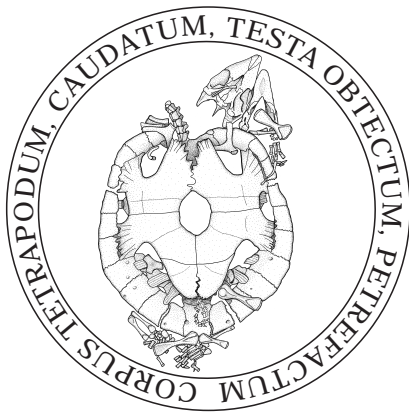


FOSSIL TURTLE

NEWSLETTER



February, 2005



FOSSIL TURTLE NEWSLETTER

Compiled by:
Walter Joyce
and
James Parham

Cover: V1024, *Testudo 'hipparionum'*
Upper Neogene (Mio-Pliocene) Red Clay Bed of North China
Baode County, Shanxi Province
Photo: James Parham

February, 2005

February 18, 2005

Dear Fossil Turtle Colleagues,

We are pleased to present you with the second issue of *Fossil Turtle Newsletter*. The purpose of this informal bulletin is to provide the fossil turtle research community with an opportunity to exchange all information of relevance to our science on a yearly basis. The resulting document is intended for the public domain and we encourage that it be distributed freely to whoever may be interested. If you did not receive this document directly from us or did not receive an email in which you were being asked to contribute, please feel free to contact us by email to subscribe. Both this issue and the first issue can be downloaded for free at:

http://www.peabody.yale.edu/collections/vp/vp_fossilturtle.html

In addition to the annual contributions of 40 international fossil turtle researchers, this issue also features the complete list of living and fossil turtle publications of the late Dr. Walter Auffenberg (USA). Unlike the first issue, we decided to make this issue available in the month of February, because the holiday season greatly complicates an earlier release. We expect to maintain this schedule in the future.

We are grateful to returning contributors and welcome all new participants to *Fossil Turtle Newsletter*. Thanks to everybody's help, we feel that this issue is even more informative than the previous.

Sincerely,

Walter Joyce and James Parham

Annual Contributions

Averianov, Alexander (Sasha)

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Publications 2004

Averianov A. O. and A. A. Yarkov. 2004.
New turtle remains from the Late Cretaceous
and Paleocene of Volgograd Region, Russia.
Russian Journal of Herpetology 11(1):41-50.

Publications In Press

Averianov A. O. [A new sea turtle
(Testudines, Cheloniidae) from the Middle
Eocene of Uzbekistan]. *Paleontological
Journal, Moscow*. [in Russian with English
abstract].

Abstract: A new species of sea turtles, *Puppigerus
nessovi* sp. n. is based on skull and dentary
fragments, and isolated limb bones and shell plates
from the Middle Eocene (Lutetian-Bartonian)
locality Dzheroi 2 in Uzbekistan. The new taxon
differs from the only previously known species of
the genus, *P. camperi* (Gray, 1831) from the
Eocene of Great Britain and Belgium, by longer
mandibular symphysis, almost reaching foramen
dentofaciale majus, by retention of costoperipheral
fontanelles in adults, and by normal scaling of
posterior carapace.

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Publications 2004

Bona, P. 2004. Sistemática y biogeografía de
las tortugas y los cocodrilos paleocenos de la
Formación Salamanca, Provincia de Chubut,
Argentina. Ph.D. Dissertation. Universidad
Nacional de La Plata, La Plata, Buenos Aires,
185 pp.

Publications In Press

Bona, P. and M. S. de la Fuente. Phylogenetic
and paleogeographic implications of
Yaminuechelys maior (Staesche, 1929) new
comb. A large long-necked chelid turtle from
the Early Paleocene of Patagonia. *Journal of
Vertebrate Paleontology*.

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Research Statement

Current research projects are focused on questions of paleogeography and paleoecology. Two projects dealing with Early Cretaceous turtle assemblages are currently underway. One is the description of a well-preserved skull from the Arundel Clays (Maryland, USA), being undertaken with Thomas Lipka, a long-time student of the Arundel vertebrate assemblage, who discovered the specimen. This specimen is being interpreted as a paracryptodire with possible affinities with *Compsemys*.

The second Early Cretaceous project is the study of turtle material from the Early Cretaceous of northwestern British Columbia, Canada. This is a new assemblage discovered by geologists working on the stratigraphy and sedimentology of coal-bearing beds in the area. Two articulated shells were discovered. A collecting trip to the area is planned for next summer.

A paper describing turtle material from a high-latitude vertebrate assemblage of Turonian age in the Axel Heiberg Island is in progress. Three taxa are present, including a trionychid and two eucryptodires.

CT scans of a marine turtle skull of *Toxochelys* grade of evolution from the Bearpaw Formation of southern Alberta have documented the basicranial region of this turtle. Despite the primitive jaw structure, this turtle

has a derived basicranial region. The description of this turtle will be undertaken jointly with Heather Jamniczky who is undertaking a survey of basicranial anatomy for her dissertation, and Maggie Hart who has recognized that a similar turtle is present in the Pierre Shale of South Dakota.

Publications 2004

Brinkman, D. B., A. P. Russell, D. A. Eberth, and J. Peng. 2004. Vertebrate palaeocommunities of the lower Judith River Group (Campanian) of southeastern Alberta, Canada, as interpreted from vertebrate microfossil assemblages. *Palaeogeography, Palaeoclimatology, Palaeoecology* 213:295-313.

Publications In Press

Brinkman, D. B. Turtles of Dinosaur Provincial Park – diversity, paleoecology and distribution. Dinosaur Provincial Park. Indiana University Press.

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Publications 2004

Claude J., W. Naksri, P. Jintaskul, P. Srisuk, and V. Suteethorn. 2004. Tertiary turtles from

Thailand. 21-23 August, Mahasarakham University, 2004.

Claude J., P. C. H. Pritchard, H. Tong, E. Paradis, and J.-C. Auffray. 2004. Evidence for flexibility in the evolution of skull of Testudinoidea (Reptilia: Testudines): a geometric morphometric assessment. *Systematic Biology* 53(6):937-952.

Claude J., and H. Tong. 2004. Early Eocene Testudinoid Turtles from Saint-Papoul, France, with Comments on the Origin of modern Testudinoidea. *Oryctos* 5:71-113.

Claude J., H. Tong, W. Naksri, P. Jintasakul, S. Paladej, and V. Suteethorn. 2004. Fossil turtles of Thailand. 8th BRT annual Meeting, Surathanee, 14-17 October.

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Publications 2004

Crumly, C. R., and M. R. Sánchez-Villagra. 2004. Patterns of variation in the phalangeal formulae of land tortoises (Testudinidae): Developmental constraint, size, and phylogenetic history. *Journal of Experimental Zoology* 302B:134-146.

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Research Interests

Mesozoic and Paleogene turtles of Asia, Neogene turtles of Europe.

Publications 2004

Danilov I. G. 2004. [New data on morphology of turtles of the Late Cretaceous of Middle Asia]. *Problemy paleontologii Tsentralnoi Asii* [Problems of Paleontology of Central Asia] (Moscow, 27-28 May 2004). Abstracts of international conference. Pp. 23-25. [in Russian]

Comment: This abstract reports new data regarding the morphology of Adocidae, Carettochelyidae, Lindholmemydidae, and *Oxemys* (Testudines *incertae sedis*) from the Late Cretaceous of Kizylkum, which will be published in detailed in separate publications.

Danilov I. G. 2004. [New data on Jurassic and Early Cretaceous turtles of China]. *Modern Russian Paleontology: Classic and Newest Methods. The First All-Russian Scientific School for Young Scientists in Paleontology* (Moscow, 20-22 October 2004). Abstracts. Pp. 27-28. [in Russian]

Comment: This abstract reports new data regarding Jurassic and Early Cretaceous turtles from China (IVPP collection), which will be published in details in separate publications.

Publications In Press

Danilov, I. G. Die fossilen Schildkröten Europas; in U. Fritz (ed.), Handbuch der Reptilien und Amphibien Europas. Schildkröten II (Cheloniidae, Dermochelyidae, Fossile Schildkröten). Aula-Verlag. Wiebelsheim.

