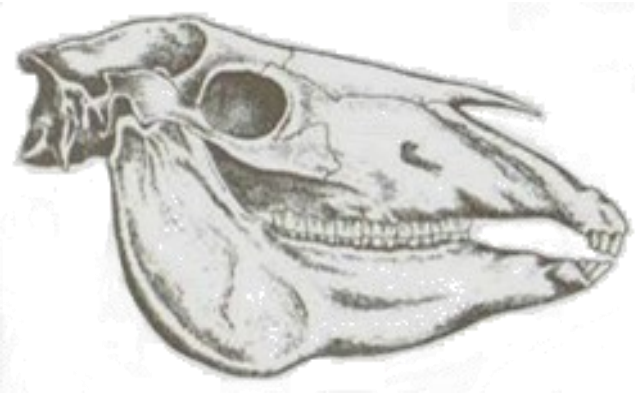


Fossil Club of Lee County

November 2015

Letter from the President

I'm writing this from a location that is high and dry! After all the rains we have had this season I'm glad it's finally stopped! Just kidding, though. I always write the newsletter from a dry spot--inside! But, it IS nice for the weather to get dryer and hopefully a little cooler.

ATTENTION: **Our November meeting is moved--to the Shell Factory**. Please don't show up at the fellowship hall where we usually meet. There is a fall harvest festival taking place there, not a fossil club meeting. Directions are provided inside this newsletter for the meeting.

November 7 and 8 is the Orlando Fossil Show. It's always a good one. Try to make it if you can. (Actually, you may not see this newsletter until it's over, but, who knows, maybe you'll get it in time.)

A few of us did some creek hunting. It seems that Lee and Hendry county creeks are lower than the ones connected to the Peace River. It felt good to get out and many of the finds are posted to our Face Book page. Go there and check it out. I encourage as many of you as possible to view, then join the FCOLF group on face book. Post your finds and stories there. See what others are doing.

The Southwest Florida Fossil Society is having their annual fossil show on November 14th. Address is Punta Gorda Women's Club and Historical Society Building, 118 Sullivan St, Punta Gorda, Fl., 33950. Hours are 9 till 4. All tables are rented so it will be a full house! Go see them and have fun!

The speaker for November will be Eleanor Gardner, from the FLMNH. She will be speaking on fossil birds. Eleanor is also the coordinator of the FOSSIL PROJECT, so will be able to answer any questions about that. Many of us travel, and would like to fossil hunt different areas. Since so many clubs and museums are members of the FOSSIL PROJECT this is an excellent resource to help find those places.

Please make sure you have a fossil permit. If you do not, follow the link inside and apply for one. To be considered a member in good standing with the club, so as to be able to participate in trips, you must have a fossil permit. If you hunt ANY state owned lands or waterways you must have this permit. AND, once a year, when it expires, you must renew it! Get one, and mark it down on the calendar to renew. Simple! ONLY 5 bucks! What a deal!!

Our Fossil Festival is February 13, 2016. Please try to remember that we need fossils for the kids dig, as well as donations for the silent auction and the raffle. Also, our annual Fossil Auction is in March, and this is our biggest annual fundraiser. Please keep this in mind as you decide what to do with all those extra fossils!!

The December meeting will be back at the Fellowship Hall. It is our annual Christmas meeting and it is pot luck! We also have a gift exchange for folks that want to participate. More on this meeting in next month's newsletter.

The January speaker will be Walter Stein. If you have any questions, or interest, in Dinosaur fossil hunting, make sure you attend this meeting!!

As the water levels drop, we will be planning some river trips, both fixed location as well as canoe trips. So get your fossil permits, and get your hunting gear ready. Al Govin,

Continued on page 2

Continued from page 1

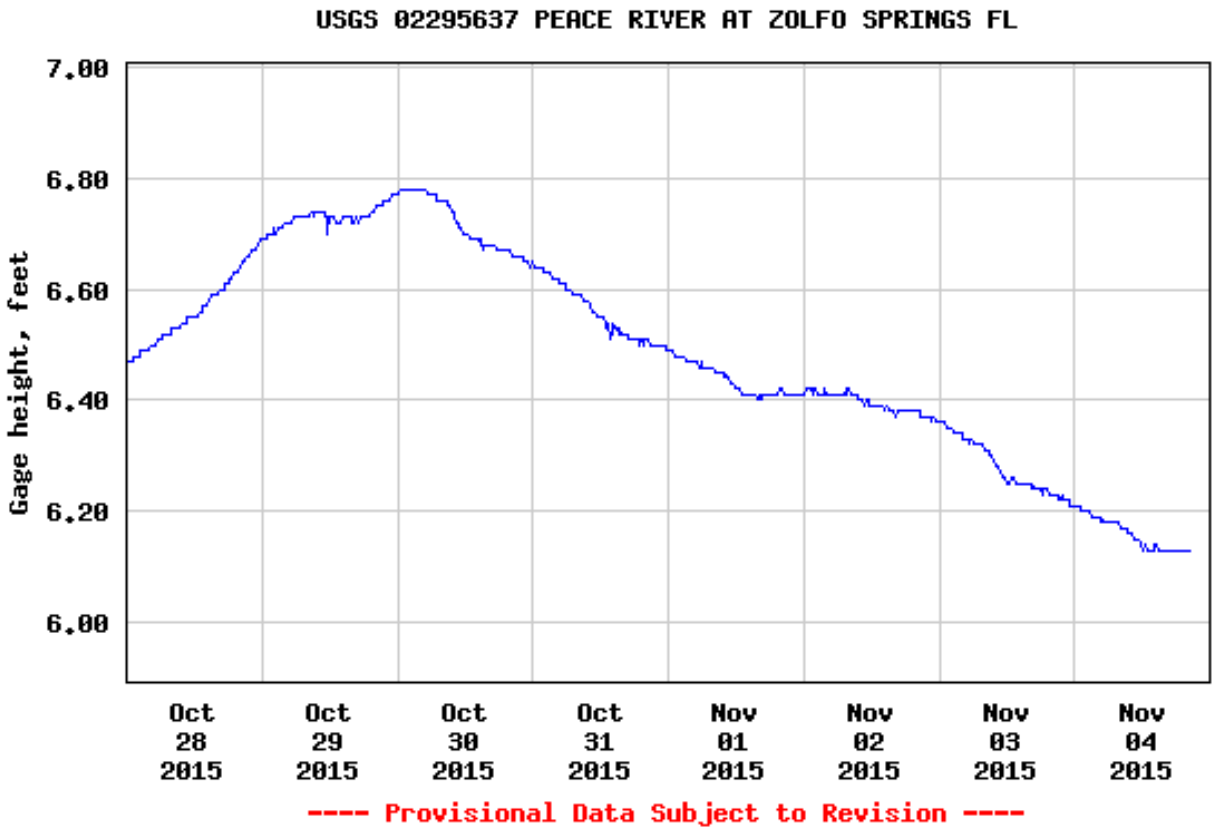
and Mike Cox, our newest trip coordinator, will be busy organizing, so be nice to these guys! It's a lot of work to put on a club trip, so make sure you take advantage of it when it comes!

