JANUS

THE NEWSLETTER
OF THE
NORTH CAROLINA
FOSSIL CLUB

1999 NUMBER 4

Apologies to Dr. Jay **Goldberg** who conducted the super auction at the Aurora Fossil Festival. I badly garbled his name (as Gould) in the last issue of *Janus*. Sorry Jay, the mind was not operating very well that night.

There will be a **Club meeting** on January 16 in the 3rd floor classroom of the NC State Museum of Natural Sciences in downtown Raleigh, beginning at 1:30. The business meeting will be followed by speaker Alec Blalock who will talk about "Diving for Fossils". Show-and-Tell is always encouraged, so bring your recent acquisitions.

Again, there will be a paucity of trip reports this fall. In addition to causing colossal destruction and enormous misery in eastern North Carolina, the flood waters following Hurricane Floyd did major damage to fossil collecting as well. Nearby rivers broke into two Martin Marietta sites, closing the Castle Hayne quarry indefinitely and destroying the very nice collecting area which Richard Tellekamp and Bill Little had developed over the years in the Belgrade quarry. In spite of this, Richard still managed to conduct the regularly scheduled trip there:

36 Fossil Club members and guest arrived at the Belgrade Quarry Nov.21 and had a perfect day for fossil hunting. The weather couldn't have been better and the enthusiasm of the fossilers was really up there.

Although the old site was unavailable due to hurricane Floyd, a new area was very productive as numerous shark teeth and a variety of fossils were found. Hopefully by next spring we will be able to use the old site again as the water has been receding on a very good pace. If so, it should be an exciting area for fossils.

See you all then. Richard Tellekamp

Important:

This is the last issue of *Janus* for 1999. This means that it is now time for you to renew your membership for 2000. Use the renewal form inside the last page. Note: there is now a place for your email address (if you have one). Note our new address as well.

Advent Quiz

One of the fun (and challenging) things to do this holiday season was to participate in Peter and Gabriele Englehard's Advent Quiz. Many of you know about "Revolver Jaw", **the** premier WWW trading site (http://home.netsurf.de/peter.engelhard/) for shark and skate teeth. For the past two years, beginning on December 1, the Engelhards have provided a quiz: you click on the Christmas tree ornament corresponding to the date and up pops that day's question. You have from December 24 – 31 to email your answers, the winner being announced on January 1.

The quiz is in multiple choice format with 1st, 2nd, and 3rd place prizes awarded. The 1st place winner gets to choose his/her prize from two lists of shark teeth and other items while 2nd and 3rd place winners get to choose from one list.

Here are a few questions from this year's quiz:

5. (With a picture of a *Borodinopristis schwimmeri* rostral tooth): How long is the pictured rostral?
a) 0.5 cm b) 1.5 cm
c) 2.5 cm d) 5 cm

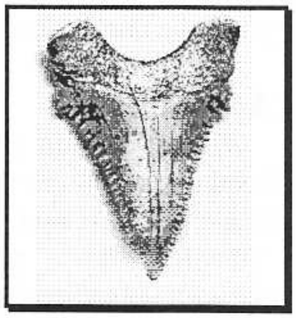
7. (Showing a photo of a *Prosopodon assafi* tooth): What does the name *Prosopodon* mean?
a) syllable tooth b) scar tooth
c) elongated tooth d) mask tooth

18. (Showing a photo of a nice *Palaeocarcharodon orientalis* tooth): Which synonym was commonly used before?
a) *P. angustidens* b) *P. engelhardi*
c) *P. landanensis* d) *P. lybica*

24. (Showing a photo of a Peruvian *Carcharocles chubutensis* tooth): Who erected this species?
a) Arambourg b) Applegate
c) Agamemnon d) Ameghino

As you can see, these are challenging. I knew outright the answers to 5: a), 18: c) and 24: d). I had to look up the answer to 7: d). About half the questions could be answered using WWW resources, **if you knew how to look**. I also had a certain advantage over many contestants: easy access to 3 major universities' research libraries. Peter and Gabriele made no ground rules regarding what they considered acceptable methods for getting the answers, although last year they did discourage people from posting the questions on electronic bulletin boards devoted to paleontology.