Comments: This is a brief review of the fossil turtles of Europe consisting of two parts: The history of the European turtle fauna and systematics. In the systematic part, 24 families of European turtles, known from the Late Triassic to the Present, are discussed. Characters, distribution, phylogeny, and main representatives are given for each family. This review is illustrated by 25 figures, including a phylogeny of turtles, paleobiogeographic schemes, and representatives of all European turtle families.

Danilov I. G. and J. F. Parham. A reassessment of the referral of an isolated skull from the Late Cretaceous of Uzbekistan to the stem-testudinoid turtle *Lindholmemys*. *Journal of Vertebrate Paleontology*.

Abstract: A fossil turtle skull (ZISP PH 1/17) from the Late Cretaceous (Upper Turonian, Bissekty Formation) of Dzharakuduk (Uzbekistan, Asia) was used to score the skull characters for the genus *Lindholmemys* (a stem-testudinoid) in a recent phylogenetic analysis. A description of ZISP PH 1/17 and a new cladistic analysis reveals no characters to support its referral to *Lindholmemys elegans* or to the stem-testudinoid lineage. ZISP PH 1/17 is very similar to North American *Adocus*, differing mainly in characters of the upper jaw. Therefore, we hypothesize that ZISP PH 1/17 is the skull of *Shachemys baibolatica* or “*Adocus*” *aksary*, adocid shell taxa from Dzharakuduk. Pending additional discoveries and description of turtles from Dzharakuduk, we refer ZISP PH 1/17 to Adocidae gen. et sp. indet.

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Research Statement

I am currently working in collaboration with Juliana Sterli and Guillermo Rougier on *Palaeochersis talampayensis*, a Late Triassic turtle from La Rioja, Argentina, and on other Mesozoic turtles from Patagonia.

Publications 2004

Leanza, H. A., S. Apesteguía, F. E. Novas, and **M. S. de la Fuente**. 2004. Cretaceous terrestrial beds from Neuquén Basin (Argentina) and their tetrapods assemblages. *Cretaceous Research* 25:61-87

Publications In Press

Bona, P. and **M. S. de la Fuente**. Phylogenetic and paleogeographic implications of *Yaminuechelys maior* (Staesche, 1929) new comb. A large long-necked chelid turtle from the Early Paleocene of Patagonia. *Journal of Vertebrate Paleontology*.

Lapparent de Broin, F. de, **M. S. de la Fuente**, and M. Fernandez. *Notoemys* (Chelonii, Pleurodira), late Jurassic of Argentina: new examination of the anatomical structure and comparisons. *Revue de Paléobiologie*.

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Publications 2004

Abbazzi, A., C. Angelone, M. Arca, G.

Barisone, C. Bedetti, **M. Delfino**, T. Kotsakis,
F. Marcolini, M. R. Palombo, M. Pavia, P.
Piras, L. Rook, D. Torre, C. Tuveri, A. M. F.
Valli, and B. Wilkens. 2004. Plio-Pleistocene
fossil vertebrates of Monte Tuttavista (Orosei,
E Sardinia, Italy), an overview. *Rivista
Italiana di Paleontologia e Stratigrafia*
110:603-628.

Abstract: The preliminary results of the analysis of fossil vertebrate remains from the karst network at Monte Tuttavista (Orosei) are reported. About 80 taxa, among fishes, amphibians, reptiles, birds and mammals have been recognised.

These remains testify the evolution of vertebrate assemblages in the Sardinian insular domain, during a time interval from possibly Late Pliocene to Late Pleistocene or Holocene. A succession of at least four populating complexes have been identified which document the vertebrate colonisation phases from the mainland and the following periods of insularity. [Note: *Testudo* cf. *T. hermanni* is listed and briefly commented]

Abbazzi, L., S. Carboni, **M. Delfino**, G. Gallai,
L. Lecca, and L. Rook. 2004. Fossil
vertebrates (reptiles and artiodactyls) from
Capo Mannu (Late Pliocene, Western
Sardinia, Italy). *Abstract 32nd International
Congress of Geology, 20-28 August 2004,
Firenze, Italy*, Abstract Volume pt. 1, abs.
150-21, p. 706.

Abstract: A vertebrate fauna has been reported within the middle part of the coastal dune complex of the Capo Mannu Fmt. (Carboni & Lecca -1995). The lower part of this formation yielded in the late 70's a small mammal assemblage (Pecorini et al. -1974) containing a murid assigned to *Rhagapodemus azzarolii*, an endemised species derived by the Early Pliocene *R. balleioi* (Angelone & Kotsakis 2001). The new interpretation allows to consider the age of this fauna (Mandriola) not to be older than the MN 15 unit. Accordingly, the dispersal of vertebrate taxa of this locality may be referred to a regression phase at the Zanclean/Piacenzian transition, confirming the stratigraphical interpretation of Carboni & Lecca (1995).

Otherwise, the yet unpublished vertebrate remains from the middle part of Capo Mannu dunes belongs to large mammals (Bovidae and Suidae) and reptiles (Chelonii). Bovids are well represented in the assemblage although quite fragmentary. They have been identified as belonging to two forms of different size. The smaller one is comparable by morphology (e.g. occurrence of Caprinae fold, absence of basal pillars in lower molars) with the Caprinae *Nesogoral*, one of the most characteristic taxa in Late Pliocene?-Early Pleistocene Sardinian endemic fauna ("*Nesogoral* complex"). These remains show a slightly larger size respect the samples of *Nesogoral*, which is consistent with a lesser degree of endemisation. The other bovid, represented by very few fossil remains is referred to as Bovidae indet. As a matter of fact however, the occurrence of other species than *Nesogoral* is documented in other Sardinian late Pliocene-early Pleistocene localities. The suid material is made up by few specimens among which a fragmentary palate of and a partial mandible (by G. Pecorini in 70's), smaller than the endemic species *Sus sondaari* from Capo Figari. The fossil tortoise retains the general external shape but lacks of the majority of the diagnostic characters because of the presence of a thin concretion or the alteration of outer bony layers. The surface corresponding to each of the 5 vertebral scutes is distinctly raised in a way not known in any Recent European tortoise. On the whole, the Capo Mannu assemblages open a new window on the Plio-Pleistocene terrestrial faunas of the Sardinian Island.

Delfino, M. 2004. The middle Pleistocene herpetofauna of Valdemino Cave (Liguria,

North-Western Italy). *The Herpetological Journal* 14:113-128.

Abstract: The herpetofauna from the Middle Pleistocene cave deposit of Valdemino (Borgio Verezzi, Liguria, north-western Italy) is represented by the following taxa: *Triturus* sp., *Speleomantes* sp., *Pelodytes punctatus*, *Bufo bufo*, *Hyla* gr. *H. arborea*, *Rana dalmatina*, *Testudo hermanni*, *Tarentola* cf. *T. mauritanica*, *Anguis fragilis*, *Lacerta* gr. *L. viridis*, Lacertidae indet., *Coronella* cf. *C. austriaca*, *Elaphe* sp., *Hierophis viridiflavus*, *Malpolon monspessulanus*, Colubridae indet., *Natrix natrix* and *Vipera aspis*. The most striking characteristic of the Valdemino assemblage is its modernity: all the identified taxa are members of the modern herpetofauna of western Liguria, including *Pelodytes* and *Malpolon* (identified for the first time in the Italian fossil record), that nowadays differentiate the western Ligurian herpetofauna from that of all the neighbouring Italian regions. The modernity of the herpetofauna sharply contrasts with the associated mammalofauna that still hosts, among others, Barbary ape, elephant, rhinoceros, leopard and sabre-toothed tiger. The assemblage testifies that the Ligurian herpetofauna was already established in the Middle Pleistocene and that it is not the result of post Würmian dispersal, although cyclical immigrations (from Iberian or French refugia) during warm stages, followed by extinctions during the cold ones, cannot be ruled out.

