The Paleontograph

A newsletter for those interested in all aspects of Paleontology
Volume 2 Issue 5 August, 2013

From Your Editor

Welcome to our latest issue. It's been a while. I hope you all did not forget about me. As I've said in the past, I have been very busy and the beauty of my doing this newsletter on my own and at no charge is that I am not pressured to keep putting out issues. So I was able to give myself a break and put this to the side for a while. I'm making up for it, a little, with a larger than normal issue. I hope you enjoy it and remember that I need articles to fill the news up with. I started putting this together last month and just got back to it so I will leave the August date on it.

The Paleontograph was created in 2012 to continue what was originally the newsletter of The New Jersey Paleontological Society. The Paleontograph publishes articles, book reviews, personal accounts, and anything else that relates to Paleontology and fossils. Feel free to submit both technical and non-technical work. We try to appeal to a wide range of people interested in fossils. Articles about localities, specific types of fossils, fossil preparation, shows or events, museum displays, field trips, websites are all welcome.

This newsletter is meant to be one by and for the readers. Issues will come out when there is enough content to fill an issue. I encourage all to submit contributions. It will be interesting, informative and fun to read. It can become whatever the readers and contributors want it to be, so it will be a work in progress. TC, January 2012

Edited by Tom Caggiano and distributed at no charge

Tomcagg@aol.com

Ed. Note: In yet another demonstration of my failing mind, I left the end of this article off in the last issue. I'm reprinting the beginning along with the part I left out. My apologies to Alan and the readers.

Some Thoughts on Fossil Collecting

Alan Russo

There are many "styles" of Fossil collecting. Another way to put it is there are many ways and reasons that people collect Fossils. Some collect for the Science, the amateur paleontologist if you will. Some collect to decorate their living rooms. Some have never stepped one foot out in the field, but have incredible collections of bought fossils. Some do it as a business to make money, and some, just for the excitement of the "Hunt".

Personally I consider myself an experiential Fossil collector. What I mean is, I love the whole experience of the act of collecting. For me, the experience is such an important part of collecting that I don't buy, trade, or acquire Fossils in any other way other than collecting them myself. I have a story and an experience that goes along with each fossil in my collection. Don't get me wrong, I love the science of it, there are many times I find myself interested in the name etc. of the Fossils I find, and I am certainly am not putting down others for the way they collect, but it is not a nearly as important to me as the experience of it all.

For me the experience is a multi-leveled affair. First there is the collecting trip itself and all the levels of excitement and experience it brings. There is the anticipation of visiting a new part of the country, and visiting new ecosystems. Then there is the camaraderie of spending time with likeminded friends that perhaps you haven't seen since the last major expedition you had partaken. Then of course there is the anticipation of what new and incredible Fossils you might find. I sometimes feel like an explorer setting off for new lands and sometimes I fell like Indiana Jones on the adventure of a lifetime.

Next , there is the getting down and dirty part of it. It is just so cool, that after spending the whole rest of your life fitting in to the norms of society, you don't have to worry about rolling around in the dirt as an adult and being ostracized for it. Dirty, muddy ,wet, boots and pants full of dirt and rock dust and loving it, now that's living!

My imagination and wonderment are also an important part of the experience. Almost every time I discover a new find, at some point in time while holding that Fossil, I wonder what the Earth was like at the time and the circumstances of the life and death of the animal or plant I have found. When I taught Earth Science programs I did a program on Plate Tectonics, and part of that program was showing the students maps of the Earth at different intervals of the geologic timeline. I try to envision what the earth looked like when that particular Animal or Plant (fossil) was alive and try to imagine what the place that I found the Fossil looked like at the time it was alive. This is all sheer speculation of course, but in my head, a fun thing to do none the less.

Let me give you an example if I may. On a trip to Texas, part of a long journey of discovery I was on at the time, I decide to go to Guadalupe Mountains National Park after seeing it on a map. Fossils were not really on my mind, though I am always on the lookout for fossil bearing rock, I just wanted to discover a new place I had never been before. It was early afternoon when I got to the park and decided to go for a hike after setting up camp. The route I had chosen was a hike to the top of Guadalupe Mountain. It was a beautiful but somewhat strenuous climb with an altitude gain of 3000 feet. When I got to the top I came around a bend in the trail and to my surprise and utter amazement, standing in front of me was a fossilized Coral Reef! Needless to say I was blown away. Of course, I have since learned that those mountains are world famous for having the best preserved Fossil Coral Reefs in the world.