And--remember--This is one of those hobbies that if you want to be successful, you have to leave your comfort zone!

Louis Stieffel
President
Fossil Club of Lee County

Peace River Water Levels!!

It's getting there!! We need five feet at this Zolfo gauge for the river to be huntable in most places.



NOTICE!!!

The monthly meeting of the FCOLC will be held November 19, at 7 pm, at the **Shell Factory** !! Located in North Ft Myers, the address is 2787 N. Tamiami Trail (# 41), 33903. It will be in the Party Room, which is the first building on your left as you enter from Hwy 41. Just turn in at the big sign, follow the road around the curve into the parking lot. If you enter from the rear, on old business 41, you must go around to the FishBones Restaurant area.

We suggest trying to get to the meeting early and eating at the FishBones Restaurant! It's very good, and then afterwards you just walk over to the Party Room. As usual, light refreshments will be served at the meeting, but it's not a meal, so consider FishBones! See you all there!!

FCOLC MEETING MINUTES

OCTOBER 15, 2015

Louis Stieffel called meeting to order.

37 members were present.

4 new members were introduced.

Cindi Bateman was announced as new Liberian.

Members reminded November meeting to be held at the shell factory.

November meeting speaker, Eleanor Gardner, will be about fossil birds.

Dr. Rick Batt the evening speaker was introduced and spoke about fossil Eurypterids.

Make sure that your email addresses are current with Al Govin if you are not getting the newsletter.

Louis spoke about National Fossil day which was held in Bradenton, as well as the SMR trip on which those attendee's were allowed to go hunting

Staci Marshen was complimented on her great job of establishing a face book site for FCOLC.

Staci Marshen is also in charge of the February club fossil show. Louis discussed some of the details of that upcoming show.

Door prizes were awarded.

Snack break was held.

Dollar Raffle was held.

Show-N-Tell was held.

Minutes by Secretary/Treasurer Al Govin

Fossil Club of Lee County Meetings
Are held the third Thursday of the month, at the Zion Lutheran Church Fellowship Hall. 7pm.
7401 Winkler Road, Ft Myers, Florida.

OFFICERS	DIRECTORS	COMMITTEES
Louis Stieffel, President 239-851-7499, cape187@earthlink.net Michael Siciliano, Vice President 239-980-1406 Al Govin, Secretary, Treasurer 239-910-2339	Charles O'Connor….239-246-5526 Dean Hart……..941-979-8217 Dave Seehaver Jeanne Seehaver Don Lindsey Jim Manderfield	Al Govin, Club Trips Director Curt Klug, Web Master Cherie Neat, Newsletter Developer Al Govin, Badges, Membership Dave and Jeanne Seehaver, Merchandise Dean Hart, Refreshment Michael Siciliano, Raffle and Dive Trips Charles O'Connor, Speakers Louis Stieffel, Auctioneer, Vertebrate Education, Newsletter editor, FOSSIL project representative

Meetings are held on the third Thursday of the month, at Zion Lutheran Church Fellowship Hall.

Websites & Locations of Interest

Fossil Club of Lee County: www.fcolc.com

FCOLC c/o Al Govin 16331 Estuary Ct., Bokeelia, Fl., 33922

The FCOLC website is a source for links to Fossil websites of interest, archived monthly club newsletters, details on club meetings and officers.

Museum of Natural History @ Gainesville www.flmnh.ufl.edu/

The Fossil Project www.myFOSSIL.org

Randell Research Center PO Box 608, Pineland, FL www.flmnh.ufl.edu/RRC/

Smithsonian Natural History Museum www.mnh.si.edu

Southwest Florida Museum of History 2031 Jackson St., Fort Myers www.MUSEUMofHISTORY.org

The Bailey-Matthews Shell Museum, 3075 Sanibel-Captiva Rd, Sanibel, FL www.shellmuseum.org

Cracker Museum at Pioneer Park in Zolfo Springs, FL Tel 863.735.0119

www.hardeecounty.net/crackertrailmuseum/about.html

Cape Coral Friends of Wildlife Burrowing Owls

www.ccfriendsofwildlife.org

Calusa Nature Center and Planetarium 3450 Ortiz Av, Fort Myers Tel 239-275-3435 www.calusanature.org

Imaginarium 2000 Cranford Ave, Fort Myers

www.i-sci.org

Florida Fossil Clubs

Southwest Florida Fossil Club

www.southwestfloridafossilclub.com

Tampa Bay Fossil Club

www.tampabayfossilclub.com

Orlando Fossil Club

www.floridafossilhunters.com

The Fossil Forum

www.thefossilforum.com/index.php

Fossil Treasures of Florida

www.fossil-treasures-of-florida.com

Florida Paleontological Society

http://floridapaleosociety.com/

Collecting Vertebrate Fossils on Florida state lands ***requires*** a permit. A fossil hunting permit is also part of being an ethical Florida fossil hunter.

Florida Vertebrate **Fossil Permit** http://flmnh.ufl.edu/natsci/vertpaleo/vppermit.htm

Peace River Water Levels

http://waterdata.usgs.gov/fl/nwis/rt

Picking Up Isolated Native American Artifacts www.flheritage.com/news/faq.cfm

If you find an Indian artifact, such as an arrowhead, on Florida state lands or river bottom, be aware that possession of an Indian artifact found on state lands after 2004 is a Class 3 Felony.

AWARD WINNER!!!

Our own Pam Plummer has recently won the Howard Converse award!!

It is given out by the Florida Museum of Natural History (since 1988), and the description is:

"The Howard Converse Award is presented yearly to recognize an individual from the non-professional paleontological ranks who has made outstanding contributions to Florida paleontology. The award is named in honor of Howard Converse, an amateur paleontologist and former preparator at the FLMNH. Award recipients are selected by the museum paleontology staff. Awardee's names are inscribed on a large permanent plaque which hangs in the collections and research building of the museum.

Pam won for her helping coordinate National Fossil Day activities the last few years and also helping support public outreach by creating the fossil museum at the shell factory in Ft Myers. Pam is also a past treasurer of the FCOLC as well as last year's co-chairman of the fossil festival.

Presented by Roger Portell.

CONGRATULATIONS, PAM!!!

Find us on: facebook®

Link to Fossil Club of Lee County Face Book page Please check out the FCOLC site and if not a member, please join.
https://www.facebook.com/groups/378838762286864/

A new species is evolving right before our eyes — an ultra-successful mix of wolves, coyotes and dogs

Eastern coyote (Wikipedia Commons)

A new species combining wolves, coyotes and dogs is evolving before scientists' eyes in the eastern United States.

Wolves faced with a diminishing number of potential mates are lowering their standards and mating with other, similar species, reported *The Economist*.

The interbreeding began up to 200 years ago, as European settlers pushed into southern Ontario and cleared the animal's habitat for farming and killed a large number of the wolves that lived there.

