The Paleontograph

A newsletter for those interested in all aspects of Paleontology
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From Your Editor

Welcome to our second issue. I hope everyone liked the first issue. I received many thanks and compliments. I want to thank you all, as well as our two contributors from last issue. As I've said this will become what we all make it. That means that we all need to pitch in. Pass it around to anyone that you know that might want to subscribe. If they like it, they can email me and sign on. The more people we have, the more contributions will come in and the newsletter will be better. In that spirit, I've written a book review article. I have not had to write for a long time and I found I actually enjoyed doing it. You may feel the same if you try.

Based on a comment that came in, I added a bit of color. Several people requested more photos. I'll see what I can do about that.

I excited to be leaving for the Tucson show as I write this, however I won't finish this issue until I return.

I'm back from the Tucson show. Maybe we will get a show report from someone. As the first issue got passed around, I got many more subscribers. We are already over two hundred. Bob Sheridan has kept articles coming as you can see in this issue. I had a request from a club to use an article in their newsletter. We are OK with that. Well, that's enough for now; keep those cards and letters coming.

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

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A Salvage Dig at Lodgepole

Kenneth Quinn mosasaur47@msn.com

Should you ever find yourself driving on I-80 in western Nebraska just east of Lodgepole, you would have little indication that you are at the site of a significant fossil discovery. I spent several weeks in the summer of 1970 excavating a herd of Galapagos - sized tortoises, horses, a mastodon tusk, and a primitive dog from the right of way about one mile east of the Lodgepole exit. When federal funds are involved in highway construction and items of scientific or historical interest are threatened by the construction, the federal government will provide funds to rescue such items in the same proportion that federal funds are involved in the construction. For interstate highways, this is 90%, with the state needing to kick in the other 10%. Nebraska has a program to provide those matching funds, and for several years I was the paleontologist who examined construction sites for fossils and salvaged any that I found; these were deposited in the University of Nebraska State Museum.

When I got the call from my supervisor to hurry down to Lodgepole, I was in the general area and was able to be there in a few hours. The contractor excavating the roadbed was having a hard time; the material was a sandy silt but was very well cemented by calcium carbonate and was almost like hard limestone. Each pass by the "scrapers" only lowered the surface by a fraction of an inch, but that was enough to expose little circles of bone - the tops of tortoise carapaces! A quick survey showed about 10 spots where fossils had been exposed, and who knew how many more would show up? I had an unpaid but enthusiastic helper - my wife - but clearly I needed help. I called back to the museum and reported the situation. There was good news - about 100 miles away was a crew of 4 geology students who had been working at a known fossil deposit of Tertiary vertebrates, excavating additional bones from that site. With time being at a premium at Lodgepole, they were told to pack up and assist me. One day later, they were at Lodgepole.

There is a standard method for excavating and removing vertebrate fossils. You expose what you can of the surface of the skeleton - or more often, the single bone - and then dig around it to form a pillar. The bone is usually rather fragile and needs several coats of shellac to strengthen it. After the shellac dries, tissue paper is placed over the exposed bone. Next, you undercut the pillar somewhat. Then, you soak strips of burlap in plaster of Paris and wrap the strips around the block containing the fossil. After the plaster dries, you detach the block from the pillar, roll it over and cap it with more burlap and plaster. We started doing that to every tortoise, digging as fast as we could in order to delay construction as little as possible; the machinery worked on other sections of the roadbed, sometimes passing within a few feet of us as we frantically dug. Several facts became obvious as we uncovered the tortoises. Each carapace was tilted, with the head end upward, but no skull bones were there - we did find one fragment of one skull but that was it. The limb bones were all there, and even the dermal armor was preserved - something that I understand is very rare. Along with the nature of the enclosing sediment, I could reconstruct what had happened to preserve this herd of tortoises. The area must have been something like the modern Platte River, shallow but wide, with areas of silty sand that had properties similar to quicksand. Mammals could struggle out of such areas, but the tortoises, clumsier and with a higher density, would become trapped. They would slowly sink lower, keeping their head above the surface. Carnivores and scavengers would then trot out and scavenge the heads, dragging them to the banks before eating them. The identity of one of these carnivores was revealed when we found the skull of a primitive canid - a type of dog - that had died and become entombed in the riverbed. The worn teeth in that skull indicate the animal may have died of old age, a rare way for an animal to die!