When you are hiking you have a lot of time to think and on my trip down from the mountain the Coral Reef I had just "discovered" was in the forefront of my thoughts. I began to think about what I had just seen; A CORAL REEF, AT THE TOP OF THE HIGHEST MOUNTAIN IN TEXAS, IN THE MIDDLE OF A DESERT!

The more I thought about it the more amazing it became. Think about the dichotomy of it all. Coral Reef/ Desert, below sea level/the highest mountain in Texas! It blows my mind even thinking about it today. This place I was standing was once below sea level in a warm shallow tropical sea about 265 million years ago. Think about the amount of time and the circumstances that caused this Reef to end up at the top of a mountain.

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Thoughts Con't

This spot was not even at the same Lat. /Long. that it is today, and the Earth at that time, looked nothing like it does today. That sea probably existed for a millions of years before circumstances began to allow it to exist no more. Then of course the land started to uplift, taking millions and millions of more years to get to the place it is now. To take this even further, the human race didn't even exist when that reef was being formed, or for most of the time after, up till this point. Yet, it took this human, who was born a mere 35 years ago, an amount of time barely perceivable in the Geologic scheme of things, to contemplate its birth, death and rediscovery.

There are countless other scenarios in my Fossil collecting career that bring thoughts of what once existed, and brings my scientific imagination into play. Another one is finding Fish Fossils in the middle of a desert! Or imagining what the area, we now call New York, was like when this Trilobite I found was swimming around at the bottom of the ocean 450 million years ago. How about trying to imagine what was going on as a Dinosaur stepped in the very spot that I am now holding in my hand as it made the footprint I just found in a place we now call Connecticut. Was he just moseying around looking for food, was he with others or did he stop dead in his tracts because he heard a noise which gave his foot more time to sink deeply into the mud.

For me, the experience of fossil collecting doesn't stop when the trip is over or I finally put the Fossil on display, the experience is always with me and always ripe to spark my imagination. Every time I look at the Fossil sitting on the shelf, millions of years and thousands of miles from where the plant or animal lived its short but incredible life, I wonder about a world that once was, but can only imagine what it was like at that moment in time.

Ovarian Follicles in Early Birds

Bob Sheridan March 23, 2013

The biology of bird reproduction is very well understood because egg production by chickens is so important economically. As with any vertebrate, bird eggs are produced in an oval shaped organ the ovary. The set of cells that immediately surround a developing egg is called the follicle. Follicles grow and eventually open at the surface of the ovary to release the egg. In birds and reptiles, the follicles are of macroscopic size, since the mature egg contains a large amount of yolk. Eggs can be produced anywhere in the ovary, and in any given ovary there will be eggs in all stages of development, reflected in the size of the follicle.

Birds are unique among vertebrates in that only one ovary is present (the left); in an adult the other ovary is vestigial. Traditionally this is thought to be a weight-saving measure for the purposes of flight. Most birds lay eggs in clutches, i.e. many eggs reach maturity at the same time. Mature eggs exit the body through the oviduct.

Answering the question of when birds diverged from their dinosaur ancestors and took on their current reproductive characteristics has been hard to answer since the relevant soft parts seldom fossilize. The fossils in the Early Cretaceous Jehol and Yixian formation of China are very well preserved, and I am not surprised that some specimens have been found that can address this question. Zheng et al. (2013) describe three early bird specimens in which the ovarian follicles appear to be visible in a fossil. One specimen is Jeholornis, an early bird with a long bony tail. The other two specimens cannot be assigned to a known species, but they are enantiornithines, a group of early birds (extinct since the Cretaceous) with a different type of shoulder joint.

In these birds the putative follicles are 5-9 millimeters in diameter and are preserved as dark circular stains on the surface of the slabs, usually on the part and counterpart. One must be careful to distinguish follicles from other round objects that could be inside a fossil bird like seeds or gastroliths. The major distinguishing characteristic is location. The putative follicles appear to be near the spine of the bird in the pelvic area, where the ovaries are expected to be, and not the front of the abdomen, where the crop and stomach would be. Seeds, when they are preserved in fossil birds, are different in shape (pointed at one end) and surface texture (ornamented) than the putative follicles. Gastroliths are always fully preserved in three-dimensions, not as stains.

In the Jeholornis specimen there are about 20 follicles. These are all about the same size, so one inference might be that they represented multiple eggs in a late stage of maturity, which in turn means that Jeholornis laid a large clutch of eggs.