That also allowed coyotes to spread from the prairies, and the white farmers brought dogs into the region.

Over time, wolves began mating with their new, genetically similar neighbors.

The resulting offspring — which has been called the eastern coyote or, to some, the "coywolf" — now number in the millions, according to researchers at North Carolina State University.

Interspecies-bred animals are typically less vigorous than their parents, *The Economist* reported — if the offspring survive at all.

That's not the case at all with the wolf-coyote-dog hybrid, which has developed into a sum greater than the whole of its parts.

At about 55 pounds, the hybrid animal is about twice as heavy as a standard coyote, and its large jaws, faster legs and muscular body allow it to take down small deer and even hunt moose in packs, and the animal is skilled at hunting in both open terrain and dense woodland.

An analysis of 437 hybrid animals found that coyote DNA dominates its genetic makeup, with about one-tenth of its DNA from dogs, usually larger dogs such as Doberman pinschers and German shepherds, and a quarter from wolves.

The animal's cry starts out as a deep-pitched wolf howl that morphs into higher-pitched yipping — like a coyote.

Its dog DNA may carry an additional advantage. Some scientists think the hybrid animal is able to adapt to city life — which neither coyotes or wolves have managed to do on their own — because its dog ancestry allows it to tolerate people and noise.

The coywolves have spread into some of the nation's largest cities — including New York, Boston and Washington — using railway corridors.

The interbreeding allows the animal to diversify its diet and eat discarded food, along with rodents and smaller mammals — including cats, which coywolves eat skull and all — and they have evolved to become nocturnal to avoid humans.

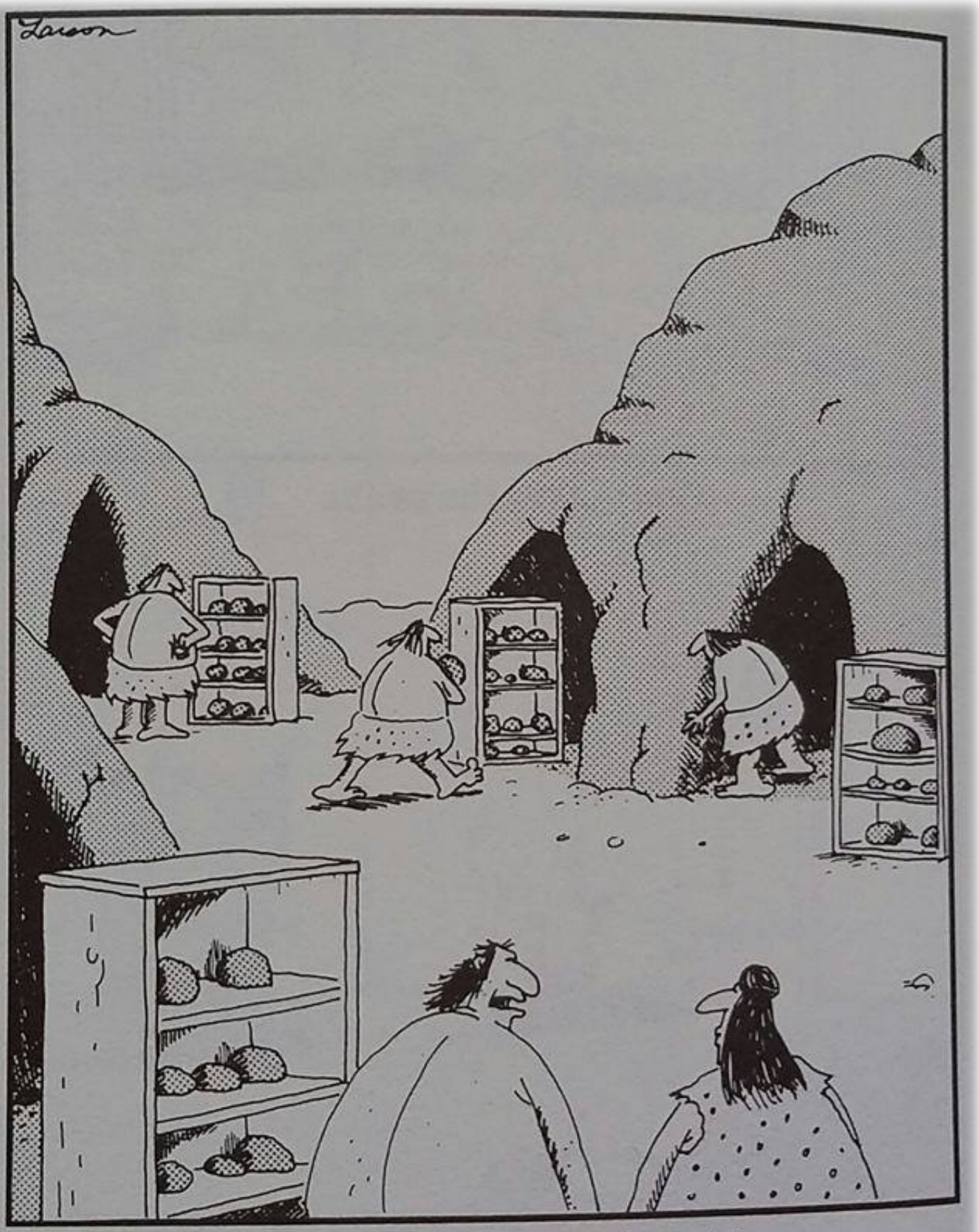
The animals are also smart enough to learn to look both ways before crossing roads.

Not all researchers agree the animal is a distinct species, arguing that one species does not interbreed with another — although the hybrid's existence raises the question of whether wolves and coyotes are distinct species in the first place.

But scientists who have studied the animal say the mixing of genes has been much faster, extensive and transformational than anyone had noticed until fairly recently.

"(This) amazing contemporary evolution story (is) happening right underneath our nose," said Roland Kays, a researcher at North Carolina State.

Watch this report on coywolves posted online by THIRTEEN:



"You know, I used to like this hobby. . . . But shoot! Seems like *everybody's* got a rock collection."

Mike, just before going under on a creek dive, is showing off his fancy fossil collecting bag!!
He better not find something TOO big!!

Fossil conference in Dallas

I had the opportunity to go to the Paleo Synergy conference in Dallas Texas in October. This was put on by the Fossil Project and the Dallas Paleontological Society.

My cost of the conference was paid for by the Florida Museum of Natural History-University of Florida.

On day one we went on a tour to the Shuler Museum. This is part of SMU and not open to the public. This was a real treat. Dr. Louis Jacobs met us and showed us his facility and explained the fossils and the work that was being done there. He has a wealth of knowledge and answered all our questions. He took us to his office which in itself was a museum. We then headed to the labs and fossil holding rooms. They had so many fossils that they were working on. A big part was the work on the Mosasaur Prograthodon Kianda. This Mosasaur was from Angola as they have done a lot of work there. Dr. Jacobs was so proud to show us on of them but the greatest thing was that the fossil had three other Mosasaurs in its stomach. He also showed us a Pawpawsasaurs skull.