Last year I was the 1st place winner ☺, getting all 24 correct, and won the very nice *Palaeocarcharodon orientalis* tooth from Morocco at the right. This year I got only 22 correct ☹, good enough for 2nd place and a *Cretoxyrhina mantelli* tooth from Texas.



Richard Chandler

Internet Auctions

Lately I have had several good experiences with on-line bidding on eBay (http://pages.ebay.com). WWW auction sites are a hot item on the Internet these days: it's like having the world's largest flea market in your computer. For potential buyers eBay works as follows:

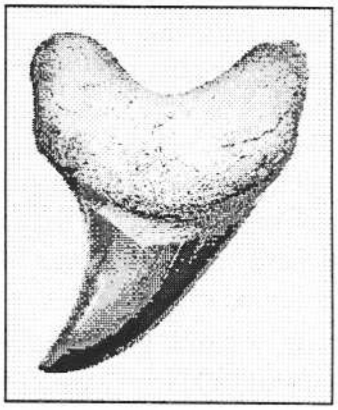
In order to enter bids you must be 'registered', a simple process in which you give eBay a pseudonym (or your email address) to identify you as a bidder, your email address (if you are not using it as your pseudonym), and a password you make up. Having received an email confirmation of your registration, you are then free to bid on auctions. The auction process is interesting: eBay encourages you to enter the maximum amount you are willing to pay for the item. Suppose you and I are the only ones interested in a 6" *C. megalodon* tooth from Lee Creek and the seller has entered a starting bid of $25. If I enter my maximum ($100), I would then have the high bid at $2 (eBay's increment in this range is $1). You then enter your maximum bid ($75). eBay's computer then has a 'bidding war' between your high bid and mine and since mine is higher than yours, I would then have the high bid at $76 ($1 increment over your high bid). You can see immediately that I now have the high bid at $76 and decide whether or not you want to bid higher, but you don't know what my maximum is (just that it is at least $76).

Suppose at this point you decide that you just *have* to own that tooth. You could then enter a new maximum bid of $500, say. The eBay computer would then have another 'bidding war' and this time award you the high bid at $102.50 (the minimum increment increases as the bidding gets higher). If I decide at this point that I don't want to go any higher (and no one else jumps in before the auction ends), you would then be the proud owner of that 6" tooth for $102.50 + whatever amount the seller charges for shipping.

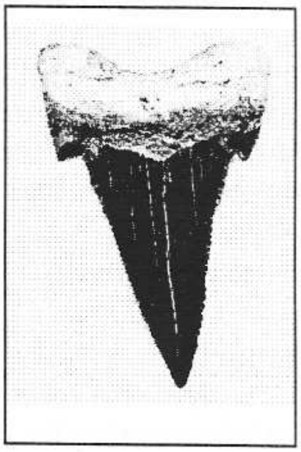
You must be careful here: once entered, a bid cannot be easily retracted and it binds the highest bidder to buy the item. There is also scope for fraud as well. eBay acts only as broker for the transaction; it does not own the item being sold. So if the seller "takes your money and runs" you have little protection. eBay has a simple rating scheme so that following the transaction, buyer and seller can record their (brief) comments and give a positive, neutral, or negative vote on their perception of the experience. Bid on items only where the seller has a large positive vote (most do).

I know you are dying to know what I have gotten:

- 6 Lee Creek teeth (2 small, damaged *C. megalodon*, 3 *Isurus hastalis* about 2¼", and a gem 2½" *Parotodus benedeni*) for $85.51. The seller told me that he found these 6 and 4 *C. megalodon*, all in excess of 4 inches on one trip to the mine in June, 1981 (Ah, the good old days).



- A "*Palaeotodus fakei*" (a *Palaeocarcharodon* blade glued to an *Otodus* root which had serrations filed into the cusplets) for $1.25. I was the only bidder for this gem. The remarkable thing was its size: almost 2"!! I had wanted one of these ever since I saw some John Smith had gotten at Tucson.



- for $76 a 36" rostrum of a modern sawfish to complement my collection of fossil rostral teeth.
- 13 *Isurus* teeth (*hastalis* and *planus*) from Shark Tooth Hill, CA in the 1¼" – 1¾" range for $24.