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Follicles Cont'd

This would be consistent with the idea that, Jeholornis being the most primitive birds, it would more closely match the dinosaurian condition of laying large clutches. In the larger enantiornithine there are at least 12 follicles; in the smaller about 5. Interestingly, the size of the follicles relative to the size of the birds, and the number of follicles might indicate the same trade-off between the number of eggs in a clutch vs. the size of each eggs that is seen in modern birds. Of course, we would need more specimens to be sure of that.

Theropod dinosaurs clearly have two active oviducts (and presumably two ovaries), since specimens are preserved with paired eggs. Is there evidence that the fossil birds described here have only one ovary as in modern birds? The answer appears to be straightforward. The enantiornithine specimens are flattened from front to back, and one can see the follicles only on the left side as would be expected for the modern condition. The Jeholornis specimen is flattened from side to side, so there is no way to tell.

There is a bonus here in that we can identify unambiguously the gender of the enantiornithine specimens as female. This may reflect on an unrelated question. One particular type of early bird Confusciusornis, with a beak and pygostyle (e.g. very modern short tail), comes in two varieties, one with very long tail feathers and one without. One explanation is that these represent "male" and "female". However, there does not seem to be a correlation between possessing these feathers and size. Some enantiornithines have similar long tail feathers. It is a controversy whether Confusciusornis is an enantiornithine or not. The authors point out that the enantiornithines here do not possess elongated tail feathers and are clearly female. This could mean that it is the males that possess the elongated tail feathers, or it could merely mean that the specimens belong to a species where neither sex has elongated tail feathers.

Sources:

Zheng, X.; O'Connor, J.; Huchzermeyer, F.; Wang, X.; Wang, Y.; Wang, M.; Zhou, Z.
"Preservation of ovarian follicles reveals early evolution of avian reproductive behavior."
Nature 2013, 495, 507-511.

My Beloved Brontosaurus

Bob Sheridan May 5, 2013

Assuming the cost is not too high and assuming the book is not just a collection of technical papers, I read pretty much any dinosaur-themed book I find. The latest for me is "My Beloved Brontosaurus." The author, Brian Switek, is a a free-lance science writer and author of the paleontological blog Laelaps (http://phenomena.nationalgeographic.com/blog/laelaps/). He is a native New Jerseyan currently living in Utah.

MBB is a collection of topics over twelve chapters: dinosaurs in popular culture, late research on dinosaurs, speculations about dinosaur behavior (in particular in regards to how they had sex), and the history of dinosaur science. The style is pretty much what one would expect from an author of a blog: informative while including much personal perspective. I am reminded of the style of Allen A. Debus, dinosaur sculptor and regular contributor to "Fossil News".

This is the "hook" for MBB and the meat of the first chapter: The author, as a child in 1988, visited the American Museum of Natural History was very impressed with "Brontosaurus" only to later discover that "Brontosaurus" never existed. To review, "Brontosaurus" is not an accepted dinosaur genus, plus its original reconstruction turned out to be a chimera. The great nineteenth century O.C. Marsh described *Apatosaurus ajax* in 1877, and then gave a different name "Brontosaurus" to a separate specimen of a very similar dinosaur two years later. He also mistakenly assigned to Brontosaurus the skull of Camarasaurus, which we now know is an unrelated sauropod. Elmer Riggs, in reviewing the literature on sauropods known up to 1903 noticed that Brontosaurus was not sufficiently different from Apatosaurus to deserve its own genus. By that time, however, the blunt-skulled, tail-dragging, semi-aquatic image of "Brontosaurus" was so much a part of popular culture and paleoart (in particular that of Charles R. Knight and Rudolf Zallinger) that most museums still labelled their mounted skeletons "Brontosaurus." It was not until the 1970's that Marsh's mistake was rediscovered and Apatosaurus was finally assigned the correct skull (previously thought to belong to Diplodocus, which is related to Apatosaurus). Some museums caught up quickly, some later.

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AMNH didn't revise its "Brontosaurus" until the refurbishment of the Dinosaur Halls in the mid-1990's. Switek compares the psychological effect on the public of "Brontosaurus" being revised to the loss of Pluto as a planet. After all, "Brontosaurus" ("thunder lizard") sounds so much cooler than "Apatosaurus" ("deceptive lizard").

As far as I can tell Switek is now about 35 years old, which would place his childhood "dinosaur stage" slightly after the Dinosaur Renaissance and after Apatosaurus was completely understood.

