by-sa/4.0/deed.en]

Pelecanimimus also had more teeth than any other therapod, giving it the scientific name, *polyodon*, meaning "many tooth" (Pérez, 2004). All these teeth may have helped in its piscivorous lifestyle, using them to keep a good grip onto the slippery fish it caught in its mouth. This dinosaur would most likely be a main food source for *Concavenator*, due to it being small and relatively defenseless if caught.

Pelecanimimus was not the only prey for *Concavenator*, another dinosaur named *Mantellisaurus atherfieldensis* would have fallen prey to *Concavenator* as well. *Mantellisaurus* was an iguanodontian that lived throughout Europe during the Early Cretaceous around the same time as *Concavenator*. A fully articulated *Mantellisaurus* hindlimb, discovered in the Las Hoyas fossil site, suggests its presence in the wetland, eating the lush and abundant foliage found there (Serrano, et. al., 2013). This being the only species of herbivorous dinosaur

discovered in the Las Hoyas fossil site, it can be assumed that they played a key role in keeping foliage in check and preventing overgrowth.

As of now, only three dinosaurs have been found in the Las Hoyas fossil site, all of which I have described in this paper. But most of the biodiversity is made up of various amphibians, reptiles, mammals, invertebrates, and even early birds.



Artist's rendition of *Mantellisaurus*. By Steveoc 86, Creative Commons license BY-SA 3.0 [https://creativecommons.org/licenses/by-sa/3.0/deed.en]

We might not have known any of this, if it were not for the microbial mats that sometimes grew across the wetland. When these large mats of various types of bacteria and microbes grow over the carcass of a dinosaur, animal, or plant, the microbial mat protects it from erosion and scavenging. At the same time, it delays the processes of decomposition, thanks to the chemicals it produces, allowing the time needed for sediments to cover the body and begin the processes of fossilization (Iniesto, et. al., 2013). Because of these ancient microbial mats that floated in wetland pools, we are able to study an ecosystem rich in biodiversity preserved in the Las Hoyas Lagerstätte.

References and Further Reading:

Iniesto, M., Lopez-Archilla, A. I., Fregenal-Martinez, M., Buscalioni, A. D., & Guerrero, M. C. (2013). Involvement of microbial mats in delayed decay: an experimental essay on fish preservation. *Palaios*, *28*(1), 56-66.

Ortega, F., Escaso, F., & Sanz, J. L. (2010). A bizarre, humped Carcharodontosauria (Theropoda) from the Lower Cretaceous of Spain. *Nature*, *467*(7312), 203-206.

Pérez, B. P. (2004). *Pelecanimimus polyodon anatomía, sistemática y paleobiología de un Ornithomimosauria (Dinosauria: Therapoda) de Las Hoyas (Cretácico inferior; Cuenca, España)* (Doctoral dissertation, Universidad Autónoma de Madrid).

Serrano, M. L., Vullo, R., Marugan-Lobon, J., Ortega, F., & Buscalioni, A. D. (2013). An articulated hindlimb of a basal iguanodont (Dinosauria, Ornithopoda) from the Early Cretaceous Las Hoyas Lagerstätte (Spain). *Geological Magazine*, *150*(3), 572-576.

How do geologists like to relax?

In Rocking Chairs