Delfino, M. 2004. Palaeoherpetofaunas from Lombardy; pp. 43-48 in Atlas of the Amphibians and Reptiles of Lombardy, F. Bernini, L. Bonini, V. Ferri, A. Gentili, E. Razzetti, and S. Scali (eds.), Monografie di Pianura, 5, Provincia di Cremona, Cremona. [in Italian with English abstract]

Abstract: The oldest traces of amphibians and reptiles in what is now Lombardy go back to the end of the Palaeozoic when Permian taxa (290-250 million years ago) left tracks in muds that are now transformed in stones. The extraordinary wealth and diversity of Mesozoic remains found in the Alpine area in Lombardy is such that this area has been the source of most of the information we have on marine vertebrates from the middle Triassic (about 240-230 million years ago). Over the last two

centuries, palaeontologists have discovered abundant remains of both marine and terrestrial reptiles in the Mesozoic fossil deposits. In contrast, fossils of contemporary amphibian and reptile species and their direct ancestors are scarce in Lombardy. This is probably because there are few Cainozoic deposits in Lombardy, especially from the Neogene and the Quaternary (approximately the last 23 million years). In this period, the area presently corresponding to the Po Plain was for a long time occupied by a sea of varying depth which only in the mid-late Pleistocene, gave way to environments suitable for terrestrial vertebrates. There are only 12 deposits in Lombardy containing fossils of contemporary reptiles and amphibians; and the entire Neogene-Quaternary record consists of 15 taxon/locality data, less than 2% of the records in Italy for this period. Nearly all the data testify the presence of *Emys orbicularis*.

Delfino, M., F. Chesi, A. Varola, and L. Rook. 2004. New remains of *Psephophorus polygonus* (Chelonii: Dermochelyidae) from the Miocene of Southern Italy. *Abstract 32nd International Congress of Geology, 20-28 August 2004, Firenze, Italy*, Abstract Volume pt. 1, abs. 77-15, pp. 379-380.

Abstract: In the last 150 years, abundant vertebrate remains have been found in the "Pietra Leccese," a sandstone that outcrops extensively in the southeastern tip of Italy and whose age spans the latest Early Miocene and the earliest Late Miocene. The presence of marine (Family Cheloniidae) and soft shell turtles (Family Trionychidae) has been reported by several authors and new species like *Chelonia varicosa* (Costa, 1851) and *Euclastes melii* Misuri, 1910 have been described. Waiting for a review of the original material, recent literature reviews (by de Lapparent de Broin -2001- and Delfino -2002) consider these taxa as undetermined Chelonii and Chelonioidae incertae familiae respectively.

Here we describe the material recovered by one of us (A.V.) at Melpignano (Lecce, Apulia) and stored at the "Museo dell'Ambiente dell'Università di Lecce" with the collection number MAUL 974/1. The material consists of 5 major slabs (plus several fragments and casts) whose upper surface shows the typical carapax ossicles of the marine turtles belonging to the family Dermochelyidae. The slabs

are relatively large (with sides between 40 and 50 cm) and even though the carapax is not complete, the available material allows to understand some details of the fine structure of the shell and of its general shape (that, paradoxically, is poorly known since the shells of these large animals are usually found as little fragments or even disarticulated ossicles). Two kinds of ossicle are present: elongated ones that form the anteroposterior ridges of the carapax, and smaller ossicles that "fill" the spaces between the ridges. The smaller ossicles are not irregularly shaped and sized; their arrangement does not show any "sunflower" pattern. The ridges are dorsally rounded, with gently sloping sides, while their visceral surface is flat. In lateral view, the crest of the ridges forms "peaks and valleys" that coincide with the sutures between elongated ossicles. Ridges are separated by more than 5 ossicles.

According to a recent review of fossil Dermochelyidae published by Wood and co-workers, all these features are typical of *Psephophorus polygonus*, the only Miocene dermochelyid turtle of Europe. This genus has previously recovered from the Miocene of Cusano-Mutri (Campania, central Italy) but the remains from the "Pietra Leccese" are by far more informative and they could represent the best-preserved specimen ever described.

Delfino, M., S. Gentili, and T. Kotsakis. 2004.

The last occurrence of *Latonia* (Anura: Discoglossidae) and the Early Pleistocene herpetofauna of Pietrafitta (Central Italy).

Abstract 32nd International Congress of Geology, 20-28 August 2004, Firenze, Italy, Abstract Volume pt. 1, abs. 150-24, p. 707.

Abstract: The well-known fossiliferous lignite quarry of Pietrafitta (Umbria, Central Italy) yielded an abundant vertebrate assemblage that has been referred to the Farneta Faunistic Unit (Late Villafranchian, Early Pleistocene). The lignite lithosomes are a good example of plant matter accumulated *in situ*, over a relatively extended period of time, in a system of marshes at the periphery of a lacustrine intermontane basin. The occurrence of fossil amphibians and reptiles has been quoted since 1977 by Ambrosetti & co-workers, while the chelonian fauna has been described by Kotsakis & Gregori in 1985.

The recent analysis of all the material recovered so far allows to identify the presence of the following 2 amphibians and 4 reptiles: *Latonia* sp., *Rana* gr. *R. ridibunda*, *Emys orbicularis*, Colubridae indet., *Natrix* sp. and *Vipera ammodytes*. Anuran and snakes fragments devoid of taxonomical value probably belong to the above mentioned taxa. The amphibians remain outnumber those of the reptiles and, not considering the European pond terrapin, they represent nearly entirely the fossil herpetofauna. From a paleoecological point of view, although the taphonomical conditions of lignite deposit strongly bias the taxonomic composition of the fossil assemblage (it is unlikely that very small and delicate skeletons are preserved and recovered), the relative abundance of anurans and pond terrapins strengthens the presence of a humid environment with permanent water.

All the fossil remains are isolated from the matrix and, with the exception of the chelonians, whose shells are sometimes perfectly preserved, all the skeletal elements are completely disarticulated. A specimen of *Latonia*, although disarticulated, is represented by several elements found in a disordered group. The most important element of the Pietrafitta herpetofaunistic assemblage is represented by the large frog *Latonia*. According to a recent summary by Rage & Roček (2003), this genus seems to appear in the earliest Oligocene of France (MP21), in the Miocene it is widespread from Spain to Russia, while in the Pliocene it is rather rare in central Europe but still common in the Mediterranean area. It was thought to disappear at the end of the Pliocene but the Pietrafitta remains testify its survival into the Quaternary. The unquestionable presence of smooth maxillae contrasts with the diagnosis of the only Pliocene species, *L. gigantea*, and requires to reconsider the taxonomy of the genus or the specific chronological ranges.

Delfino, M., A. Segid, D. Yosief, J. Shoshani, L. Rook, and Y. Libsekal. 2004. Fossil reptiles from the Pleistocene *Homo*-bearing locality of Buia (Eritrea, Northern Danakil Depression); pp. 51-60 in Abbate, E., B. Woldehaimanot, Y. Libsekal, T. M. Teclé, and L. Rook (eds.), A step towards human origins. The Buia *Homo* one-million-years

ago in the Eritrean Danakil Depression (East Africa). *Rivista Italiana di Paleontologia e Stratigrafia* 110 (supplement).

Abstract: The Early to early-Middle Pleistocene fossil assemblage from the Buia area (Northern Danakil Depression, Eritrea) hosts, along with *Homo* and several other large mammal taxa, the following reptiles: Nile Crocodile, *Crocodylus niloticus*, Serrated Hinged Terrapin, *Pelusios* cf. *P. sinuatus*, Nile Monitor, *Varanus niloticus* and Central African Rock Python, *Python* gr. *P. sebae*. All the identified taxa belong to living species. At present, these taxa do not occur in the Northern Danakil depression since it is an arid area. *P. sinuatus* is not a member of the Eritrean herpetofauna. Although the marked preponderance of the crocodile remains is probably connected to the taphonomy of the sites and the collecting methods used, the ecological value of the reptile fauna corroborates that of the mammals, in indicating a lacustrine or fluvio-deltaic palaeoenvironment and a tropical/subtropical or even sub-Saharan climate. The Buia remains represent the first reported Eritrean palaeoherpetofauna.

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Egorova V. N. 2004. [Morphology of skull of Mesozoic turtles of 'macrobaenid' grade and position of the Macrobaenidae in the system of turtles]. Ph.D. Dissertation, Moscow State University, Moscow, 197 pp. [in Russian]

Egorova V. N. 2004. The levels of the evolution of the turtle skull within Centrocryptodira (Chelonia). *International conference of students, post-graduate students and young scientists "Lomonosov-2004" 12-15 April 2004. Section of Biology. Moscow: 45-46.*

Abstract: Within Centrocryptodira (including all recent and some fossil families of Cryptodira) we can distinguish three levels of skull evolution.