Be warned: sometimes things get more than a little crazy on eBay. As I write this there is a beautiful Lee Creek *C. megalodon* up for auction. With 20 hours left, the high bid is $150.01. "Not too remarkable," you say. "Cheap at twice that," you say. The tooth is just shy of 2½"!!!

* * *

Incidentally, the final bid on that tooth was a stupefying $280.01. Like I said, CRAZY!!

Richard Chandler

Gone Fishin' or Eocene Excursion

John Smith

Well, I have collected at another nationally famous, if not world famous, fossil site and I thought I would share the experience with you.

There are some fossil collecting benefits to a job which requires travel to unusual places. The reason I travel to these places is usually because the have problems with hazardous waste. In this particular case, I was teaching a course for the Department of Energy at a series field sites. This time I was teaching folks from the Idaho National Engineering and Environmental Laboratory at Idaho Falls, Idaho. After completion of the course, I planned to collect at two sites. I will tell you about only one now and the other in another article.

Idaho Falls is about 200 miles northwest of Kemmerer, Wyoming, the nearest town to sites where fossil fish in the Green River Formation, can be collected by the public on a fee basis at commercial quarries. All of these sites are found on Fossil Ridge. Fossil Ridge is across U.S. Highway 30 from Fossil Butte National Monument about ten miles west of Kemmerer.

Since boyhood I have had a specimen of a fossil fish from the Green River Formation. In my more recently rekindled interest in fossils I have purchased two additional specimens. I think that most of you will have seen these fossil fish specimens from the Green River Formation at mineral/fossil/gem shows and "rock" shops. The matrix is varying shades of tan to brown and the fossil fish are completely flattened and usually naturally brown or painted brown. The bone structure in these fossils is often detailed and complete. Fish can be of almost any size from just longer than 1 centimeter in length to over 1.5 meters in length. Fish are the most famous fossils found in the Green River Formation, but some spectacular reptile, bird, mammal, and plant fossils have also been collected there.

I have long been interested in collecting from this site and even tried to go once, I believe it was in May, but my timing was wrong. It was off-season and the site was covered in snow. The site is at an altitude of approximately 7,000 feet and public collecting is only allowed from July 1 through Labor Day. My work in Idaho Falls (scheduled by someone else) happened at the right time of year.

There have been estimates that millions of fossil fish have been collected in the monument and at Fossil Butte with current estimates that 20,000 fish are collected annually. There are several quarries which allow collecting for a fee and under rigidly monitored and controlled conditions. I only know the conditions and fees for the quarry where I collected, Ulrich Quarry which was $55.00 plus tax for a maximum of three hours collecting with a limit of about ten fish collected from the "split fish" layer (more about the fossils and strata later).

From an internet site I read that the fish collected at the Ulrich Quarry were in the best condition, so that is where I went. This quarry is on land leased from the State of Wyoming. The lease requires that any unusual (rare) fossils are the property of the state. This was not an issue for what I found. At some of the other quarries on private land there may not be such restrictions on the finds of rarities, but my guess is that there are still strict collecting rule and close supervision to see that they are followed.

The Green River Formation has been the site for fossil collecting first recorded in 1856. Later during the construction of the Union Pacific Railroad more extensive collecting began near Green River, Wyoming. The famous fossils have been collected in the region ever since, not only from the original site but several other sites in three states, Wyoming, Utah, and Colorado, from what is assumed to be sediments from three former lakes: Fossil Lake, Lake Gosiute, and Lake Uinta. All fossil fish bearing sediments are Eocene in age and are a sandy shale which can be split into layers of very uniform thickness. There are two major fossil bearing units in the Fossil Lake area: the "split fish" layer, which is about six feet thick faintly laminated, almost pure calcite; and the "18-inch" layer, which is as its name suggests about 18 inches thick of laminated, whitish to buff colored calcite limestone. As far as I know, most public collecting is only allowed in the split fish layer. The 18-inch layer is reserved for the quarry owner/operators who are commercial collectors and preparers for wholesale and resale.

No real preparation is required for fossils found in the split fish layer. The fossils are clearly visible and often have two imprints when the layer is split. However only one of the imprints contains fossilized material, the other is a mold. Mr. Ulrich likes to clean the dust off and use a thin clear plastic spray to protect and adhere the fossil material to the matrix after it has been exposed.