In all, we recovered around 35 tortoises, the canid, and scattered bones of some mammals. Some horse remains allowed us to place a date on the sediments; they were of Late Pliocene age. After awhile, the rich deposit of fossils played out and the four students returned to their former endeavor. I stayed at the Lodgepole site longer, seeing if anything else turned up. My patience was rewarded when the machinery uncovered a mastodon tusk from a shoveltusk mastodon. Some mastodons had the tusks in their lower jaw modified to enable them to dig up tubers and such in swampy areas, and this was such an animal; its presence confirmed my conclusion about the area having been a riverbed, or at least a swampy area. In later years, I would remind my wife that she was the only woman on the block to help dig up a mastodon tusk!

Such spectacular finds are rare.
My career was cut short due to health problems and I was lucky to have participated in such an event.

Did Polar Dinosaurs Hibernate?

Bob Sheridan October 29, 2011

In the Cretaceous, the earth was warm enough not to have polar ice caps. However, there would still be no sunlight at the poles for months at a time and the temperature would dip below freezing. One has to assume that plant growth would stop and that there would be not enough to eat for herbivorous dinosaurs. On the other hand, we do have herbivorous dinosaur fossils from polar regions, particularly Alaska and Australia, which were near the north and south poles, respectively, in the Cretaceous. There are basically three choices about how polar dinosaurs got along:

1.They migrated from the poles to more temperate regions seasonally.
2.They stayed put and lived on their reserves all winter.
3.The dinosaurs hibernated in the winter.

The third possibility has been captured many times by paleoartists, who often show small dinosaurs curled up and sleeping in the shriveled undergrowth while the aurora glows overhead.

Hibernation usually involves lowering the metabolic rate, and growth completely stops. This ought to be detectable in their bones. This requires an aside about the histology of dinosaur bones. Imagine we take a long bone and take a section across the middle. The bones of a growing reptile have less dense microscopic bone structure. Once the animal has stopped growing, the bone becomes more dense. For most dinosaurs, one can see alternating concentric rings of open and dense bone, much like tree rings. The dense rings are called LAGS (lines of arrested growth). One can estimate the age of a dinosaur by counting the LAGS; presumably the LAGS represent a time in the year when growth slowed. An animal with no LAGS is probably less than a year old. If animals hibernated one might expect to see different LAGS in polar dinosaurs than dinosaurs that lived in warmer latitudes, although exactly how they would be different is not obvious.

Woodward et al. (2011) examined the microstructures of 16 femurs from dinosaurs found near Victoria, Australia. Most of these femurs are probably from hypsilophodonts, which are small bipedal herbivorous dinosaurs. There is one femur from a small theropod. Except for the very smallest femur, all the hypsilophodont femurs have anywhere between 2 and 7 LAGs. The theropod femur has no LAGs. The major point here is that these Australian dinosaurs have pretty much the LAG structure of dinosaurs of the same size found elsewhere, who presumably did not hibernate. Therefore, there is no evidence for hibernation, at least in the bone structure. The authors speculate that since most dinosaurs slowed their growth annually regardless of latitude, they would be pre-adapted to survive periods of starvation in polar latitudes.

It is interesting to point out that this paper is an example of good science in action. The idea of hibernating polar dinosaurs came from the same laboratory that is now debunking the idea now that more evidence is available.

Sources:

Woodward, H.N.; Rich, T.H.; Chinsamy, A.; Vickers-Rich, P.
"Grow dynamics of Australia's polar dinosaurs." PLoS ONE 2011, 6, e23339

Could Smilodon Attack Large Prey?

Bob Sheridan October 23, 2011

Large upper canine teeth (saber-teeth) have evolved independently several times in several lines of carnivores, including some mammal-like reptiles. The latest examples are found in large cats. The most extreme example is Smilodon from the Pleistocene. The replica Smilodon skull on my bookshelf is 30 cm long and the upper canines are 16 cm long. How Smilodon actually used the saber-teeth, however, is uncertain and has been a matter of speculation for a long time. (There are no sabercats of any size existing today.) For example, did it bite by getting its jaws around the prey, or did it stab the prey with the sabers using its neck muscles? Given its robust build and very strong arms, Smilodon probably was an ambush killer that subdued its prey before using the teeth, which would be consistent with the fact that the sabers are actually quite thin from side to side, and could not stand much sidewards force without breaking.

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Smilodon Cont'd

Andersson et al. (2011) do a very simple but revealing analysis of the utility of saber-teeth as a function of the size of the jaw, the size of the sabers, and the size of the prey animal. This analysis depends on the assumption that big cats kill by biting, which is the case with all extant cats, large or small, and that the job is done by the canine teeth. The bite can be used to cause injury to vertebrae or blood vessels, or it may be used to suffocate the prey.