The "Classic" Brontosaurus

This book is very well written, although perhaps it could have used more illustrations. That said, the proper audience for this book is an adult or teen with some enthusiasm for paleontology, but who does not keep up on the current dinosaur literature. Much of the "new science" material was old news to me, since my hobby for fourteen years has been writing short articles about the general paleontological literature. So, generally speaking, I ended up wanting more surprises than what I was getting from MBB, and I suspect this would be true of most long-time readers of the Paleontograph. However, to be fair, the chapter "The Secret of Dinosaur Success" was an eye-opener. In the Triassic, there were many swift, straight-limbed, even bipedal, predatory non-dinosaurian archosaurs. Ideas that dinosaurs became ascendant because they were "special" in those characteristics relative to contemporary animals seem less plausible.

Those of us who reached our childhood love affair with dinosaurs in the early 1960's have more claim to have suffered loss when favorite dinosaurs were shown not to exist. Perhaps someone of my generation could write a follow-on book "My Treasured Trachodon."

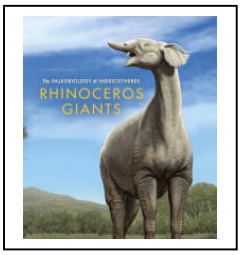
Anyway, this book is inexpensive enough ($14 at Amazon) to take a chance, and it would make a good gift.

Sources:
Switek, B.
"My Beloved Brontosaurus. On the Road with Old Bones, New Science, and our Favorite Dinosaurs."
Scientific American/Farrar, Straus, and Giroux, New York, 2013, 256 pages ($26 hardback)

Note: Trachodon is a genus of large hadrosaur named by Joseph Leidy in 1856 based only on isolated teeth collected in what is now Montana. Whether some or all of these teeth belong to Edmontosaurus, Anatosaurus, or Hadrosaurus remains controversial. One of my favorite Charles R. Knight paintings known from childhood is of Trachodon.

Rhinoceros Giants--A Review

Bob Sheridan May 18, 2013



Indricotheres are rhinoceros cousins that lived in Asia during the Eocene and Oligocene. They are the largest land mammals known, up to 20 feet tall at the shoulder and weighing about 20 tons. (In comparison the most elephants today are 5 tons.) Indricotheres are something I don't know much about, although I fondly remember the mother indricothere and her baby from the television special "Walking with Prehistoric Beasts" (2001). Therefore I was interested in the new book "Rhinoceros Giants," which is the latest in the "Life of the Past" series from the University of Indiana University Press.

The author Donald Prothero is (retired) professor of geology at Occidental College and lecturer in geobiology at the California Institute of Technology. He has written a few dozen books. The one I am most familiar with, and which I reviewed for the Palentograph is "Evolution: What the Fossils Say and Why It Matters."

The style of the book is "semitechnical". That is, it includes many illustrations from the original scientific literature, and also includes many references, much as would a review article. There are less technical sections on historical aspects. The ideal audience for this would be people with some scientific background and some familiarity with paleontology. So here are a few things I learned:

The first indricothere skeleton was discovered in Mongolia during the first Asian expedition by the American Museum of Natural History in 1922. The original specimen consisted of four isolated legs buried vertically. The usual interpretation is that the animal died trapped in quicksand. Aside from Mongolia, Indricothere remains have also been found in Kazakstan, China, and Russia. Even now the skeletal anatomy is not completely known, and some of the current reconstructions may contain parts from animals of different sizes.

The largest indricothere genus has had a variety of names assigned to it: Indricotherium, Baluchitherium, Paraceratherium, etc.) This has basically two causes:
1. When the remains were being discovered, paleontologists tended to be "splitters" instead of "lumpers."
    1. The remains were so incomplete that it was hard to recognized when two specimens were of the same animal.

The name currently accepted as valid is Paraceratherium.

There are only a few genera of rhinoceros living today, but in the past rhino relatives were abundant and much more diverse. There were many that were gracile; we could perhaps mistake them for horses from a distance. I was aware that modern rhino horn is made of compressed hair, but the attachment point leaves a scar on the skull, so we are able to tell which rhinos had horns and which didn't. (Most didn't). Like modern rhinos and horses, indricotheres were vegetarians with "hindgut" digestion.

Indricotheres were first restored as scaled-up modern rhinoceroses with stout legs, barrel-shaped bodies, folded skin, and small ears. However, they are surprisingly long-limbed and long-necked and their shins and metatarsals are long. This last is in contrast to the much smaller modern elephant where the lower part of the legs are particularly shortened. The author speculates that the ears of indricotheres might have been large like those of elephants for the purpose of removing heat from such a large body. Also, it is likely, as judged by the large nasal region, that the upper lip was mobile and or there was a short trunk. (The cover art has this unusual depiction.) The skin is usually depicted as naked, wrinkled and gray, by analogy with the elephant.