Fossils found in the 18-inch layer have a thin layer of sediment covering. The fossils can be distinguished by raised vertebra centra and other skeletal features. The thin layer of sediment is chipped or ground away, usually using a sharp pointed steel probe. When preparing a fossil, you need to alternate chipping and blowing to remove dust and pulverized sediment. Almost all of the framed large fish and other large fossils found for sale are from the "18-inch" layer.

So much for the background, what did I do to collect the fossils fish and what did I find?

As I mentioned earlier, the season is short. Also, they prefer to go only in the morning because of the heat. The final consideration is the relatively small size of the collecting area. At the Ulrich Quarry this probably means less than 20 collectors per day. There are large groups, such as clubs and schools, which could completely fill a day, so as soon as you want to go, call, and try to have alternative dates in case your first choice is not available.

When I collected we rode with a guide in a four wheel drive vehicle up the cliff to the collecting site. All tools are provided. There were three in my group and at least two and maybe three other groups collecting when we arrived. We each had a two foot by two foot 3/4 inch plywood pallet on which to place our finds. We were told that we could collect approximately ten fish and would have a maximum of three hours to do this. Pieces of rejected/abandoned fossil fish were immediately obvious in the talus around spot where our guide assigned us to collect. I quickly gathered several up and designated them "school fish" to be given away at my annual fossil lecture at my son's school. I was able to contribute broken pieces which I collected shortly. My guide allowed me to do this without including these "school fish" in my quota.

The guide showed us how to use flat spring steel tool to pry apart layers of the limestone. Sometimes you have to pound the steel into the layer and use more than one tool. With care, we could split a slab of limestone from 1/2 to 3/4 inch thick to a size of about 24 inches by 36 inches. Large slabs are increase the probability of finding a portion of a nice fish in the middle of a slab and not on the edge. My area was on the ground (the lower level of the split-fish layer) as opposed to the to others in my group who were on a bench formation in the center of the split-fish layer. The ground was wet and I had problems freeing large slabs because the sediment tended to crumble. Also, thin slabs of this softer material broke instantly. I was getting a little discouraged, because it seemed that the others were finding many more than I did and they were not breaking. We finally reached a layer with several nice fish visible. I was told that this was one of two "mortality layers" in the split-fish sediments and the quarry operator collects that layer. I had to stop with the prize in view.

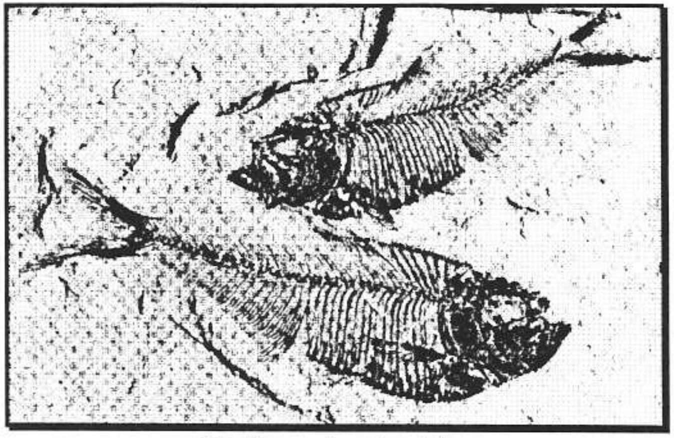
My guide asked me if I wanted to try to collect in the bench area where there was a complete fish. I had little to lose, so we spent about half an hour trying to split the fish out. As we started out our split two feet away from the fish and worked inward toward the fossil very carefully until we ran into an obstruction just under the location of the fish. With perfect 20/20 hindsight I would have tried to split at another deeper layer (for another half hour). But we didn't. We tried to split the layer where it was not flat (we're not talking about peeling sheets of paper off a pad here, this is laminated limestone rock) and split the fossil right down the vertebral column. It would probably have been the best fossil I found. We found another slightly smaller and less sharply defined fish at a lower level, but the treasure had been destroyed. I am sure it was not the first or the last fossil destroyed that day. This is one reason why many of these fossils for sale at more reasonable prices are repaired or incomplete.