The first, most primitive level is that of the Xinjiangchelyidae. It is characterized by: the foramina basisphenoidales are absent, the arterias caroticus interni lie open at the sulcus on the ventral side of basisphenoid. A second, more advanced, level is typical for some families, such as Macrobaenidae, Sinemydidae, Lindholmemydidae, Toxochelyidae. The second level is characterized by the presence of foramina basisphenoidales that are formed when the path of the arteria carotica interni are not fully closed by the pterygoids ventrally. The foramen posterius canalis caroticus internus is on the posterior edge of pterygoid, but it can be formed also with the participation of the basisphenoid.

Both lower levels of evolution can have the following characters that differ from the more advanced forms of turtles of the third level: parietals always contact postorbitals; nasals present (can be present in earlier forms and are absent at late forms); prefrontals can be characterized by an anteromedial processes of frontals, at least at the ventral side; parietals may contact squamosals. The character state of the last three features can vary within the group according to the degree of primitiveness of the turtle.

The more advanced third level of the skull evolution is characteristic for the recent members of Chelydroidea, Testudinoidea, Chelonioidea and Trionychoidea. At this level foramina basisphenoidales are fully closed by the pterygoids from below and sometimes there are small foramen caroticopharyngeale (in some Testudinoidea). The foramen posterius canalis caroticus internus remains at the posterior edge of pterygoides, but the basisphenoid does not take part in its formation. Nasals are always absent, prefrontals contact each other, parietals and squamosals are always divided. The more advanced Testudinoidea and Trionychoidea have squamosals that do not contact the postorbitals.

Egorova V. N. 2004. [Skull of turtles of the family Macrobaenidae and their phylogenetic relationships]. *Problemy paleontologii Tsentralnoi Asii [Problems of Paleontology of Central Asia]* (Moscow, 27-28 May 2004).

Abstracts of international conference. Pp. 32-33. [in Russian]

Abstract: Macrobaenidae (Cretaceous – Palaeocene) includes genera of turtles known from skull material: *Dracochelys*, *Kirgizemys*, *Hangaiemys*, *Ordosemys* and *Macrobaena* (Sukhanov, 2000). The structure of the shell in the group varies within relatively narrow limits. Based on cranial features we can distinguish two subfamilies: Macrobaeninae and Kirgizemydinae.

The group uniting *Dracochelys*, *Kirgizemys* and *Hangaiemys* (subfamily Kirgizemydinae) is characterized by relatively increased temporal emargination that reaches the level of the anterior end of otic chamber as well as a transversely-directed processus pterygoideus externus. They have big foramen palatinum posterius and a narrow triturating surface. These features unite Kirgizemydinae with the members of more primitive family Xinjiangchelyidae, that may be ancestor to Macrobaenidae (Peng and Brinkman, 1993).

Ordosemys and *Macrobaena* (subfamily Macrobaeninae) in comparison with Kirgizemydinae are characterized by a series of synapomorphic features of the skull. These are relatively small temporal emargination, that does not reach the level of the anterior side of otic chamber and processus pterygoideus externus is directed at the angle to the transversal axis of the skull. Both genera have small foramen palatinum posterius and relatively wide triturating surfaces. Besides this, they have extensive ventral pits on the basioccipital that expands onto the part of the basisphenoid. Also the pterygoid is expanded posteriorly and forms a wide contact with exoccipital, thus covering from below the processus interfenestralis opisthoticus and removing the fenestra postotica laterally.

Macrobaena differs from *Ordosemys* in the wide middle part of corpus basisphenoideum and the forming of the posterior part of canalis caroticus internus only by the pterygoid. Also in contrary to other Macrobaenidae, *Macrobaena* has no nasals, the diameter of the foramen orbitonasale is relatively large, the foramen jugulare posterius is close and its edges are formed by an expanded ventromedial projection of the pterygoid.

Among Kirgizemydinae, *Dracochelys* differs from close genera *Hangaiemys* and *Kirgizemys* by larger temporal emargination and stronger posterior projections of the processes pterygoideus externus. This genus has the most number of primitive skull

characters among Macrobaenidae. The contact between the pterygoids is very short, so that the rostrum basisphenoidale is almost fully visible ventrally. This brings *Dracochelys* not only together with *Sinemys*, Pleurosternidae from late Jurassic, but also with middle Jurassic *Hecherochelys* (Sukhanov, 2003). Besides this, the canalis caroticus internus is more open and goes close to the suture between pterygoids and basisphenoid. These features are also similar to the more primitive level of skull development, as in Xinjiangchelyidae. The specific character of *Dracochelys* is the disposition of foramina posterius canalis caroticus lateralis far ahead of foramina caroticum basisphenoidale. So the foramen basisphenoidale is very wide and does not have perfect edges.

Kirgizemys and *Hangaiemys* are very similar to each other (Danilov et al., 2003), but *Kirgizemys* differs in that the triturating surface expands posteriorly, the lower jaw is higher, and the processus coronoideus is closer to the middle. The size of the quadratojugal of *Kirgizemys*, especially its posterior dorsal process, is increased, whereas in *Hangaiemys* the quadratojugal is weakly joined to the skull and seemingly was a narrow triangular plate without posterior projection.

On the basis of the preceding we can offer the relationships within Macrobaenidae: ((*Dracochelys* (*Hangaiemys*, *Kirgizemys*)) (*Macrobaena*, *Ordosemys*)).

Egorova V. N. and V. B. Sukhanov. 2004.

[Content and characteristics of Asian families of Mesozoic turtles Macrobaenidae and Sinemydidae]. *Problemy paleontologii Tsentralnoi Asii* [Problems of Paleontology of Central Asia] (Moscow, 27-28 May 2004).

Abstracts of international conference. Pp. 34-35. [in Russian]

Abstract: The system of Macrobaenidae (Sukhanov, 1964) and Sinemydidae (Yeh, 1963) was changed many times by different researchers not only with discovery of new specimens but with the revision of existing material. In this mixed group there are *Ordosemys*, *Macrobaena*, *Hangaiemys*, *Dracochelys*, *Kirgizemys*, *Anatolemys*, *Manchurochelys*, *Sinemys* and some other genera. Some scientists (e.g., Gaffney, 1996) restrict the Macrobaenidae to

include only *Macrobaena* and include the rest of the genera in Sinemydidae in accordance with Ckhikvadze (1977, 1987). But there are serious objections against this division (Khozatsky and Nesson, 1979; Sukhanov, 2000) and this is confirmed by our investigations of materials at the Paleontological Institute of Moscow.

The skulls of this group are similar to each other. They are characterized by the presence of well developed foramina basisphenoidale and also have foramina posterius canalis caroticus internus on the posterior end of pterygoids. Other important characters, such as the presence of contact between prefrontals, contacts between parietals and squamosals and the presence of nasals are variable in this group. Other cranial features are also variable in these genera and so we could not use them for the revision and description of these families.

Sinemys is different from all other genera in its shell features. *Sinemys* specimens lack a nuchal and the posterior end of carapace is reduced: Peripherals VIII-XI are small, there is no pygal, marginals XII do not contact each other, centrale V form the posterior edge of the carapace. Suprapygale I is smaller than II. Peripherale VII is enlarged and usually has a lateral projection. The free ends of ribs of the last 3-4 costals are between adjacent peripherals. The epiplastra are reduced and have the shape of small triangles. The epiplastra do not contact the hyoplastra, as they are separated from them by the entoplastron. The entoplastron is reduced, stretched transversely and form the edge of the anterior lobe of the plastron.

All other members of the group are characterized by opposite shell features. They possess nuchals and the posterior part of carapace is not reduced: they have a pygal, the last peripherals are not reduced. The last centrale is divided from the carapace edge by XII marginals, that contact each other. Suprapygale I is as big as suprapygale II. The free edges of the last ribs enter in the pits on the respective peripherals. The epiplastra are long, lancet shaped, and lie at the angle to the middle line and have long contacts with hyoplastra. The entoplastron is not reduced, has the shape of an elongated rhombus and is divided from the anterior edge of carapace by the epiplastra.