The only thing bad I can say is that the nominal price of $42 is fairly high for this short a book, although perhaps not out of the range of technical books. The cost for the hardcover is $29 at Amazon, with the Kindle version at $19.

Sources:

Prothero, D.R.
"Rhinoceros giants. The paleobiology of indricotheres."
Indiana University Press, Bloomington, Indiana
2013, 141 pages $42 (hardcover).

Hadrosaurs: Palms Down or Palms In?

Bob Sheridan June 1, 2013

Palaeontologica Electronica (http://palaeo-electronica.org/) is an open access journal of paleontology, free for everyone to read, as opposed to subscription journals for which one must pay a fee to read the articles. PLoS ONE (http://www.plosone.org/) is another such journal, except that it covers all the sciences, although I see at least one or two paleontology articles per week. I have been keeping up with PLoS ONE for the past few years, but I forgot about Palaeontologica Electronica until last week. I am glad I did look again because I found a number of very interesting articles.

The topic for today is the palm position of hadrosaurs (duck-billed dinosaurs). Hold your hands out in front of you and point your palms down. This is called the "caudal" position, because if you were a quadrupedal animal, your palm would be pointed toward your tail. Now move your wrists so your palms are facing each other. This is the "medial" position (i.e. toward the center line). Humans and other primates have very flexible forearms in that we can rotate our palms a little over 180 degrees. Motion toward "palms down/posterior" position is called "pronation", and motion towards "palms up" position is called "supination." This range of motion is allowed because our radius and ulna can move relative to each other. In the supine position those bones are parallel; in the pronation position they cross. Most animals, especially quadrupedal animals, do not have anywhere near that range of motion. Generally, the palm position is dictated by the forearm because the thumb side of the hand is more or less aligned with the radius and the pinky side of the hand with the ulna. Most quadrupedal animals would have the palms in the posterior position with the toes pointing forward and touching the ground.

An article by Senter (2012) examines the case of hadrosaurs. Hadrosaurs are thought to be facultatively bipedal, i.e. they habitually walked on all fours, but could lift the forelimbs off the ground when needed. Hadrosaurs, and bipedal dinosaurs are often restored with palms down. Museum mounts of hadrosaurs vary in how the arm bones are articulated, specifically the humerus and the radius. In one possible articulation ("RL"), the radial head contacts the lateral condyle of the humerus (as in most tetrapods). In the other ("RM"), the radial head contacts the median condyle of the humerus. Also there is variety in how the radius and ulna are positioned relative to each other. The author examined several mounted hadrosaur specimens in museums (including Edmontosaurus, Hypacrosaurus, and Parasaurolophus) and considered three aspects:

1. How hadrosaur arm bones would best articulate.
    1. How the arm bones are disposed in naturally articulated specimens.
    2. What hadrosaur tracks look like.

The results are, respectively:

1. There is a depression in the ulna into which the radius would fit. This means the forearm bones are locked in place and cannot cross; this prevents complete pronation. Also, the RL position for the humerus-radius joint makes sense. Given these two constraints, the palm of hadrosaurs should be somewhere between a medial and caudal position, tending toward medial.
2. A few hadrosaurs have been mounted as intact slabs, and there are a few hadrosaur "mummies". In those cases, the RL configuration is present. In one case there appears to be a caudal palm orientation, but in that case the elbow joint was twisted laterally into an unnatural position.
3. Hadrosaur tracks consist of rounded three-toed impressions from the foot and smaller oval impressions from the hand. The hand impression is at about a 45 degree angle relative to the front-back axis of the hindlimb impression, consistent with a position of the palm midway between caudal and medial.

It is unusual for a bipedal animal to have a medial disposition of its palm, with the exception of mammals like anteaters and sloth who walk on their knuckles instead of their toes. However, it appears that medially facing palms are common among dinosaurs, including bipedal prosauropods and some small ornithischians. (These non-hadrosaur dinosaurs are also sometimes incorrectly mounted with palms down.) Hadrosaurs, and their immediate ancestors the iguanodonts, found a way to have a semi-medial palm position and yet effectively walk on their toes.