We left there full of knowledge.

We then went back to Brookhaven Collage for a town hall meeting. Linda McCall -president of the North Carolina Fossil Club spoke and also Cynthia Crane Director of the Aurora Fossil Museum.

The main concern is that the federal government is trying to restrict fossil hunting on Bureaul of Land Management. We in Florida would not be affected in our state.

Scott Foss -BLM Senior Paleontologist was next to speak. He was a very good speaker. We had some questions for him and he did his best to answer them.

We then had a Fossil Day presentation by Pamela Owen from the Texas Memorial Museum at UT-Austin.

Then a my Fossil presentation by Lisa Lundgren and Eleanor Gardner of the Fossil Project. They gave a good and informative talk. We then broke out into topical sessions. I went to the best uses of Social Media for Fossil Organizations. We had a good session we all came out with new ideas.

We then went to the Dallas Paleontology Society monthly meeting. Paul Sereno from the University of Chicago gave a talk on Feathered Dinosaurs. It was a very good talk and made you rethink some of the possibilities of Dinosaurs having feathers.

Day two-We went on a field trip for fossil hunting. We went to Lake Jackson which included a little bit of a walk to get to the area to hunt. It took a bit but after a while you get used to what you are looking for. Lots of small fossils. We left there and went to Mineral Wells. It turned out to be the same type of fossils but also some trilobites.

Fossil hunting was fun and the talks were very interesting but the new friends made there was more than worth the trip. I spent a lot of time with the folks from the University of Florida and wish to thank them again for the opportunity for attending this conference.

Dean Hart

FOSSIL FINDS OF THE MONTH

Beautiful Tiger shark teeth, creek found by Staci Marshen

A COOL DINOSAUR!!

A photo of a strange but cool ceratopsian. Overall length is 88", length from back of jugal to beak 48", nasal horn 17" long at the shortest length from inside the nasal cavity and 12" wide! Unlike other Triceratops there appears to be a fenestra behind the horns and the nasal horn extends above the beak and rostrum and does not sit back midway. Photo and Prep worked done courtesy of Neal Larson of Larson Paleontology — with Neal Larson.

Ancient Reptile with Bizarre Smile Kept Tooth Fairy Busy

by Laura Geggel, Staff Writer | October 16, 2015 11:40am ET

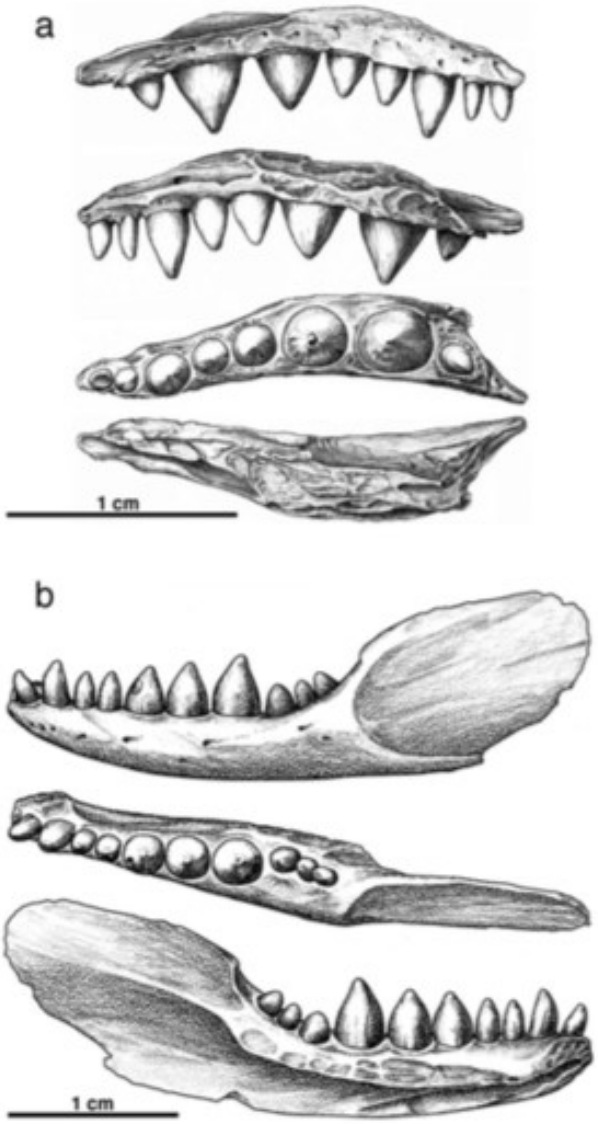
DALLAS — The large and bulbous teeth of an early reptile likely helped it crunch beetles and other hard-shelled invertebrates about 290 million years ago, a new study finds.

But the curious creature also lost teeth as it aged, giving it a less toothy smile in its senior years.

"Since we have so many specimens, we can actually see how the dentition changes throughout the life of this organism," said Robert Reisz, a distinguished professor of paleontology at the University of Toronto Mississauga, who presented the findings here at the 75th annual Society of Vertebrate Paleontology conference on Wednesday, Oct. 14. "Interestingly, the number of teeth is reduced in the larger, older animals because the individual teeth got bigger relative to the size of the animal." [Photos: Ancient Crocodile Relatives Roamed the Amazon]

Researchers discovered the newfound species at a limestone quarry near Richards Spur, Oklahoma. The quarry is teeming with fossils of ancient land-dwelling vertebrates, including small reptiles. But many of the fossils are fragmented — mostly an assortment of jaws and isolated bones, Reisz said.

In fact, researchers concluded in earlier studies that many of the fossils belonged to the species *Euryodus primus*, a four-legged amphibious creature. But when the researchers of the new study found more complete skulls and skeletons of the critter, they realized that the specimens "belong instead to a previously unrecognized and unusual" reptile, they wrote in the study, which is published in the October issue of the journal Naturwissenschaften.



The right upper jaw (a) and left lower jaw (b) of the newly identified reptile. Notice how the large, bulbous tooth on the lower jaw is followed by three smaller teeth.

Credit: The Science of Nature

They named it *Opisthodontosaurus carrolli*, derived from the Greek words *opisthos* (behind, rear) and *odontos* (tooth) — a reference to the animal's "conspicuously large tooth" toward the back of its lower jaw that is usually followed by two or three smaller ones, the researchers wrote. The species name honors Robert Carroll, who made many contributions to Paleozoic vertebrate paleontology, they said.

The newly named *Opisthodontosaurus carrolli* is a captorhinid, a group of lizardlike reptiles that had broad and strong skulls. Captorhinids were also part of the first large evolutionary burst of diversity among

land-dwelling early reptiles, the researchers said in the study.

The researchers did a thorough anatomical study of the fossils. They noted that *Opisthodontosaurus* had a large coronoid process, a projection on the jaws that attaches to the muscle. It even looks "reminiscent of the mammalian" coronoid process, "but this animal is nearly 290 million years old," Reisz said. (One of the oldest mammals, *Morganucadon*, lived about 210 million years ago, according to the Smithsonian Museum of Natural History.)