The reduction of the posterior part of carapace and the structure of the anterior plates of plastron determine aberrant character of *Sinemys* and thus we can consider him as the member of the special family Sinemydidae. All other turtles reviewed here

are united by the specific characters listed above into the other family: Macrobaenidae. Macrobaenids more closely approximate the family Xinjiangchelyidae (Peng, Brinkman, 1993). The Xinjiangchelyidae, probably through the series of transformed forms (Macrobaenidae, Lindholmemydidae), gave rise to Chelydridae and Testudinoidea.

The contraction of Macrobaenidae to one genus *Macrobaena* that was offered earlier on the procoelous and not biconvex cervical VIII (Gaffney, 1996) is not valid, as this feature varies in the group and occur also at *Hangaemys*. *Manchurochelys*, sometimes included in Sinemydidae, is more close to Macrobaenidae. The species *Sinemys lens* Yeh and *S. wuerhoensis* Yeh, that was described only by their shells (Yeh, 1963, pl. XIX, fig. 1-2; 1973) cannot be included in *Sinemys* (Brinkman, Peng, 1993) and must be included in Macrobaenidae.

The Macrobaenidae differ from Sinemydidae also by the following cranial features: the anterior end of basisphenoideum (seen from below) is at about the same level with the foramen posterius canalis caroticus lateralis; incisura columellae auris is open. In contrast, the Sinemydidae have the basisphenoid on the ventral side expanded far forward the level of the foramen posterius canalis caroticus lateralis and closed incisura columellae auris.

The investigation is supported by grant of RFFI № 04-05-65000-a.

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Research Statement

We are continuing studies on fossil tortoises from Nebraska, Florida, and the Caribbean. The most time-consuming and rewarding activities of 2004 have been visiting 15 museum collections in the northern Great Plains, New Mexico, west Texas, and the east coast to

examine and photograph their tortoise samples. We plan to continue with museum visitation activities in 2005, particularly those museums in LA, TX, OK, KS, and the American Museum. Our goal is to visit every collection in North America over the next two years.

Highlights of the 2004 field season include the collections of *Gopherus* and *Hesperotestudo* from the Camp Rice Formation (Late Blancan) near La Union in southeastern New Mexico with Gary Morgan and Paul Seeley of the New Mexico Museum of Natural History and *Gopherus* and *Styemys* from the White River sediments at Sand Creek, Sioux County, Nebraska, and near Douglas, Wyoming (Tate Museum symposium field trip).

An especially interesting find this year was the discovery of complete tortoise shells from a blue hole cave on Abaco Island in the northern Bahamas. We will visit the Bahamas this spring to examine this material after the tortoises have been stabilized in freshwater to remove the salt and the bones dried. We plan to describe the tortoise fauna of the Bahamian archipelago, based on this material, other unreported museum specimens, the fossil fragments reported by Auffenberg (1967, *Herpetologica*, 23:34-44), and excellent material from archaeological and cave sites on Grand Turk and Middle Caicos in the Turks and Caicos Islands. DNA samples were successfully recovered from the Grand Turk material. We are currently acquiring blood samples from *Gopherus polyphemus*, *Geochelone pardalis*, and the four South American tortoise species,

which seem closest to the Turks and Caicos fossils.

The Florida studies center on the extensive collections at the Florida Museum. Some interesting discoveries include *Floridemys* from I-75 (late Whitneyan), *Gopherus*-like tortoises from Thomas Farm (early Hemingfordian) and Withlacoochee 4A (early Hempillian), *Styemys*-like tortoises from Cow House Slough (early Arikareean), and Buda (late Arikareean), and *Hesperotestudo*, close to *alleni* (incisa Group), from Buda, several Barstovian sites, and the Love Bone Bed (late Clarendonian). We are also in the process of evaluating a gopher tortoise-like fossil from late Whitneyan beds in southeastern South Carolina. This specimen shows features that may align it with the *flavomarginatus-polyphemus* clade. This gopher tortoise record is second only to *Gopherus laticuneus* in geologic age.

Publications 2004

Franz, R. and S. E. Franz. 2004. An assessment of the White River tortoise faunas from Nebraska and related Oligocene and early Miocene tortoises from Florida and South Carolina. *Tate Museum symposium. June 2004, Casper, WY.*

Franz, R., L. A. Carlson, D. Steadman. 2000. Fossil tortoises from the Turks and Caicos Islands, BWI. *Proceedings Bahamas Field Station, San Salvador (Symposium, 1999).*

Franz, R. 2004. Walter Auffenberg (1928-2004). *Herpetological Review* 35(3):215-216.

Franz, R. 2004. The White River Badlands: Prospecting for ancient tortoise fossils.

Special Florida Museum insert, *Natural History Magazine*, October issue.

Publications In Press

Franz, R., and I. R. Quitmyer. Fossil and archaeological records for gopher tortoises in the southeastern United States. *Bulletin of the Florida Museum of Natural History*.

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Publications 2003

Fuentes Vidarte, C., M. Mejjide Calvo, F. Mejjide Fuentes, M. Mejjide Fuentes. 2003. Rastro de un tetrápodo de pequeño tamaño en el Weald de Cameros (Sierra de Oncala, Soria, España) Nov. Icnogen. Nov. Incnosp.: *Emydhipus cameroi*. p. 119-128. in F. P. Lorente (ed.) Dinosaurios y otros reptiles Mesozoicos en España. Fundación patrimonio Paleontológico de La Rioja, La Rioja.

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Statement

To see a summary of my work and my bibliography, please go to:

<http://research.amnh.org/~esg>

Please refer to BioOne for online copies of my recent papers. Soon all AMNH Bulletins and Novitates will be available online.

Publications 2004

Siddall, M, and **E. S. Gaffney**. 2004. Observations on the leech *Placobdella ornata* feeding from bony tissues of turtles, *Journal of Parasitology*, 90(5):1186-1188.

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Research Interests:

This January, I am entering the workforce (finally!) as a fossil preparator for San Diego Natural History Museum, so research may be minimal. At the very least, I will be working on resurrecting *Toxochelys browni* as a valid species (currently considered a junior synonym of *Toxochelys latiremis*). I plan to examine other individuals identified as *Toxochelys latiremis* as opportunities arise.

Sea turtles and other marine reptiles are my main research interests. As for disciplines of paleo, I am very interested in geometric morphometrics and functional morphology.

Publications 2004

Hart, M. M. 2004. *Toxochelys*: Taxonomic comparison and stratigraphic distribution during the Campanian lower Pierre Shale of South Dakota. M.S. thesis, South Dakota School of Mines and Technology, Rapid City, South Dakota, 109 pp.

Abstract: The Campanian Pierre Shale contains a diverse assemblage of marine reptiles, including the sea turtle, *Toxochelys*. The Museum of Geology at the South Dakota School of Mines and Technology houses 64 toxochelids collected from six members of the Pierre Shale of the Black Hills Region in western South Dakota and the Missouri River Trench of central South Dakota. Correlation of beds within the Pierre Shale members has allowed the *Toxochelys* specimens to be arranged and analyzed in the order of stratigraphic occurrence.

Forty-three *Toxochelys* have been collected from three members of the Pierre Shale in western South Dakota, having a temporal range spanning from the late Early to the Middle Campanian. Seven *Toxochelys* have been collected from the Gammon Ferruginous Member, the basal member of the Pierre Shale. Twenty-eight have been collected from the overlying unit, the Sharon Springs Member. The remaining eight were collected from the Mitten Black Shale Member. Twenty-one *Toxochelys* have been recovered from four members of the Pierre Shale in central South Dakota, with a temporal range from the late Early to Late Campanian. The Sharon Springs is the basal member in central South Dakota and is overlain by the Gregory Member. Each member has yielded one *Toxochelys*. The Crow Creek Member overlies the Gregory; no specimens have been recovered from this member yet. The DeGrey Member lies above the Crow Creek and has produced fifteen individuals. The youngest Campanian unit, the Verendrye Member has yielded four *Toxochelys*.

Cranial and mandibular material useful in taxonomic identification are included with twenty-one of the sixty-four toxochelids. Twenty of the specimens are identified as *Toxochelys* sp. cf. *T. browni*, pending resurrection of *Toxochelys browni* and are defined by snout emargination, a hooked beak of the mandible, and labial and lingual ridges of the dentary. These specimens were recovered from the basal three units of the Pierre Shale in western South Dakota. One specimen is identified as *Toxochelys* sp. A, defined by a smooth snout without emargination, a posterolateral margin of the pterygoid that extends to the base of the mandibular condyle, and absence of the mandibular depressor muscle attachment site along the posterior edge of the articular. This specimen was recovered from the DeGrey Member of the Pierre Shale in central South Dakota. The remaining toxochelids do not include material useful for species designation and are referred to as *Toxochelys* sp. indet.