Sources:

Senter, P.
"Forearm orientation in Hadrosauridae (Dinosauria: Ornithopoda) and implications for museum mounts." Palaeontologica Electronica 2012, Article 15.3.30A

"Evidence" for Man Coexisting with Dinosaurs Refuted

Bob Sheridan June 2, 2013

Young Earth Creationism is the belief that, because the Biblical book of Genesis is to be taken literally, the earth is less than 10,000 years old. One implication of this is that animals and plants we consider "prehistoric" lived contemporaneously with humans. Taking this further, this means that either those animals went extinct because of Noah's Flood, or are still living in obscure parts of the world. Occasionally someone will claim to have evidence for the coexistence of humans and dinosaurs. While some of this evidence is based on deliberate fakery, some cannot be refuted without further work, in particular inspecting the evidence for oneself. In my mind refuting such "evidence" is a complete waste of time. However, some professional scientists make it part of their job to do so. Recently I came across three articles by Phil Senter in the open access journal Paleontological Electronica (Senter, 2011; Senter, 2012; Senter, 2013). Senter is a professor of Biology at Fayetteville State University, North Carolina.

These articles cover two types of "evidence":

1. Petroglyphs drawn by Native Americans thousands of years ago that supposedly depict dinosaurs or pterosaurs.
2. A 17th Century engraving of mounted skeleton on a pedestal, labelled a "dragon," and supposedly the remains of a pterosaur.

Senter proposes a set of necessary conditions to determine whether a petroglyph depicts a dinosaur (or any other extinct animal):

1. The dinosaur should be depicted in a single drawing.
2. All parts of the drawing should be made by a human artist and not, say, formed by natural stains in the rock.
3. The drawing should not be explainable by the local fauna. That is, don't assume the drawing is of a dinosaur if it can be interpreted as a lizard or bison.
4. The drawing resembles a known dinosaur.

Note that most petroglyphs are very old and fairly faint. The rocks they are written on can erode, show stains, etc. So parts of real drawings can be lost and false parts added. Also, remember that ancient art, like contemporary art, can depict things according to an artistic convention or by symbol, rather than realistically. Unfortunately, we do not know all the ancient conventions and symbols, although we can recognize the same type of symbol in many petroglyphs. So interpreting petroglyphs unambiguously is difficult at best.

The first petroglyphs discussed by Senter are "Dinosaur 1" through "Dinosaur 4" which are on the walls of Kachina Bridge in Natural Bridges Park in Utah. Dinosaur 1 is presumably depicts a sauropod in profile. However the tail is clearly a separate drawing from the "body/neck". The legs of Dinosaur 1 and all of Dinosaur 2 are stains on the rock. Dinosaur 3 is supposedly a Triceratops. The "tail" and "back" are composed a single wavy line that ends in a circular symbol. The "torso" and "legs" seem to be composed of 8 pictures of stylized people, similar to depictions of people seen in other locations. Dinosaur 4 is supposedly a one-horned Ceratopsian like Monoclonius, but in actuality is a roughly circular symbol with some straight or J-shaped extensions.

Another set of petroglyph discussed by Senter is the "pterosaur" at Black Dragon Canyon, Utah. Presumably it is a Pteranodon-like animal standing on its hind legs with its head raised and wings outstretched. However, at best, the wings are asymmetrical and very irregular. At close inspection, the "pterosaur" is made up of at least five separate drawings: two horse-like (or antelope-like) animals, a cougar-like animal, and two human figures. The only reason someone might believe this was a single drawing is that someone drew a chalk outline around the separate drawings for reasons unknown decades ago, perhaps as a practical joke.

Senter also mentions the alleged "dinosaurs" in other ancient art of the American West, Canada, and in Zambia and Tanzania. Most of the drawings are easily identified as stylized rabbits, giraffes, lizards, etc. In the case of the Agawa Rock site in Ottawa, the supposed "dinosaur" can be identified as a known mythical creature called Underwater Panther, usually drawn as a quadrupedal animal with a round head and bison-like horns, which does not resemble any known dinosaur. The only character of this animal that can be considered reptilian is a "frill" along its back and tail.

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Creationist falsehoods Cont'd

The other "evidence" comes from an engraving in a book from 1696 by a Dutch civil engineer Cornelius Meyer. The engraving is supposedly of a "dragon" skeleton found near Rome during a dike construction project. The engraving is made of two parts. One shows a mounted skeleton (with some skin present) of a biped with bony tail and ribs. Wings are attached to the back. The skull has a strange hook on the upper jaw backward pointed horns. The other part depicts the dragon as a living animal. No other details are given in the book, although Meyer claims to have captured the dragon himself. Since the book is about specific dike construction projects, the inclusion of an engraving of a mythical animal seems very strange. Senter explains that some political opposition to the dike projects came from the local belief that some kind of dragon had been released when the earth was disturbed (apparently that seemed plausible at the time!), and Meyer was trying to squash the belief by pretending that the putative dragon was already dead.