Overall I was pleased with what I found. I found complete fish from 1 7/8 inch to 5 5/8 in length. I found probably the three most common of the eight common fossils found there: *Knightia eocaena* Jordan (1907), *Diplomystus dentatus* Cope (1877), and *Mioplosus labracoides* Cope (1877). Number of species, number of fish, and size of fish do not determine whether I had a good day. My evaluation as to whether I did well is based on whether I would go back (spousal approval, time, and money not being an issue) with the following qualifiers in the order of decreasing interest: in a heartbeat, the next time I am in the area, if the thought occurs, only to take someone else who wanted to go, and not likely. I think that this would be "the next time I am in the area" category.

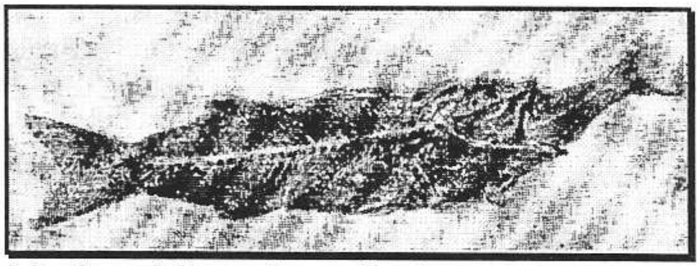
The best part of the trip was the addition to my collection of memories. This is a wonderful and interesting collecting site. The nearby National Monument had a museum containing magnificent fossils and excellent references for sale. I watched and talked to experts who prepare these beautiful fossils. And finally, I found some new and interesting fossils, which are some of the most complete (and affordable) vertebrate fossils in the world. In addition to complete skeletal remains, skin, scales and pigments are visible in some of these fossils. Paleontologists have collected specimens of fish eating other fish, apparently dying because the prey was too large.

I now have to leave you with several questions which continue to nag me about these fossils. Why did so many fish die all at once, several times? Why are the fish be so well preserved? If the fish were buried and covered before scavengers could eat their flesh, what happened to the soft tissues and why didn't they "mess up" the skeleton? Where did the next group of fish come from repeatedly, if there were mass mortalities from poisonings? There are proposed answers from paleontologists to all of these questions, but none of them satisfy my scientific senses.

My last remarks address issues that others have raised previously about classification of organisms based on dental remains. Some of the Green River Fish like extant species are speciated based on the count of fin rays, body shape, and minute skeletal features, not only teeth. True, sharks are not bony fish, but extant sharks are often characterized based on anatomical features which either do not fossilize frequently or do not fossilize at all. In my opinion, too many paleontologists do not place sufficient qualifiers on their "scientific" analyses. They do not qualify their publications saying that there is great peril at speciating fish based solely on dental characteristics from unassociated, unarticulated teeth, and state that the isolate fossil teeth closely resemble teeth from an extant species. They normally write detailed descriptions of the physical properties of these isolated teeth, and the stratum where the teeth were found and then establish new families, genera and species based on a different stratum and location from that/those previously published. And please don't forget their name and the date of the publication. I also find it very strange that the only way to distinguish some "species" is to know in what strata they are found. Why should a scientist judge speciation based on stratigraphy and geography? Do we judge extant fish species by ocean, depth at which the fish was caught, of the date of capture?



Diplomystus dentatus



Mioplosus labracoides swallowing *Knightia eocaena*

Eureka!

(The next two items are reprinted from one of the first issues of *Janus* that I did as editor: *Janus* 1990#4. Apologies to all the long-time members who have already seen them. Actually, I have redone the second so it conforms with my present beliefs.)

I am going to try to introduce a new feature into Janus which for want of anything better gets the above title (with apologies to Archimedes). For this to be successful it must get your contributions. I know each of you have had your magical moments while looking for fossils - I have heard many of you tell about them when we stand around reminiscing during trips. All you have to do is put pen to paper. Your contribution need not be typed; I'll have to retype it into my computer anyway. Here's my example of an "Eureka episode":

Growing up in southern Florida I was much more interested in trying to collect rocks and minerals (virtually nonexistent) than in collecting fossils (commonplace). After moving to North Carolina in

1963, 1 was finally able to search for rocks and minerals with a reasonable expectation of success and did pursue that hobby with some zeal for awhile. About 10 years ago our church had a spring family weekend at Camp Seafarer, a YWCA summer camp on the Neuse River near Arapahoe. Someone had told me that you could find shark teeth in the area and I spent most of Saturday finding the small black pointy things on one small section of the beach in front of the camp.