Results of this analysis indicate that *Toxochelys* sp. cf. *T. browni* could serve as the basis for a biostratigraphic local range taxon zone, spanning the time from the late Early Campanian to the Middle Campanian, between 81 and 78 million years ago.

Hart, M. M. 2004. Biostratigraphic distribution and cranial size comparisons of *Toxochelys* (Testudines; Cheloniidae) of the Campanian Pierre Shale of South Dakota: *Journal of Vertebrate Paleontology, Abstract, Sixty-fourth Annual Society of Vertebrate Paleontology Meeting*, p. 68A.

Abstract: The Campanian Pierre Shale contains a diverse assemblage of marine reptiles, including the sea turtle, *Toxochelys*. The Museum of Geology at the South Dakota School of Mines and Technology houses sixty-nine toxochelids. The toxochelids have been recovered from six members of the Pierre Shale. Seven have been collected from the Gammon Ferruginous Member, the basal member of the Pierre Shale. Thirty-four have been collected from the overlying unit, the Sharon Springs Member. In western South Dakota, suprajacent to the Sharon Springs Member is the Mitten Black Shale Member. This unit has produced eight toxochelids. In central South Dakota, the Gregory Member rests upon the Sharon Springs Member and has produced one turtle. The Crow Creek Member overlies the Gregory; no specimens have been recovered from this member as of yet. The DeGrey Member lies above the Crow Creek Member and has yielded fifteen individuals. The youngest Campanian unit, the Verendrye, has produced four of the chelonians collected by the Museum of Geology. Accurate field notes recorded by the field crews were used to correlate the stratigraphic distribution of these specimens and their localities. Of the sixty-nine identified toxochelids, twenty-two include cranial and/or jaw material. Forty-six characters of the skull and lower jaw were measured and analyzed for each of the toxochelids. Stratigraphic data was then incorporated with the analytical data to analyze the morphologic changes in a temporal sequence.

Hart, M. M. 2004. Size variation in cranial morphology of Late Cretaceous *Toxochelys* (Testudines; Cheloniidae) of South Dakota:

Geological Society of America, Rocky Mountain and Cordilleran section, Abstracts with Programs, vol. 36, no. 4, p. 80.

Abstract: In 1988, five species belonging to the genus *Toxochelys* were reexamined. As a result, only two species were considered valid, *T. latiremis* Cope and *T. moorevillensis* Zangerl. *T. browni* (Hay), *T. weeksi* Collins, and *T. barberi* (Schmidt) were designated as junior synonyms of *Toxochelys latiremis* (Nicholls 1988). Prior to the reinvestigation, *T. browni* was a species defined by its broader size limits and distinct premaxillary region. Nicholls dismissed these characters as natural variations within a species, attributing them to temporal factors. *T. browni* was also temporally restricted, only being found in the lower Pierre Shale, a unit that had not been known to yield *T. latiremis*. Eleven undescribed toxochelid skulls from the Pierre Shale of South Dakota have been studied and all exhibit sizes that are less than or greater than the size range specified for *T. latiremis*. Furthermore, all of the toxochelids retaining an anterior cranial region display the characteristic sigmoidally-curved lateral margins of the premaxilla and maxilla. This character is not observed in *T. latiremis*. It is a possibility that *T. browni* may have been incorrectly assigned junior synonym status. In order to examine this uncertainty, a preliminary study has been conducted to determine if the systematics of *Toxochelys* needs to be readdressed. 46 characters of the skull and lower jaw were measured on the group of eleven Pierre Shale toxochelids and on a separate group of turtles belonging to *T. latiremis*. Measurements were first compared within each group to establish generalities. This and the original data were then used to compare proportionality of the various measurements and to compare the average growth rate between the two groups. Differing proportions between the two groups in both morphology and growth rate indicate the possibility of an error in the synonymization. Further research is recommended to clarify this uncertainty.

Publications In Press

Knell, M. J. and **M. M. Hart**. Using the modern analog *Caretta caretta* (Testudinata: Cheloniidae) to study taphonomic processes of fossil sea turtles from the Cretaceous Pierre

Shale (Campanian-Maastrichtian) of South Dakota, USA: Extended abstract for poster presentation at the Twenty-fourth Annual Symposium on Sea Turtle Biology and Conservation, San Jose, Costa Rica.

Abstract- During the Cretaceous Period, a vast seaway covered much of the central North American continent. The state of South Dakota was centrally located within this epicontinental seaway. A diverse assemblage of marine reptiles, including two families of fossil sea turtles, Protostegidae and Cheloniidae, can be found in the Cretaceous Pierre Shale. Taphonomic studies of fossils derived from the Pierre Shale have not included sea turtles until now. The St. Catherines Island Sea Turtle Project provides us with a modern analog for sea turtle nesting and posthumous processes. The extant sea turtle *Caretta caretta* annually uses the beaches of Georgia, including St. Catherines Island, as a nesting ground. Deceased turtles commonly wash ashore, exhibiting either partial or no decomposition. The stranded turtles are then documented through measurements and photography to record the decay process. Using this data, in conjunction with preservation details acquired from the Cretaceous fossil sea turtles of South Dakota, it is possible to correlate death processes between the two.

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Publications 2004

Hervet, S. 2004. Systématique du groupe « *Palaeochelys* sensu lato – *Mauremys* » (Chelonii, Testudinoidea) du Tertiaire d'Europe occidentale : principaux résultats. *Annales de Paléontologie* 90(1):13-78.

Hervet, S. 2004. A new genus of “Ptychogasteridae” (Chelonii, Testudinoidea)

from the Geiseltal (Lutetian of Germany).
Comptes Rendus Palévol 3(1):125-132.

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Publications 2004

Okazaki, H., N. Kaneko, **R. Hirayama**, S. Isaji, H. Kato, H. Taru, Y. Takakuwa, A. Momohara, and H. Ugai. 2004. Flood-plain deposits and fossil assemblages of the Middle Pleistocene Kiyokawa Formation, Shimosa Group, East Japan. *Quaternary Research* 43:359-366.

Publications In Press

Hirayama, R., S. Egi, and M. Natori. A femur of soft-shelled turtle (Family Trionychidae; Order Testudines) from the Early Miocene Katsuta Group of Okayama Prefecture, western Japan. *Bulletin of the Kurashiki Museum of Natural History* 20:1-5. (in Japanese with English Abstract).

Tong, H. and **R. Hirayama**. First Cretaceous dermochelyid turtle from Africa. *Revue de Palaeobiologie*.

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Publications 2004

Holman, J. A. 2004. Book Review of: Gerlach, J., 2004. Giant Tortoises of the Indian Ocean, The genus *Dipsochelys* inhabiting the Seychelles Islands and the extinct giants of Madagascar and the Mascarenes. *Bulletin of the Chicago Herpetological Society* 39:224-225.

Publications In Press

Holman, J. A. and U. Fritz. The box turtle genus *Terrapene* (Testudines: Emydidae) in the Miocene of the USA. *Herpetological Journal*.

Holman, J. A. and D. Parmley. Noteworthy turtle remains from the Miocene (Late Hemphillian) of northeastern Nebraska. *Texas Journal of Science*.

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Publications 2004

Hutchison, J. H., **P. A. Holroyd**, and R. L. Ciochon. 2004. A preliminary report on Southeast Asia's oldest Cenozoic turtle fauna from the late middle Eocene Pondaung

Formation, Myanmar. *Asiatic Herpetological Research* 10:38-52.

http://www.ucmp.berkeley.edu/people/pah/HHC_2004_AHR.pdf

Publications In Press

Holroyd, P. A., J. F. Parham, and J. H.

Hutchison. A reappraisal of some Paleogene turtles from the southeastern United States.

Journal of Vertebrate Paleontology.

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Research Statement

I am afraid that I do not have much of import to contribute. My move from Alabama to Virginia together with teaching and administrative responsibilities have kept me pretty much out of the research arena for the last few years. I will hopefully get some work done this summer and have something to contribute the next time around.