Despite its intriguing teeth, *Opisthodontosaurus* actually had fewer of them compared with other captorhinids. But analyses show that *Opisthodontosaurus'* teeth and jaws had similarities with other four-legged lizardlike animals called recumbirostran microsaurs. This suggests their dental anatomy was convergent, or that it evolved the same way in separate species.

These Permian period creatures may have evolved to sport such interesting dentition because they ate similar prey — "arthropods tougher than those normally subdued by simple piercing dentition," the researchers said.

This is consistent with the fossil record of arthropods, which emerged during the Late Carboniferous (the period before the Permian) and the Early Permian, the researchers said.

Follow Laura Geggel on Twitter @LauraGeggel. Follow Live Science @livescience, Facebook & Google+. Original article on Live Science.

FOSSIL FIND, BY JOSHUA FRANK

This is the prettiest Mako tooth I've found off of Venice. It hasn't been cleaned. It came up just this beautiful.

science

Mighty Mammoths Fell Prey to Rapidly Warming Earth

by Laura Geggel, Staff Writer | July 23, 2015 06:27pm ET

The mighty megafauna of the last ice age, including the wooly mammoths, short-faced bears and cave lions, largely went extinct because of rapid climate-warming events, a new study finds.

During the unstable climate of the Late Pleistocene, about 60,000 to 12,000 years ago, abrupt climate spikes, called interstadials, increased temperatures between 7 and 29 degrees Fahrenheit (4 and 16 degrees Celsius) in a matter of decades. Large animals likely found it difficult to survive in these hot conditions, possibly because of the effects it had on their habitats and prey, the researchers said.

Interstadials "are known to have caused dramatic shifts in global rainfall and vegetation patterns," the study's first author Alan Cooper, director for the Australian Centre for Ancient DNA at theUniversity of Adelaide in Australia, said in a statement emailed to Live Science. [Photos: Autopsy of a 40,000-Year-Old Mammoth]

Temperature drops during the Late Pleistocene showed no association with animal extinctions, Cooper said. Instead, only the hot interstadial periods were associated with the large die-offs that hit populations (local events) and entire species of animals (global events), he said.

Ancient humans also played a role in the megafaunal extinction, albeit a smaller one, he said. By disrupting the animals' environments, human societies and hunting parties likely made it harder for megafauna to migrate to new areas and to refill areas once populated by animals that had gone extinct, he said.

Extinction analysis

The study is the latest in a long string of research examining what caused megafauna, or animals weighing more than 99 pounds (45 kilograms), to die off during the Late Pleistocene.

George Cuvier, the French paleontologist who first recognized the mammoth and the giant ground sloth, started the speculation in 1796 when he suggested that giant biblical floods were to blame for the animals' demise. The extinctions also baffled Charles Darwin after he encountered megafaunal remains in South America.

Alan Cooper lowers himself into Natural Trap Cave in Wyoming, a location rich with ice age megafaunal fossils.
Credit: Laura Weyrich

Since then, various studies have placed the bulk of responsibility on ice age humans, temperature swings and a perfect storm of events.

However, advances in examining ancient DNA and ancient climate allowed Cooper and his colleagues to get to the bottom of the issue.

They examined DNA from dozens of megafaunal species that lived during the Late Pleistocene, combing through more than 50,000 years of DNA records for extinction events. The ancient DNA not only told

them about global extinction events, but also local population turnovers, which occur when a group of animals dies and another population of animals moves in to replace them. [Wipe Out: History's Most Mysterious Extinctions]

They then compared the data on megafauna extinction with detailed records of severe climate events, which they gathered from Greenland ice cores and the sedimentary record of the Cariaco Basin off Venezuela.

"By combining these two records, we can place the climate and radiocarbon dating data on the same timescale, thereby allowing us to precisely align the dated fossils against climate," Cooper said. "The high-resolution view we gained through this approach clearly showed a strong relationship between warming events and megafaunal extinctions."

The findings also show that extinction events were staggered over time and space, likely because the interstadial warming events had different effects on different regions, Cooper said.

Modern connections

Earth's climate is much more stable today than it was during the Late Pleistocene, making the world's current warming trends a "major concern," the researchers said.

Alan Cooper looks at the skull of an ancient wolf in Canada's Yukon Territory.
Credit: Julien Soubrier

"In many ways, the rise of atmospheric carbon dioxide levels and resulting warming effects are expected to have a similar rate of change to the onset of past interstadials, heralding another major phase of large mammal extinctions," Cooper said.

In addition, humans have disrupted the habitats and surrounding areas of many wild animals, making it challenging for species to migrate or shift ranges to places where they would be better adapted to deal with climate change, he said.

Other researchers called the new study an important one.

It shows "that the extinction and population turnover of many megafauna was associated with rapid warming periods, rather than the last glacial maximum [when the ice sheets reached their maximum during the last glacial period] or Younger Dryas [a sudden, cold spell that happened when the Earth was starting to warm] as has previously been suggested," said Eline Lorenzen, an assistant professor of paleogenetics at the University of Copenhagen in Denmark.

In fact, understanding how the past climate change affected extinction rates may help people be better prepared for future rapid global warming events, she said.

"This study is a bit of a wake-up call," Lorenzen said. "Here we have empirical evidence — based on data from a lot of species — that rapid climate warming has profoundly impacted megafauna communities, negatively, during the past 50,000 years.

"It doesn't bode well for the future survival of the world's megafauna populations," she said.

The study was published online today (July 23) in the journal Science.

Follow Laura Geggel on Twitter @LauraGeggel. Follow Live Science @livescience, Facebook & Google+. Original article on Live Science.

SOME OF THE FOSSILS FROM THE LINDA WARNER COLLECTION.

SHOW and TELL!!

Dave, our trusty store keeper/board member, is showing off the new manikin used for club t-shirts.

Not a fossil, but sure is eye catching!!

Those members who attend the meetings are never sure of what may happen!

FROM THE SMU COLLECTIONS. DEAN HART

Megalodon Shark Nursery Found in Panama

Megalodon News 11 May, 2015

University of Florida vertebrate paleontology graduate student Dana Ehret holds a juvenile and adult Megalodon tooth up for comparison.

Carcharocles megalodon collection from the Gatun Formation.

Researchers from the University of Florida have announced the discovery of a 10 million year old Megalodon nursery area located in Panama. In a paper published in the research journal PLoS ONE they present the analysis of over 400 fossil Megalodon teeth collected from the shallow, marine Gatun Formation. These fossil Megalodon teeth in this collection are all surprisingly small, representing very young juveniles of the species.

Analysis of the Megalodon teeth determined the size did not relate to tooth position in the jaw or the size of the species during the time period. “Our study suggests the specimens represent mostly juveniles with lengths between 2 and 10.5 meters (6.5 to 34.5 feet),”, researcher Pimiento said. While several other areas have been suspected to represent Megalodon nurseries including the Bone Valley region of Florida and the Calvert Cliffs in Maryland due to the high concentrations of small teeth, this study maybe the most in depth analysis to date.