Some Creationist authors have used this engraving as evidence that pterosaurs (or at least some kind of "dragon") lived until the 17th Century. One author suggests Scaphognathus, which is a rhamphorynchoid pterosaur from the Late Jurassic of Germany. Fortunately, the Meyer engraving is very detailed and one can identify the parts of the "dragon" skeleton, assuming the engraving represents a mounted skeleton that existed in reality and not just in imagination. The cranium is that of a domestic dog, the mandible is from a smaller dog. No explanation of the hook on the snout or the horns, other than those features are seen in other drawings of dragons from the same time period. The ribcage is probably from a fish, and the spine from some kind of mammal. The hindlimbs are probably the forelimbs of a bear. The tail does not resemble the tail of any known animal. Nothing about this skeleton resembles that of Scaphognathus or any other known pterosaur. The wings are shown covered with skin and have at least three stiffening spars each, but they do not resemble the wings of birds, bats, or pterosaurs in detail. Combining parts from different animals to create a mythical creature was very common in the Renaissance Europe and it has gone on until fairly recently (e.g. Barnum's Mermaid).

These articles left me (even more than usually) appalled about what Creationist authors accept as evidence. The practice of believing the assertions of others without checking for oneself and making extreme claims without looking for more plausible explanations is never acceptable in science. (Hypothesis A: pterosaurs lived in the 17th Century. Hypothesis B: someone built a fake dragon skeleton. Which would you choose?) One would like to believe that these authors are just naive about the "rules of evidence", but one is afraid that they just do not care about the truth of their claims as long as their rhetorical point is served. It is not surprising that scientists cannot take them seriously.
Sources:

Senter, P.; Cole, S.J.
'"Dinosaur' petroglyphs at Katchina Bridge site, Natural Bridges National Monument, southeastern Utah: not dinosaurs after all."
Palaeontologica Electronica 2011, Article 14.1.2A

Senter, P.
"More 'dinosaur' and 'pterosaur' rock art that isn't."
Palaeontologica Electronica 2012, Article 15.2.22A

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A New Therizinosaur with a Ornithiscian Dental Arrangement

Bob Sheridan June 3, 2013

Therizinosaurs are Late Cretaceous theropod dinosaurs with some unusual characteristics. They have small heads on long necks and wide hipbones, making them superficially resemble prosauropods like Plateosaurus. Their teeth are pointed pegs or "spoons" rather than serrated blades, which suggests that they are mainly herbivores, whereas all other theropods are carnivores. The premaxillary is sometimes toothless, suggesting there might have been some kind of horny beak in the front of the upper jaw. Also the dentary is sometimes downturned, which is an adaptation for uprooting vegetation. The mammalian analogy for therizinosaurs is the giant panda, a large herbivore that has a carnivorous (or at least omnivorous) bear as an immediate ancestor. Some therizinosaurs had extremely long claws on their hands, presumably for raking in tree branches. We know that therizinosaurs were feathered.