Publications 2004

Shimada-Kenshu and **G. E. Hooks III**. 2004.

Shark-bitten protostegid turtles from the Upper Cretaceous Mooreville Chalk, Alabama. *Journal of Paleontology*. 78(1):205-210.

Abstract: Protostegids are Cretaceous marine turtles. Fossil materials assignable to the family

Protostegidae range from early Albian to Late Campanian in age and have been described from all continents except Antarctica (Hirayama, 1995). The group includes two gigantic forms, *Archelon* Wieland and *Protostega* Cope, that reached maximum carapace lengths in excess of 2 m and rank among the largest turtles that ever lived. In this paper, we describe two specimens of *Protostega gigas* Cope housed in the Field Museum of Natural History (FMNH), Chicago, Illinois: FMNH P27452 and FMNH PR58. Both are from the Mooreville Chalk (Upper Santonian to Lower Campanian: Mancini et al., 1995) in Greene County, Alabama, and are noteworthy because they show tooth marks from at least one large shark. One of the specimens also exhibits five embedded teeth of the Late Cretaceous cretoxyrhinid shark *Cretoxyrhina mantelli* (Agassiz). This note constitutes the first report of protostegid turtles bitten by *C. mantelli*.

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Publications 2004

Hutchison, J. H., P. A. Holroyd, and R. L.

Ciochon. 2004. A preliminary report on Southeast Asia's oldest Cenozoic turtle fauna from the late middle Eocene Pondaung Formation, Myanmar. *Asiatic Herpetological Research* 10:38-52.

Abstract: Late middle Eocene fossils from the Pondaung Formation of central Myanmar document Southeast Asia's oldest Cenozoic turtle fauna. Although the material is fragmentary, seven distinct turtle taxa are recognized. These include a podocmenid pleurodire, anosteirine and carettochelyine carettochelyids, two or more trionychine trionychids, and a testudinid. Of these, only the carettochelyine carettochelyid is complete enough to recognize as a new taxon, *Burmemyx magnifica*, gen. et sp. nov. The Pondaung turtle fauna is one of

the best known of its age from Southeast Asia but comparisons with the limited literature of the Eocene faunas from China, Mongolia, and the Indian subcontinent indicate it is probably biogeographically unique. Among the recognized genera, only *Anosteira* is known from other Eocene Asian localities, and the presence of pleurodires is unusual.

Hutchison, J. H. and A. D. Pasch. 2004. First record of a turtle (*Protochelydra*, Chelydridae, Testudines) from the Cenozoic of Alaska (Chickaloon Formation, Paleocene-Eocene). *PaleoBios* 24(1):1-5.

Abstract: A chelydrid turtle from the late Paleocene (Clarkforkian NALMA) of the Chickaloon Formation, near Anchorage, is the first record of a turtle from the Cenozoic of Alaska and the most northerly record of the family known thus far. The specimen consists of a partial carapace from a plant-rich carbonaceous mudstone. It compares most closely with *Protochelydra zangerli* from the late Paleocene (Tiffanian NALMA) of North Dakota.

Publications in Press

Holroyd, P. A. J. F. Parham, and **J. H. Hutchison**. A reappraisal of some Paleogene turtles from the southeastern United States. *Journal of Vertebrate Paleontology*.

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Research Interests

My dissertation research focuses on the evolution of the turtle skull, with a particular focus on the cranial circulation. I am taking an integrative approach that utilizes information

gathered from embryological studies, computed tomography of extinct and extant skulls, and traditional morphological assessments. I am attempting to thoroughly document patterns in the internal carotid circulation, from which systematic characters have been drawn in many analyses of turtle phylogeny, in order to better assess the utility and importance of such characters in determining turtle interrelationships.

Publications 2004

Jamniczky, H. A. and A. P. Russell. 2004. In the eye of the beholder: A geometric morphometric assessment of the batagurine process of testudinoid turtles. *Journal of Morphology* 260(3):302.

Jamniczky, H. A. and A. P. Russell. 2004 You can't believe your eyes! A geometric morphometric assessment of the batagurine process of testudinoid turtles. *Canadian Society of Zoologists Bulletin* 35(2):96.

Jamniczky, H. A. and A. P. Russell. Cranial arterial foramen diameter in turtles: quantitative assessment of size-independent phylogenetic signal. *Animal Biology* 54(4):417-436.

Jamniczky, H. A. and A. P. Russell. A geometric morphometric analysis of the batagurine process in testudinoid turtles. *Amphibia-Reptilia* 25(4):369-379.

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Personal Message

The year 2004 was a rather eventful year in my life, given that I started my new position as Collections Manager for the Division of Vertebrate Paleontology at Yale University in March and successfully defended my thesis in May. So far, I am rather pleased with my new position.

I have had less time this last year to devote myself to the study of fossil turtles than in previous years. I nevertheless expect my final thesis chapter, a cladistic analysis of basal turtles (see SVP Abstract below) to appear in print this year. Two small review chapters regarding European fossil Dermochelyidae and Cheloniidae that I coauthored with Gabe Bever for the *Handbuch der Reptilien und Amphibien Europas* (also see Igor Danilov below) will likely appear in print as well.

I am currently coauthoring with Hans-Volker Karl a brief description of Rupert Wild's infamous mid-Triassic Muschelkalk "turtle" and with a group centered on Torsten Scheyer (University of Bonn) a paper regarding the

bone histology of the trionychid shell. Once these projects are out of the way, I hope to devote my time again to the formal description of *Kayentachelys aprix* and my beloved Solnhofen turtles, in particular some wonderful material that has been discovered by Hans-Volker Karl in some private collections that we hope to integrate into public collections for description.

2004 Publications

Joyce, W. G. 2004. Systematics, Nomenclature, and Ecology of Mesozoic Turtles. Ph.D. Dissertation, Yale University, New Haven, Connecticut, 470 pp.

Joyce, W. G. 2004. A phylogeny of turtles and the age of the turtle crown. *Journal of Vertebrate Paleontology* 24(3, Supplement):77A.

Abstract: This study is the first morphological analysis of turtle relationships that attempts to test the monophyly of numerous groups of turtles by using only single species as terminals and by integrating a large number of primitive fossil taxa. The final data matrix consists of 136 osteological characters with 171 derived character states for 45 fossil and 22 living species of the clade *Testudinata*.

The results of this analysis corroborate the monophyly of a large number of previously hypothesized clades, but refute the accepted hypothesis regarding the basal split of living turtles. In particular, the primitive turtles *Proterochersis robusta*, *Kayentachelys aprix*, *Mongolochelys efremovi*, *Meiolania platyceps*, and *Kallokibotion bajazidi* are removed from their current position as crown turtles and placed along the phylogenetic stem of this clade. The age of the turtle crown must thus be adjusted from the Late Triassic to the Late Jurassic, a conclusion relevant when testing molecular clock hypotheses. This revised topology has important implications regarding the evolution of several character complexes, because it implies that the common ancestor of all living turtles must have possessed a partially braced brain case and a

primitive trochlear mechanism. Other noteworthy results include the tentative exclusion of protostegids from *Chelonioidea*, the placement of *Platysternon megacephalum* outside of *Chelydridae*, and the tentative interpretation of *Sandownia harrisi* as a basal eucryptodire.

Joyce, W. G., and C. J. Bell. 2004. A review of the comparative morphology of testudinoid Turtles (Reptilia: Testudines). *Asiatic Herpetological Research* 10:53-109.

Abstract: With an expansive geographic distribution, an excellent fossil record, and over 140 recognized extant species, testudinoid turtles constitute one of the most diverse and widespread clades of turtles. The current understanding of the distribution of morphological characters among testudinoid turtles is poor. Improved knowledge will help to facilitate accurate identification of fossil remains, and to provide a reliable morphological data set for phylogenetic analyses. We provide a critical review of skeletal and scute characters commonly utilized in previous systematic analyses of Testudinoidea. Description and illustration of character states, discussion of their distribution within Testudinoidea, and polarity determinations for 93 characters are provided. Our preliminary results indicate that ontogenetic changes in skeletal structure are an important source of variation within Testudinoidea. Sexual variation, ontogenetic variation, and intra- and inter-population variation are inadequately documented for most testudinoid taxa. Furthermore, data matrices of morphologic characters in the existing literature must be carefully reconsidered. Morphologic data provide reasonably strong support for the monophyly of 'Testudinidae.' Strong morphologic support for a monophyletic 'Emydidae' is lacking, and 'batagurid' monophyly has not been rigorously tested in the literature. Because a new research cycle centered on testudinoid phylogeny is now under way, it is essential to critically re-examine the underlying assumptions and working hypotheses that have governed this field of study over the last 20 years.