Baby Sharks in the Nursery

Although they were big babies, at 7 to 13 feet, young megalodons would have been vulnerable to predators, mainly other giant prehistoric sharks. Modern juvenile sharks find food and safety in shallow-water nursery areas, where bigger sharks that would prey on them can't swim. Scientists thought megalodon also used nursery areas, due to finding areas with juvenile shark fossil teeth nearby fossil marine mammals. A discovery in Panama gave scientists from the University of Florida confirmation of this belief.

The scientists studied 400 megalodon teeth collected from the Gatun Formation, an area where the Caribbean and Pacific met during the Miocene. The teeth were surprisingly small for the gigantic species. This suggested they were juveniles, but wasn't conclusive.

To determine for sure they were juveniles required thorough analysis. First, the scientists had to make sure they weren't small based on their position in the jaw. They did that by comparing the teeth from these fossils to those from fossils elsewhere of megalodon in different life stages. The scientists also conducted a review to make sure the megalodon weren't simply smaller during the time period the fossils came from.

Based on that analysis, they concluded the teeth were from juveniles and the concentration suggests a nursery area. Although other nursery areas were suggested previously, this was the first rigorous analysis to confirm an area as a megalodon nursery.

Grow Up Big and Strong

Megalodon was the biggest fish, and shark, to ever swim in the seas. Because of the limited fossils, scientists don't know for sure how big they got, but think they got to be more than 50 feet long, possibly closer to 60 feet. The large adults were bulky, too, weighing possibly weighing 50 tons or more. That's more than three times as long and twenty times as heavy as the Great White Shark.

Almost nowhere in the ocean was safe for other fish. Megalodon teeth have been found nearly everywhere, on every continent except Asia and Antarctica. They used those teeth to eat anything they wanted. Their preferred meal was probably whale; larger sea turtles may have served as snacks.

There are whalebone fossils with compression fractures; some scientists interpret them as having been caused by a massive strike from below, like a megalodon ramming its head into the whale's body. This would stun the victim and let megalodon grab and swallow it up. One fossil whale shows evidence of a healed compression fracture, making it a lucky—and rare—survivor of amegalodon attack

What is the largest Megalodon tooth ever found?

Largest verifiable Megalodon tooth at 7.48" long. Photo credit Craig Sundell

Fossil Megalodon teeth are relatively common in some areas of the world, such as the coastal regions of the SE United State. Most adult Megalodon teeth fall into the 4-5 inch size range. As teeth approach 6 inches they become rare, representing far less than 1% of teeth. These 6 inch teeth obviously represented extremely large individual sharks.

A 7 1/8″, unrestored Megalodon tooth at LowCountryGeologic.com

Very few Megalodon teeth have ever been found exceeding 7 inches. Many people who have spent their lifetime's finding and collecting Megalodon teeth have never had their hands on a 7+ inch tooth. Determining what is truly the largest Megalodon tooth found is problematic, because just like with fishing, people like to exaggerate. There's a million stories about that 7 ½" or 8″ tooth that someone found, but for some reason disappeared, never to be seen again.

Large Megalodon teeth can be very valuable, so there is a huge incentive to "enhance" a tooth, often artificially lengthening it. One of the last high quality, non-restored Megalodon teeth over 7 inches sold for around $50k. You never know the true size of these restored/enhanced teeth. These large teeth are so valuable this also causes to "old-time" collectors being very hesitant to disclose large teeth in their collection, out of fear of inviting thieves.

Separating out some of the obvious fish tails, one of the best candidates for the largest Megalodon had been a massive tooth found by the late Vito Bertucci in South Carolina and now in the collection of Dr. Gordon Hubbell. This tooth purportedly measures between 7 1/4″ and 7 3/8", although no exact caliper readings are available.

Another tooth that was often cited as the record holder, was a large specimen collected by Pete Larson of the Black Hills Institute from Peru. This tooth measured in at around 7 1/4″, but had been found broken and was repair and gaps restored. The resulting root was appeared highly elongated compared to other Megalodon teeth, leading many to question whether this restoration work caused the tooth to be artificially lengthened.

Recently photos and verifiable measurements have surface on another monster tooth from Ocucaje, Peru. It measures 190mm or 7.48″ on the slant it resides in a private collection in Peru. It was photographed, measured and casted by Craig Sundell, a researcher for the University of Kansas back in the 90's. The tooth

is not a composite and has not been restored. There is a repaired crack in the tooth because it was found broken, but it's a clean break. The discoloration on the root is residue from casting material, not restoration.

Largest verifiable Megalodon tooth at 7.48″ long. Photo credit Craig Sundell

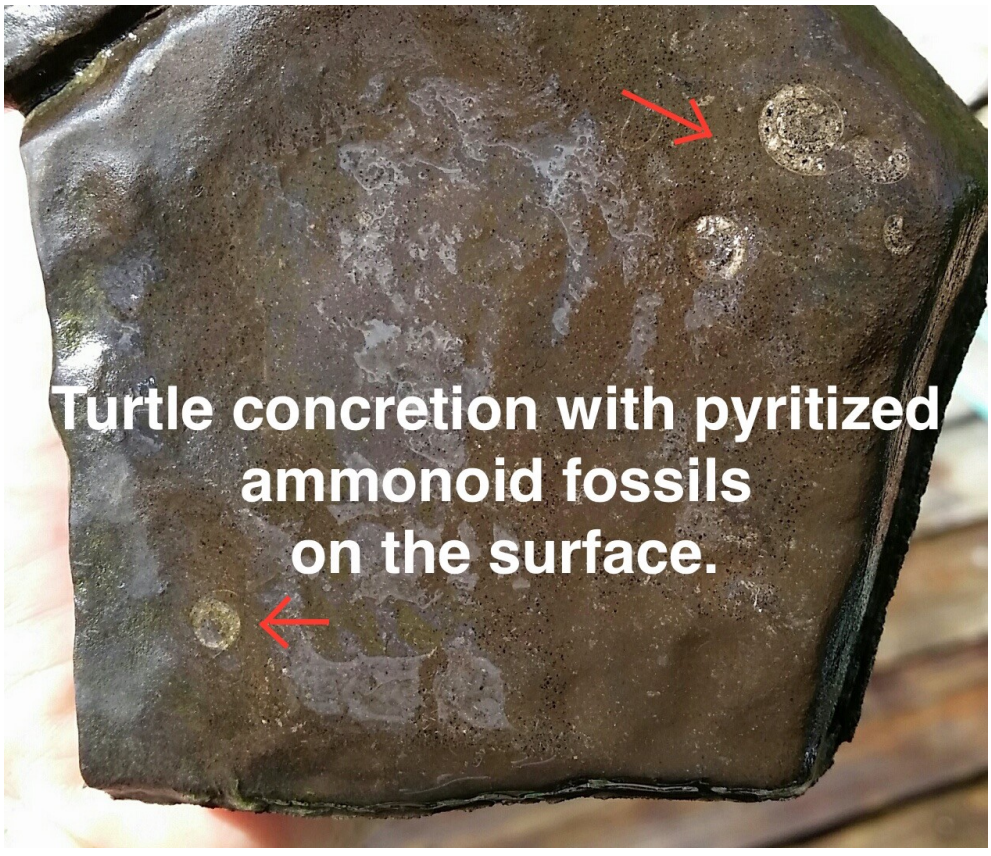
View of the back of the largest verifiable Megalodon tooth.