The sleeping accommodations were fine for adolescents, I suppose, but left a lot to be desired for families: each cabin was partitioned down the middle to make 2 large sleeping areas with 15-20 double-decker bunks per side. For privacy each family was given one side of a cabin. Saturday night brought a monster storm from the south. Since the camp is on the north side of the (very wide) river, the beach took quite a pounding from wind and wave. Very early the next morning an alarm clock went off on the other side of our cabin. It beeped forever until someone turned it off. Thoroughly awakened, my wife asked me if I wanted to get up and look for shark teeth and, after carefully weighing the merits of possibly finding something against staying in a warm, but too short, bunk, I decided to give it a try.

On the beach, right at the water level was a thin layer of dirt which was obviously different from the layers above and below. (I now know it was an outcropping of the Yorktown Formation.) Right where the water washed against this layer we began to find shark teeth, a lot larger (about 1"-1.5" long) than the kind I had found the day before. My wife, having little patience with the down-on-the-hands-and-knees, turn-over-every-rock kind of search I was making, had walked on up the beach. Just when I thought I had exhausted all possibilities and was getting ready to join her, I spotted IT in the water 3 or 4 feet away: a monster tooth (from *Carcharodon megalodon*, I now know) as big as all the others I had found put together. Actually, it was bout 4.5" long and in virtually perfect condition. While I didn't run naked down the beach (as Archimedes is said to have done) I certainly felt like shouting "Eureka!" I have had many exciting experiences looking for fossils since but none surpass that moment. (Nor have I found any teeth to surpass that one.) Needless to say I won the blue ribbon later that day for the largest Shark Tooth.

Taxonomic Classification

I thought it might be informative (and more memorable) to give an example using a family of fossils we all search for avidly (following Cappetta).

- Kingdom: Animalia
  - Phylum: Chordata (vertebrates)
    - Class: Condrichthyes (cartilaginous fish)
      - Order: Selachii (sharks)
        - Family: Otodontidae
          - Genus: *Carcharocles*
            - Species: *auriculatus*
              - *angustidens*
              - *chubutensis*
              - *megalodon*
          - Genus: Otodus
            - Species: obliquus
          - Genus: Parotodus
            - Species: benedeni
        - Family: Alopiidae
          - Genus: *Alopias*
            - Species: *superciliosus*
              - *vulpinus*
              - *crochardi*
              - *denticulatus*
              - *exigua*
              - *hassei*
              - *latidens*
              - *leeensis*
          - Genus: *Paranomotodon*
            - Species: *angustidens*
        - Family: Cetorhinidae
          - Genus: *Cetorhinus*
            - Species: *maximus*
        - Family: Anacoricidae
          - Genus: *Pseudocorax*
            - Species: *affinus*
              - *granti*
              - *laevis*
          - Genus: *Microcorax*
            - Species: *crassus*
          - Genus: *Paracorax*
            - Species: *jaekeli*
          - Genus: *Squalicorax*
            - Species: *australis*
              - *falcatus*
              - *kaupi*
              - *squalicorax*
              - *bassanii*
              - *yangaensis*

NORTH CAROLINA FOSSIL CLUB, INC.
(FOUNDED 1977)

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2000 MEMBERSHIP APPLICATION - N. C. FOSSIL CLUB