Imagine a sabertooth cat with its jaw open as far as possible without dislocating it. (In Smilodon the gape is ~110 degrees.) The distance between the points of the upper and lower canines is called the "clearance." Now imagine trying to slide a cylinder of some soft material (which could represent the prey's neck or belly, etc.) parallel to the ground into the cat's mouth until it is just stopped by the teeth. At this point close the jaws, and see how deep into the cylinder the teeth end up as measured from the point in the cylinder closest to the hinge of the jaw. This is the "bite depth." Imagine a cylinder with a really large radius (say the size of a trash can). It will never get past the teeth and the teeth will only scrape the surface of the cylinder, i.e. the bite depth will be small. On the other extreme, a narrow enough cylinder will get into the mouth with no problem and the bite depth will be large. As the canines get smaller, the larger a cylinder can get into the mouth of a cat of a given size. The authors did this analysis for a number of carnivores, living and extinct, including a dozen or so sabertooth cats.

The implication of this analysis is that, for a given jaw size and tooth size, there is a size of prey for which there is a maximum bite depth. Actually, the length of the jaw is the more important factor and the size of the teeth less important if the prey is large. If the prey is large enough relative to the size of the jaw, the canine teeth are practically useless because they can make only superficial wounds. In the case of Smilodon, the radius of the cylinder that gets the highest bite depth is only about 4.5 centimeters. This would correspond to small or medium prey. So, despite the paleoart we commonly see, Smilodon was not hunting mammoths or giant sloths.

Sources:

Andersson, K.; Norman, D.; Werdelin, L. "Sabretoothed carnivores and the killing of large prey." PLoS ONE 2011, 6, e24971

Evidence for Sauropod Migration in Tooth Isotope Ratios?

Bob Sheridan November 4, 2011

Sauropods are the largest dinosaurs and the largest land animals ever to live on the earth. It is suspected that they migrated long distances for two reasons:
1. There are hundreds of miles of sauropod trackways in the American West.
2. Even supposing they were "cold-blooded," their food requirements would have been so large that a herd of them would strip an area clean of vegetation. They would have to keep moving to find new food.

A number of recent stories have mentioned isotope ratios. In this specific story the ratio is between the more abundant O-16 and the much less abundant O-18. The ratio of O-18 to O-16 in living tissue depends on the environment. There is an assumption that the isotope ratio of tooth enamel in animals living in a certain area will be similar to that of carbonates in soil in that same area. The isotope ratio in the soil will depend on the climate, including elevation and temperature. The ratio is reported as delta-O-18, which is the isotope ratio in the tissue being measured vs. the isotope ratio in some standard.

Fricke et al. (2011) measured the isotope ratio in 32 isolated Camarasaurus teeth found in Thermopolis, Wyoming and Dinosaur National Monument, Utah. Specifically, they sampled each tooth at 10 millimeter increments from the root to the tip; the enamel near the tip is the oldest. Also, they had literature values of isotope ratios in soil carbonates in various places in the Morris depositional basin, which is east of the rockies. For most teeth the delta-O-18 changes from about -13 at the base to about 10 at the tip. The lower delta-O-18 is consistent with carbonates at a higher elevation, about 300 km to the west, and yet the teeth are found at a lower elevation. The authors hypothesize that the teeth record a seasonal migration from the highlands to the basin over a period of 4-5 months, which is approximately the expected lifetime of a Camarasaurus tooth.

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Sauropod Migration Cont'd

This data is consistent with migration, but it is hard to rule out other explanations. It would have been easier to prove migration if the isotope ratio rose and then fell again, but that would require a tooth to last more than half a year. Perhaps the change in isotope ratio is due mainly to age of the tooth alone and not the environment, in which case the decrease in delta-O-18 could only increase. One would need to measure the isotope ratios dinosaurs that had no reason to migrate (if such could be identified); in their case the isotope ratio should not change with age. Even if the isotope ratio change represents the environment, if the assumptions about the matching of soil carbonates and tooth enamel is not correct, one cannot infer low delta-O-18 corresponds to a higher elevation, i.e. different location. Perhaps it represents a different temperature at the same location.

Sources:

Fricke, H.C.; Hencecroth, J.; Hoerner, M.E. "Lowland-upland migration of sauropod dinosaurs during the Late Jurassic epoch." Nature 2011, 480, 513-515.