Rumors to slightly larger teeth in the collections of locals in Peru persist, including one reportedly 192mm or 7.55″ This region of Peru has produced the largest known Megalodon teeth. One reason being is that it likely represented a deeper water environment with larger food sources where the super-sized Megalodon's would be hanging out. It's illegal for fossils found in Peru to leave the country, so don't expect to see the gigantic teeth from this location up for sale.

Aimeee's Corner!!

I recently went on a long road trip to visit family in Missouri so of course I had to stop for fossils along the way. I've been using the site findingrocks.com to search for hunting grounds and it led me to Fayetteville, Arkansas where the Fayetteville shale (Mississipian period 354-323 million years ago) is exposed in several ditches and creek beds throughout the city. Fossil hunting locales often lack curb appeal and the ditches of Arkansas are no exception but the beautiful rocks and fossils made up for the unappealing scenery.According to the web site, my goal was to locate concretions and break them open like pecans to find a pyritized ammonoid inside. Ta da! Not that easy. The concretions were more like Brazil nuts, and the yield of ammonoids was frustratingly low. I began to examine the surfaces of all the rocks in the ditches and was happy to discover that the ammonoids were everywhere.I initially mistakenly referred to these cephalopod fossils as "ammonites" until I consulted with club member Rick Batts. Rick clarified that ammonites are members of a larger group called ammonoids and that the fossils I found are from early ammonoids called Goniatitic Ammonoids. The early ammonoids had simple suture lines compared to the intricate suture lines found in the later ammonites and predated the first dinosaurs which appeared in the Triassic Period (228 million years ago).The Fayetteville shale yields a variety of interesting concretions ranging from small red disks to large textured rocks that resemble fossilized turtle shell. I've included 3 photos to give you an idea of the ammonoid wealth that can be found in the area. For a full accounting of my tour of Arkansas ditches, check out the entry "Barefoot and preoccupied in Arkansas" at www.zookeeperfossils.blogspot.com.

Ammonoid in red concretion



Turtle concretion with pyritized ammonoid fossils on the surface.

science

World's Oldest Sea Turtle Fossil Discovered

by Lindsay Dodgson, Live Science Contributor | September 18, 2015 12:31pm ET

The world's oldest sea turtle fossil shows the ancient animal swam the oceans at least 120 million years ago, when dinosaurs still roamed the Earth, according to a recent analysis.

The now-extinct *Desmatochelys padillai* turtle skeleton was found in Villa de Leyva, Colombia, and is 25 million years older than the *Santanachelys gaffneyi* turtle from Brazil that previously held the record for the world's oldest sea turtle fossil.

The *D. padillai* specimen was dug up by hobby paleontologist Mary Luz Parra and her two brothers in 2007. However, it wasn't until Edwin Cadena, a researcher at the Senckenberg Research Institute and Natural History Museum in Germany, and James Parham, an assistant professor of geological sciences at California State University, Fullerton, inspected it that the fossil was determined to be the oldest sea turtle specimen in the world, dating back to the Cretaceous period, between 145.5 million and 65.5 million years ago. [Image Gallery: 25 Amazing Ancient Beasts]

"The cool thing about this turtle is that it's really old, but it's not very primitive," Parham told Live Science. Though the specimen is at least 120 million years old, the turtle doesn't look like an ancient species that was early on in its evolution, and instead is "very specialized," he added. This suggests there could be older sea turtles still to be found (if they are preserved), the scientists said.

The finding also suggests that turtles could have evolved to become sea dwellers more than once throughout history, the researchers said. In fact, because *D. padillai* is so old but doesn't look primi-

tive, it might not be related to modern sea turtles. Rather, it might have evolved to live in the sea, and then other turtles later evolved in the same way from a separate ancestor, they said.

Parham said there has been some resistance to this idea from other scientists. However, it shouldn't be an altogether surprising theory, he added, because mammals, reptiles and other animals evolved separately several times to produce a variety of sea-dwelling animals.

For instance, mammals advanced many times to become sea creatures like dolphins and seals, and they came from different ancestors. The researchers think it's likely that turtles did the same, and evolved several times with different descendants to live in the sea. Some sea turtles became ones like *D. padillai,* while others evolved independently to become the modern turtles that live in the sea today.

The *Desmatochelys padillai* turtle skeleton is almost completely preserved.
Credit: PaleoBios/Cadena

To determine the fossilized turtle's age, the researchers examined the invertebrates, called ammonites, preserved in the rocks and sediment around the turtle. Ammonites were widespread throughout the Cretaceous period, which means they can be used to figure out how old the surrounding rock is, Parham said.

The finding that the turtle lived during the Cretaceous period could help shed light on sea turtle history, the researchers said. The exact point that turtles split into sea dwellers and land dwellers has been difficult for researchers to identify. There are few turtle fossils from this period, so every specimen is important for understanding the story of how sea turtles evolved.

The researchers haven't yet conducted tests to determine whether the *D padillai* fossil evolved independently from modern-day turtles, but paleontology labs around the world are studying the idea.

"We're trying to figure out how turtles who lived over 100 million years ago are related," Parham said. "It's not easy!"

Some partial remains of *D. padillai* were originally discovered and dug up in the 1940s in Colombia, but were not studied for many years. For Parham, the new research comes full circle, because he was first introduced to these fossils when he was in graduate school at the University of California, Berkeley. Now, 18 years later, he realizes the fossil's significance.

The new finds dug up in 2007 had better location data, which allowed the researchers to date the turtle more accurately.

"It was really exciting that this turtle that I kind of knew about, was somewhat familiar with, and then all of a sudden, it was like, 'Hey, we've got new skeletons, and by the way, they're super old,'" Parham said. "If I had known how old the specimens at Berkeley were in 1996, I would have included them in my dissertation, for sure."

The new study was published online Sept. 7 in the journal PaleoBios.