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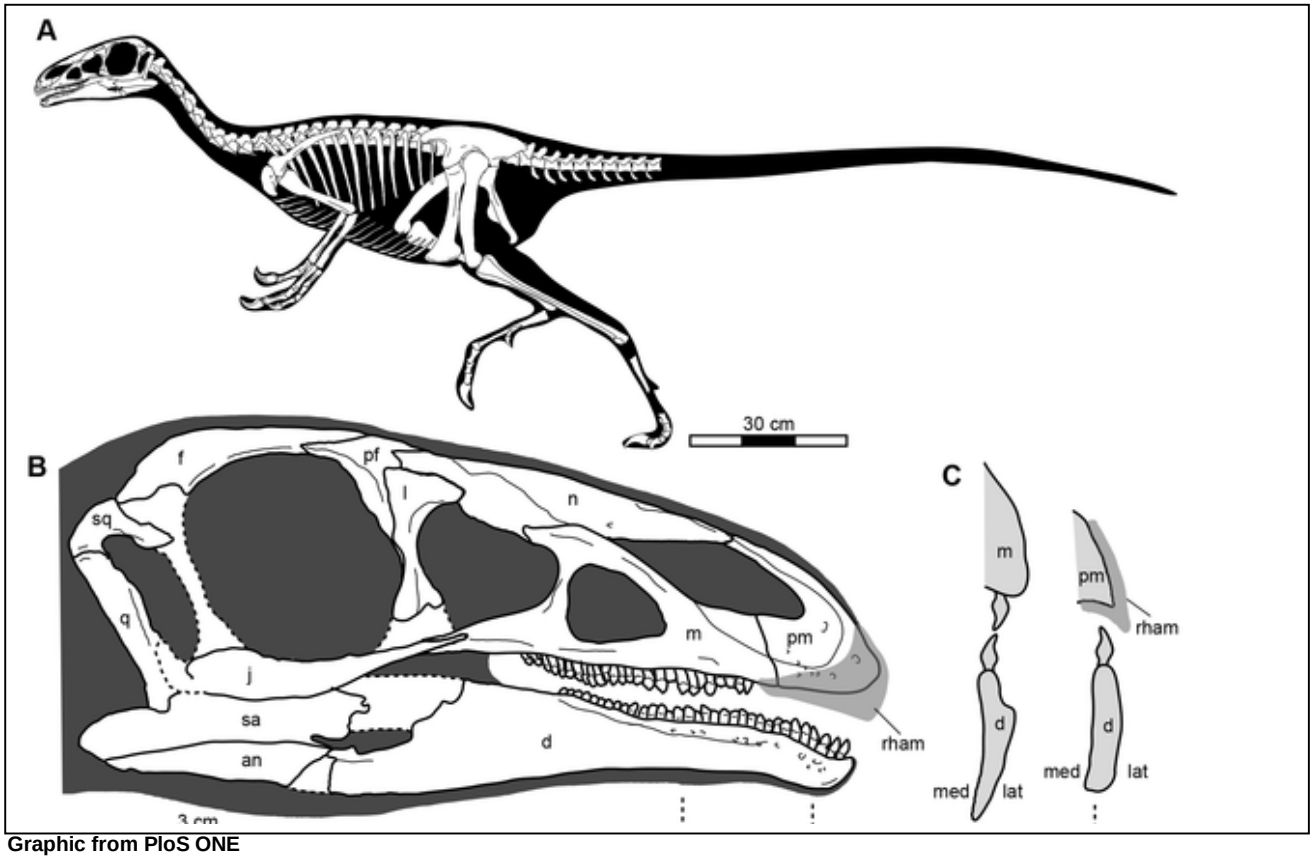
Therizinosaur Cont'd



Graphic from PloS ONE

An article by Pu et. al. (2013) describes a new therizinosaur from the Early Cretaceous Xixian formation in China. This specimen is nearly complete (except for the tail) and partly disarticulated. It probably represents a juvenile with a hip height of approximately 1 meter and a total length of about 2 meters. There are a few feather traces around the neck region.
The species name assigned to it is *Jianchangosaurus yixianensis* (after the county in the Liaoning Province where the specimen was found). Phylogenetic comparison with other therizinosaurs shows that Jianchangosaurus is overall a basal therizinosaur, similar to Falcarius and Beipiaosaurus.

Despite being "basal", Jianchangosaurus is advanced in that its teeth are very different from those of its theropod ancestors and convergent on those of herbivorous ornithiscians dinosaurs.

The tooth row exhibits a "shelf", that is the teeth are recessed from the outside of the skull toward the midline. This is a common characteristic of herbivorous dinosaurs such as hadrosaurs and ceratopsians, but not observed before in therizinosaurs. The teeth have long cylindrical roots and leaf-shaped crowns, very much like the teeth of strictly herbivorous dinosaurs. Most therizinosaurs have tooth crowns that are convex on the cheek side and concave on the tongue side. Jianchangosaurus has some teeth that show the reverse, a feature also seen in some ornithopods. The conclusion is that Jianchangosaurus had some feeding strategy unique among therizinosaurs.

Sources:

Pu, H.; Kobayashi, Y.; Lu, J.; Xu, L.; Wu, Y.; Chang, H.; Zhang, J.; Jia, S.
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A Letter from one of our readers:

Tom, here's the picture of the Fossil Shark I mentioned for your newsletter.

I've researched it to possibly an Angel Shark from the Gobi Desert, but maybe someone who receives your newsletter, who has a bit more knowledge than I do, could verify or re-identify the Shark.
Possibly with some info on it.

Someone unfortunately broke it before I got it as seen in the picture.

Ron