The Sharp Vision of Anomalocaris

Bob Sheridan December 10, 2011

Image-forming eyes appeared with the Cambrian Explosion, and the first animals to have them were arthropods. Arthropods have compound eyes made up of a cluster of many small lenses (each lens is called a ommatidium), in contrast to the camera eyes of vertebrates and cephalopods. Unfortunately, the Cambrian deposits that best preserve soft tissue, e.g. the Burgess Shale, do not always preserved details about compound eyes.

There is something called the "lightswitch theory" proposed by Oxford zoologist Andrew Parker in 2003. The idea is that the appearance of vision allowed predators to take after prey more effectively and this is what caused animals to grow hard parts that were more likely to be preserved in the fossil record, hence causing the apparent explosion of fossils in the early Cambrian. Ultimately, however, one cannot tell from the current fossil record whether eyes caused the Explosion or visa versa.

This week in Nature Paterson et al. (2011) describe a pair of fossil compound eyes (plus one isolated eye) found in the early Cambrian Emu Bay shale deposits (~515 Myr), South Australia. The eyes are a about 2 centimeters long and pear shaped with the stem of the pears touching and the long axes of the eyes angled at 45 degrees relative to each other. The eyes found together are almost certainly from the same animal. Each eye was probably on a short stalk; however since the specimen is squashed flat, the three dimensional arrangement is lost.

The original material of the eyes has been replaced by iron oxide. Individual lenses are 70-110 uM in diameter. This means that each eye has at least ~16,000 lenses exposed a the surface of the fossil. Since we are seeing only one side of a squashed spherical eye, the true number of lenses per eye is probably near double that. These eyes are much bigger and has many more lenses than is found in the eyes of most living arthropods and it implies a very high acuity of vision very early in the history of animals.

The authors assign the eyes to Anomalocaris, which is a large (almost a meter long) early Cambrian predator. Anomalocaris fossils have been found in the Emu Bay shale, and only Anomalocaris is large enough. This supports the status of Anomalocaris as an arthropod, and implies that Anomalocaris hunted by vision during daylight hours.

Sources:

Paterson, J.R.; Garcia-Bellido, D.C.; Lee, M.S.Y.; Brock, G.A.; Jago, J.B.; Edgecombe, G.D. "Acute vision in the giant Cambrian predator Anomalocaris and the origin of compound eyes." Nature 2011, 480, 237-240.

Ammonites

Treasures from a Lost World

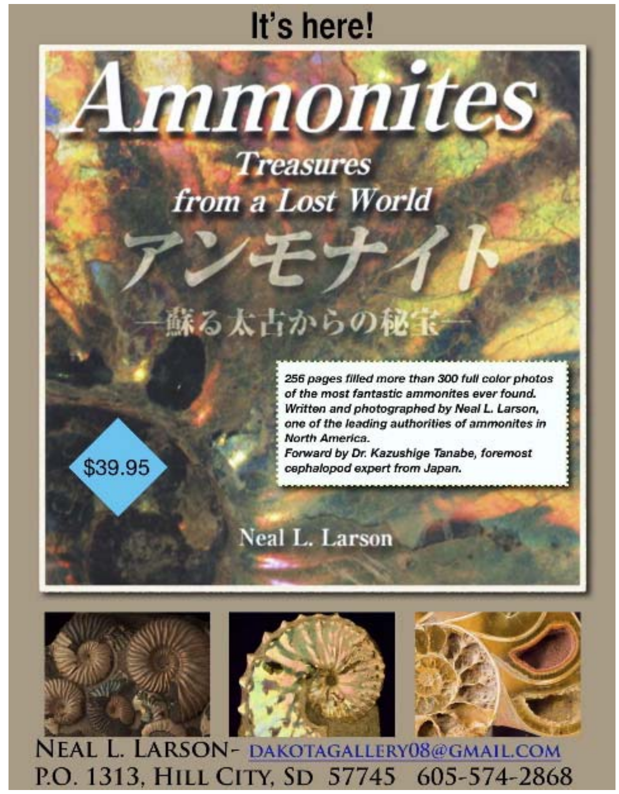
By Neal L. Larson

A Review by *Tom Caggiano*

It is not a stretch to call my friend, Neal Larson, one of the most knowledgeable people in the world when it comes to ammonites. Another thing that comes to mind is his obvious love and enthusiasm for ammonites. One need only to spend a few minutes with him and it becomes very clear that ammonites enthrall him. While Neal is a respected and well-published scientist, he is also a commercial dealer of fossils as one of the owners of Black Hills Institute of Geologic Research. I've been lucky enough to have had Neal give me a tour of his ammonite collection, where, for an hour, he pummeled me with ammonite specimen after specimen of incredible beauty while he recalled full genus, species, age and locality of each one off the top of his head, in rapid succession as easily as if he were calling out the names of his children. It is truly impressive and a lot of fun if you also love ammonites. If you are ever in the Black Hills of South Dakota, the Institute should definitely be on your list of places to see.