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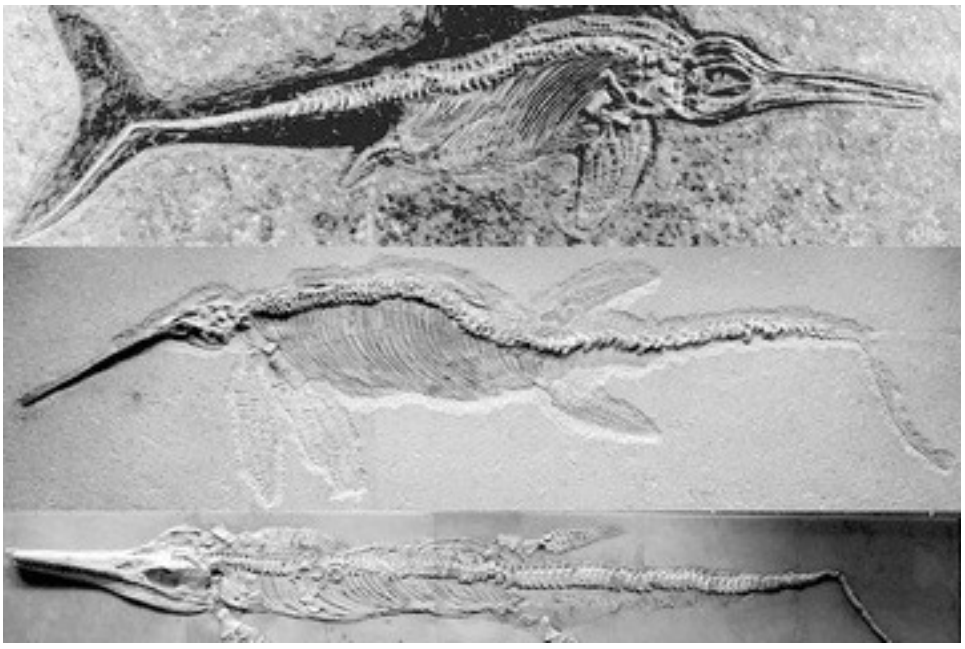
An Asteroid Didn't Wipe Out Ichthyosaurs — So What Did?

by Laura Geggel, Staff Writer | July 23, 2015 08:05am ET



Different ichthyosaur genuses, including *Stenopterygius*, a small, dolphinlike pursuit predator (top); *Eurhinosaurus*, a medium-size predator with a very elongated upper jaw (middle); and *Temnodontosaurus*, a massive apex predator with a robust skull and teeth for crushing bony prey, including other ichthyosaurs (bottom). Images are not to scale.
Credit: All images courtesy the State Museum of Natural History in Stuttgart, Germany.

During the dinosaur age, ichthyosaurs — large marine reptiles that look like dolphins — flourished in prehistoric oceans, living in all kinds of watery environments near and far from shore. But as competition in these areas grew, ichthyosaurs lost both territory and species before gradually going extinct, a new study finds.

In fact, the ichthyosaur extinction has stumped scientists for years. Ichthyosaurs likely evolved from land reptiles that dove into the ocean about 248 million years ago, researchers said. After living along the coast for millions of years, they left for the open water. They disappeared about 90 million years ago, going extinct about 25 million years before the dinosaur-killing asteroid slammed into Earth.

So, if the asteroid didn't kill the ichthyosaurs, what did? To learn more, researchers looked at ichthyosaur fossils and determined what kinds of specialized environments, or niches, the animals likely inhabited. [In Images: Graveyard of Ichthyosaur Fossils Found in Chile]

"In most studies, the niche of the animal is predicted based on a single trait, usually the shape of the teeth," said lead researcher Daniel Dick, a doctoral student in paleontology at the Natural History Museum in Stuttgart, Germany. In the new study, the researchers looked at several traits, he said.

For instance, they analyzed the ichthyosaurs' body sizes and teeth shapes. They also determined each animal's feeding strategy, such as whether ichthyosaurs were ambush predators (less powerful swimmers) or pursuit predators (fast swimmers), Dick said.

Ichthyosaur arrangements

After examining 45 ichthyosaur genuses, Dick and his colleague Erin Maxwell, a vertebrate paleontologist at the museum, used an analysis that grouped the ichthyosaurs into seven categories, called ecotypes.

For instance, the ichthyosauriform genus, *Cartorhynchus*, is so unique that it has its own ecotype. It was likely a small suction feeder and lived in shallow water, Dick told Live Science.

Another ecotype represents the majority of the genuses that lived during the Early to Middle Triassic period, he said. Animals of this ecotype were less than 6.5 feet (2 meters) long, and had robust and blunt teeth, suggesting they ate hard-shelled prey, such as coral and shelled mollusks, Dick said. They didn't have elongated bodies, so they probably didn't live in the open water, where they would have needed to swim far distances, he added.

Two genuses — *Eurhinosaurus* and *Excalibosaurus* — owe their unique ecotype to their swordfishlike jaws, which indicate they used a slashing method to demolish prey, Dick said. Their long bodies also indicate they lived in the open water, far from shore, he said.

Not all seven ecotypes existed at once, although five existed simultaneously during the Early Jurassic period, when ichthyosaurs experienced a boom in diversity.

By the Middle Jurassic, the number of ichthyosaur ecotypes decreased. Specialized feeders, such as the swordfishlike *Eurhinosaurus*, and apex predators, including *Temnodontosaurus*, went extinct, leaving only two ecotypes, both of which lived in the open water.

These last two ecotypes included ichthyosaur genuses with large bodies and robust teeth for crushing bony fish or hard cephalopods, such as ammonites. The other ecotype was more dolphinlike; it had small teeth and likely ate soft prey, such as squid (also cephalopods), Dick said.

Ichthyosaur extinction

Ichthyosaurs eventually met their end during the Cenomanian-Turonian extinction event, in which spinosaurs (carnivorous swimming dinosaurs), plesiosaurs (long-necked marine reptiles) and roughly one-third of marine invertebrates (animals without a backbone) also went extinct, Dick said. [In Images: Digging Up a Swimming Dinosaur Called Spinosaurus]

With only two ecotypes of ichthyosaurs left, they would have been easily wiped out, Dick said.

"It's a slow ecological war of attrition, where they become more and more stranded on a single niche, and then the entire [group] is depending on that niche remaining sustainable," he said. "And if that became unsustainable, then the entire group would become extinct."

It's unclear why ichthyosaurs lost their earlier niches, but they were likely "replaced, outcompeted by other species that adapted better," Dick said. For instance, plesiosaurs took over many of the nearshore niches, he said.

The study sheds light on ichthyosaurs' evolution and extinction, said Neil Kelley, a postdoctoral research fellow of paleobiology at the National Museum of Natural History in Washington, D.C., who was not involved in the new research.

According to the study, "[ichthyosaurs] get more and more confined to a specialized lifestyle," Kelley said. "Ultimately, they can never seem to re-evolve some of these more transitional lifestyles and body types that you see early on."

However, the study takes a broad view encompassing roughly 158 million years, so it loses some nuance in how these animals lived and why they went extinct, Kelley told Live Science. Furthermore, "just one weird fossil could totally rewrite that picture of what happened," by adding another ecotype, Kelley said.

The study was published online July 8 in the journal Biology Letters.

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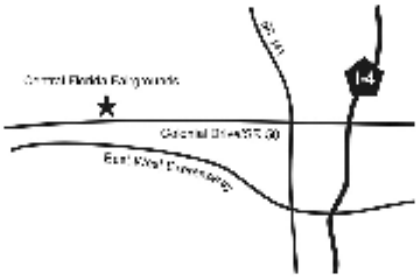

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