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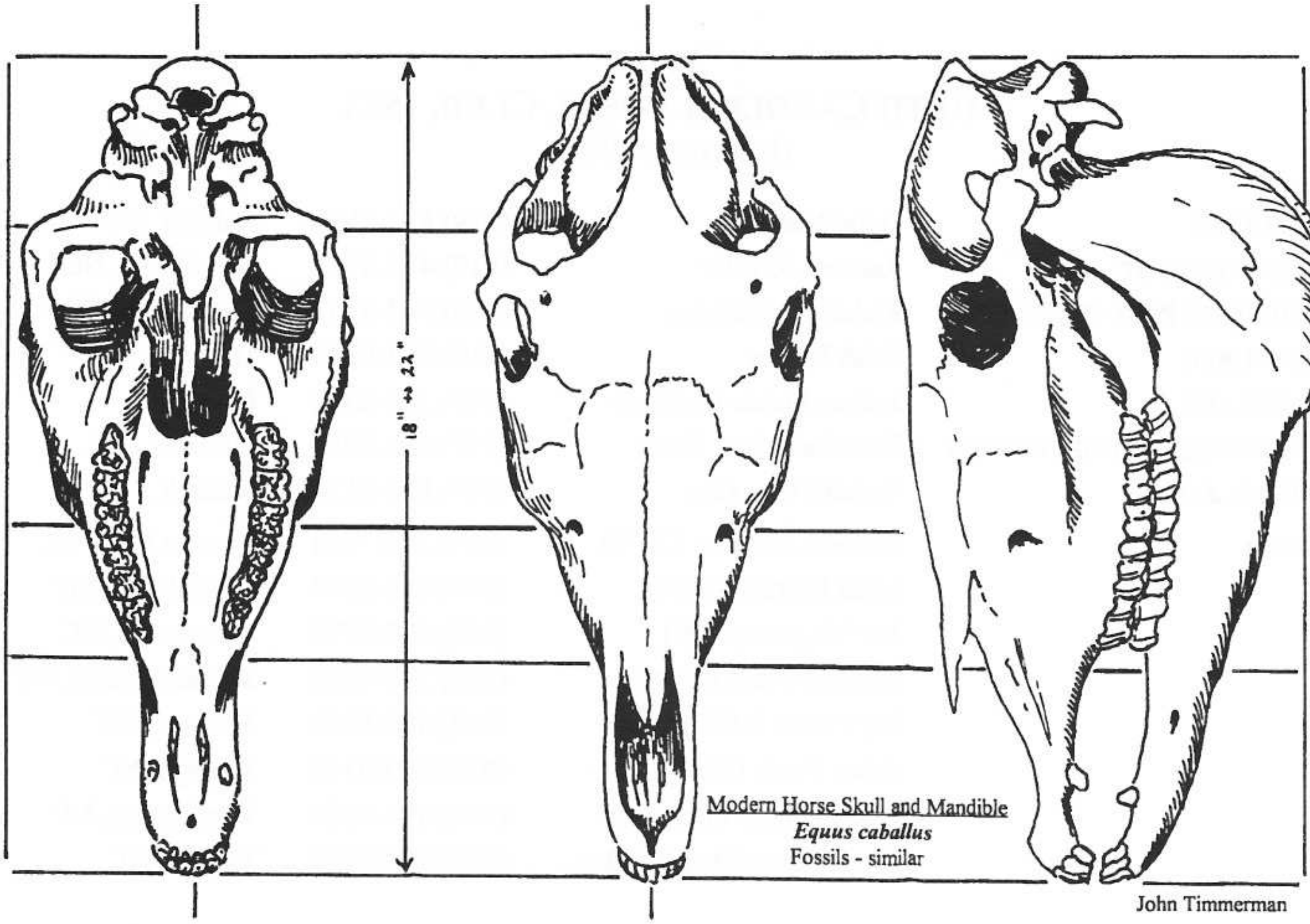
INDICATE TYPE(S) OF MEMBERSHIP(S)	INDIVIDUAL (NEW)	$20.00	________
	INDIVIDUAL (RENEWAL)	$10.00	________
	HOUSEHOLD (NEW OR RENEWAL)	$ 5.00	________
	TOTAL ENCLOSED		$________

SIGNATURE ________________________________ DATE ____________

Children of NCFC members who are dependent minors and living at home may accompany parents on any trip *EXCEPT* PCS–Lee Creek or where otherwise noted. Only 15 positions on the PCS–Lee Creek trip are available to members who reside outside of North Carolina.

Memberships are effective from January through December of the year (or portion of the year) of the date of application. For example, persons joining in August will need to renew their membership 5 months later in January.

Mail To: NC Fossil Club, P.O. Box 13075, Research Triangle Park, NC 27709



Modern Horse Skull and Mandible
Equus caballus
Fossils - similar

John Timmerman

North Carolina Fossil Club
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