I picked up a copy of his third and latest book back in 2010 and just decided to reread it after using it to identify some ammonites I just bought. So I thought I might write something about it. As I said, Neal is a well-respected ammonite specialist but he wrote this book with the amateur collector in mind. The book is an easy read. The first section of the book starts with a well-written review of Ammonite natural history, anatomy and origins. There is a nice discussion on sutures. Sutures are used to identify species. There are three major types of sutures. The early ammonites had goniatitic sutures. Then ceratitic and ammonitic suture types followed. The first two were gone by the end of the Triassic. The ammonitic types flourished into the Jurassic and Cretaceous. Pictures are used extensively to illustrate the text. There is also a nice selection of pictures of modern day creatures for comparison. There are also sections on Ammolite, the jewelry made from shell material, types of preservation, signs of predation and pathologies and extinction events.

The next section of the book is a gallery of truly magnificent photos of many of the types of Ammonites that the collector sees in the marketplace. The section is divided by geographic localities and includes many of the more common specimens you likely already own or have seen. But it also includes many of the uncommon places that Ammonites come from such as Hungary, South America, Poland and Greece.



The book is written in both English and Japanese and is printed with high production values. The stated intent of the book is "to fill the need for any easy identification guide to some of the more common ammonites available to amateurs, collectors, students and professionals" and I can say the book accomplishes that goal very nicely and I suggest you add it to your collection of reference materials on ammonites.

Ammonites Treasures from a Lost World
Neal L. Larson
Published in Japan by Ammolite Laboratory
Available in the USA from BHIGR www.bhigr.com

In speaking to Neal last week at the Tucson show, I found out that this book is temporarily sold out. A new supply will be available in the next couple of months at a higher price than the original $39.95. Preordering one may be advisable.

"How to Think Like a Neandertal"-- A Review

Bob Sheridan December 32, 2011

Neandertals (also spelled Neanderthals) diverged from modern humans about 500,000 years ago. Fossil remains in Europe and the Middle East have been dated from ~200,000 to ~30,000 years ago. Much of the later time, Europe was in the grip of an ice age. For tens of thousand years, the same places were also occupied by modern humans. Until very recently, there was no evidence that modern humans and Neandertals could interbreed, but with the complete elucidation of the Neandertal nuclear genome, we can see that a few percent of modern human genes came from Neandertals.

The physical characteristics of Neandertals are well understood from the few hundred partial skeletons that are known. They were shorter and stockier than modern humans, but had larger brains. We can also see from skeletons that Neanderthals led short, injury-prone lives. The Neandertal skull is long and low with a very large nasal opening, strong brow ridges and a receding chin. You could easily pick Neanderthals out from a crowd even if they were shaved and dressed in modern clothing.

Since their discovery in 1856, Neandertals have been fascinating since they are clearly similar to us but with enough physical differences that they appear "other." What we really want to know about them is not what they looked like but how they behaved: Could they talk? Could they think like us? Could they understand humor? How did they get along with their neighbors? Unfortunately, behavior does not fossilize, and all we have is indirect inference and speculation. (Plus plenty of fiction with Neandertal characters.) By looking at the variety of opinions scientists have had about Neandertals since their discovery, one can see that the opinions say more about our own mindset than about Neandertals. Early on, when not many other hominins were known, Neandertals were usually imagined as hairy grunting ape-men, very different from us in appearance and behavior. In the 1960's, the fashion was to regard them as a type of flower child "like us but better." When early tests on mitochondrial DNA a decade or so ago showed how far apart Neandertals are from modern humans, and how closely how living humans are related to each other, Neandertals again began to seem more "other", and the speculations about their behavior followed.

Recently I came a across a new book "How to Think Like a Neandertal" that lays out the current inference and speculation of Neandertal behavior based on the latest paleoanthropological discoveries. One author, Thomas Wynn, is a Professor of Anthropology at the University of Colorado. The second author, Frederick Coolidge, is a Professor of Psychology at the University of Colorado. Here are some things this book speculates about. The picture is a surprising mixture of "like us" and "other":

1. We probably can infer that Neandertals, as hunter-gatherers (mostly hunters) probably knew their way around the local area and had good spatial memories.
2. They lived in small groups consisting mostly of relatives. They probably would have bonded very well within the group, but might have been xenophobic toward other groups, pretty much as if we dealt all day with our immediate family but never talked to anyone else. One inference is that there would be very little opportunity for deception or theft because everyone knew everyone else intimately.
3. There are many examples of Neandertal remains that have been deliberately buried. In the past this has been taken as evidence that Neandertals had some kind of belief in an afterlife. However, these graves tend to be shallow, the bodies tend not to be arranged very neatly, and there are hardly any "grave goods." It is hard to eliminate the possibility that these burials were just for some practical reason, e.g. so the smell of the body would not attract predators.
4. We have at least one find where several Neandertals were butchered by other Neandertals. Since they were butchered along with some red deer, it is unlikely that this was for some ceremonial reason (as cannibalism was practiced by some modern people) but simply for food.
5. Neandertals had the same stone "tool kit" unchanged for 200,000 thousand years. (Which is not to say that making stone tools did not take great skill and good procedural memory.) Even when there was contact with modern humans, they did not seem to borrow any of the more modern "technology" from their neighbors. One possible inference is that there is some intrinsic "neophobia" or "conservatism" about Neandertals.
6. Speaking of the tool kit, all the stones Neandertals used was local to their living quarters. In contrast modern humans seemed to go to central sources for good stone even though it was far away.

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7. Almost all of the cultural products associated with Neandertals are purely utilitarian. That is, there is no "symbolic behavior" or "art." To be fair, modern humans, which are as old as the Neandertals, did not show any sign of "art" until ~70,000 years ago, and it was not until ~40,000 years ago that "art" became common.
8. The number of injuries Neandertal suffered is consistent with the fact that they had only heavy spears that could not be thrown. They would have to come right up to their prey animal to use the spear. (The pattern of injuries in Neandertals has been likened to that of rodeo clowns, who deal with aggressive animals for a living.) This implies a certain bravery or a high tolerance for risk, not to mention the ability to carry on after being hurt. There are many examples of Neandertal skeletons with injuries that would have been disabling, but who apparently survived their injuries by several years. This has been used to infer that Neandertals cared for those who could not care for themselves. On the one hand, this is not surprising because it happens with most social species. On the other hand, the lack of healed leg injuries might imply that Neandertals that were injured such that they couldn't walk were not as well taken care of.
9. Given that Neandertals have a modern FOXP gene (associated with language production) and that we can see the trace of Broca's area (the brain area associated with speech in modern humans) in their skulls, it is reasonable to believe they had a spoken language. "How to Think Like a Neandertal" has a whole chapter dealing with humor, specifically whether Neandertals were capable of disentangling the many levels of verbal "incongruities" in jokes. The authors say no. However, Neandertals may have enjoyed physical humor.

The authors mention several times the GEICO auto insurance "caveman" ads. These ads show what are clearly young Neandertal men living in the modern world, doing modern things like hurrying through an airport. They are indistinguishable from us in behavior except that they retain long hair and beards. The dramatic hook is that they are annoyed with GEICO's slogan "So easy a caveman can do it!" because of what it implies about their intelligence. The authors are fairly sure that Neandertals might have some minor trouble with novel situations, but for the most part could get along in the 21st Century as well as any of us, just as the characters in the GEICO ads.

An aside from me: In 2007 there was a very short-lived television show "Cavemen" that depicted the GEICO cavemen characters (male and female) as a minority group living in the modern world, suffering from subtle prejudice from their "sapiens" neighbors. I liked the few episodes I saw mostly for the "outsider" humor. It was something like the "The Big Bang Theory" with cavemen instead of geeks.

Overall, I'd have to give this book high marks for bringing together a lot of anthropological data in a small amount of space, and presenting speculations about Neandertals in a plausible and entertaining way. On the other hand, I need to point out that, as informed as these speculations may be, we may ultimately may not be able to say anything definitive about the mental life of Neandertals until we get a time machine or can clone one. At present, it is impossible to disentangle whether Neandertals didn't do certain things (like "art") because they were incapable of it or just because they never had the opportunity.

Sources:

Wynn, T.; Coolidge, F.L.
"How to Think Like a Neandertal."
Oxford University Press, New York, $25 (hardcover).