Joyce, W. G., and J. A. Gauthier. 2004. Palaeoecology of Triassic stem turtles sheds new light on turtle origins. *Proceedings of the Royal Society of London, Series B* 271:1-5.

Abstract: Competing hypotheses of early turtle evolution contrast sharply in implying very different ecological settings – aquatic vs. terrestrial – for the origin of turtles. We investigate the palaeoecology of extinct turtles by first demonstrating that the forelimbs of extant turtles faithfully reflect habitat preferences, with short-handed turtles being terrestrial and long-handed turtles being aquatic. We apply this metric to the two successive outgroups to all living turtles with forelimbs preserved, *Proganochelys quenstedti* and *Palaeochersis talampayensis*, to discover that these earliest turtle outgroups were decidedly terrestrial. We then plot the observed distribution of aquatic vs. terrestrial habits among living turtles onto their hypothesized phylogenies. Both lines of evidence indicate that although the common ancestor of all living turtles was aquatic, the earliest turtles clearly lived in a terrestrial environment. Additional anatomical and sedimentological evidence favours these conclusions. The freshwater aquatic habitat preference so characteristic of living turtles, consequently, cannot be taken as positive evidence for an aquatic origin of turtles, but must rather be considered a convergence relative to other aquatic amniotes, including the marine sauropterygians to which turtles have sometimes been allied.

Joyce, W. G., N. Klein, and T. Mörs. 2004. A Carettochelyine Turtle from the Neogene of Europe. *Copeia* 2004:405-410.

Abstract: We identify a fragmentary turtle specimen from the middle Miocene (MN 5) of Hambach, Germany, as the bridge peripheral of a carettochelyine turtle. This important find extends the fossil record of the group to the Neogene of Europe and calls into question the utility of fossil carettochelyids in identifying tropical climate zones.

Joyce, W. G., J. F. Parham, and J. A. Gauthier. 2004. Developing a protocol for the conversion of rank-based taxon names to phylogenetically defined clade names, as exemplified by turtles. *Journal of Paleontology* 78:989-1013.

Abstract: We present a rank-free phylogenetic nomenclature for 25 well-established deep clades of living turtles. This is the first attempt to fully

document the nomenclatural history of a group with the intent of proposing a coherent nomenclatural system to replace the traditional rank-based nomenclature. Because of the imperative to retain connectivity to the literature for information retrieval, due consideration is given to balancing the desire to develop a consistent system against the desire to conserve traditional associations between names, taxa (i.e., groups of species or organisms), and characters. Novel issues and problems that emerged during this review include: the unclear name/taxon association of traditional names; the creation of synonymy lists from which to choose a name; difficulties associated with selecting a single criterion for choosing among multiple subjectively 'synonymous' names; identifying authorship for any given traditional name; and the potential loss of nomenclatural information due to 'functional homonyms.' Due to its comprehensive nature, this work may provide a useful roadmap to those intent on converting their traditional Linnaean nomenclatures to phylogenetic nomenclatures under the precepts of the PhyloCode.

Publications in Press

Joyce, W. G., and M. A. Norell. *Zangerlia ukhaachelys*, n. sp., a nanhsiungchelyid turtle from the Late Cretaceous of Ukhaa Tolgod, Mongolia. *Bulletin of the American Museum of Natural History*.

Abstract: The Late Cretaceous continental deposits of Ukhaa Tolgod, Mongolia have yielded remains of a new nanhsiungchelyid turtle, *Zangerlia ukhaachelys* n. sp. This taxon is based on a single individual that consists of a partial cranium, representatives of all peripherals, an almost complete plastron, and limb fragments. *Zangerlia ukhaachelys* is diagnosed as a new taxon by the presence of an anteromedial process of the hyoplastron that reduces the typical contact of the entoplastron with the epiplastron. Phylogenetic analysis firmly places *Zangerlia ukhaachelys* as sister to *Zangerlia testudinimorpha* and *Zangerlia neimongolensis* within *Nanhsiungchelyidae* and confirms the close phylogenetic relationships between *Nanhsiungchelys wuchingensis* and *Anomalochelys angulata* and among all North American representatives of *Basilemys*. In addition, there is modest support that all Asian

representatives of *Nanhsiungchelyidae* form a monophyletic clade, which is primarily diagnosed by a deep, triangular nuchal notch. From a biogeographic standpoint, it is evident that the Late Cretaceous faunas of Asia and North America are closely related, however, phylogenetic considerations demonstrate that faunal exchange was limited for the *Nanhsiungchelyidae*.

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Research Statement:

My research interests pertain to the morphology, phylogenetic relationships, palaeoecology, and nomenclature of fossil and recent turtles and crocodiles.

In 2004, I finished a survey of Jurassic and Lower Cretaceous turtles from northwestern Germany. The manuscript is currently under review at *Geologisches Jahrbuch*. Additional works on Cenozoic turtles from Turkey, Philippine giant land tortoises, and Holocene turtle remains of the Niger Sahara are accepted for publication in *Geologisches Jahrbuch* as well. I also finished a note on Pliocene turtles from the Chiwando beds of Malawi that were found last year by a team lead by Friedemann Schrenk of Frankfurt/ Main.

I am currently working on numerous fossil turtles from the Weißelster basin near Leipzig in Central Germany. The sample includes *Glarichelys knorri* (syn. "*Chelone Gwinneri*"), an allopleurid sea turtle, trionychids and indet. remains. I furthermore am studying some

complete specimens from the southern German lithographic limestones of the Upper Kimmeridge of Eichstätt and Painten in Franconia, Germany. I am having this material CT-scanned at the Forensic Institute of Salzburg. Most specimens are prepared dorsally and the bone plates are too thin for acid preparation. Comparative surveys between the complete extremities of the fossil materials with recent turtles are being made. This is resulting in a precise reconstruction of their locomotions and ecological type. New taxa appear to be present.

Publications 2004

Karl, H.-V. and G. Tichy. 2004. Zur frühen Geschichte der Paläocheloniologie von Schaumburg-Lippe. Die Rolle des Gymnasial-Professors Max Ballerstedt in der Naturwissenschaft. *Berichte zur Wissenschaftsgeschichte* 27:285- 296.

Summary: A survey is given on some new aspects of the early history to the palaeochelontology in Schaumburg-Lippe (Northern Germany). The very slow development of this is good reconstructable on base of authentic estates. It is the first time to make such a nearly complete reconstruction.

Publications in Press and Review

Karl, H.-V. The structure of fossil teeth of chelonophagous crocodiles (Diapsida: Crocodylia. *Studia Geologica Salamanticensia* 41:1- 11.

Karl, H.-V. About the structure of axial elements of turtle shell. *Studia Geologica Salamanticensia* 41:13- 22.

Karl, H.-V. and U. Staesche. Fossil Giant Land Tortoises from the Philippines and their palaeogeographic importance.

Abstract: First finds of remains of giant land tortoises from the Philippine island Luzon are described. They give rise to review the possibilities of land vertebrates colonizing the southeast asian archipels during Pliocene and Pleistocene. The fossil tortoises belong to the genus *Manouria* (GRAY 1854). They acquired their giant stature only by their life on the island.

Karl, H.-V. and U. Staesche. Remains of fossil Turtles and other Vertebrates from Holocene Lake Sediments in the present Sahara Desert.

Abstract: Remains of aquatic turtles and fishes as well as of mammals are described from sediments of so far unknown holocene lakes. These remnants allow the identification of climate and the ecological situation of the area during the existence of the lakes.

Karl, H.-V., U. Staesche, G. Tichy, J. Lehman and S. Peitz. Systematics of the turtles (Reptilia: Testudines) of Upper Jurassic and Early Cretaceous from Northwestern Germany

Abstract: This work tries to fill the gap in the investigation of the fossil turtles of Upper Jurassic and Lower Cretaceous from Northern Germany, which exists since the latest publication of Oertel (1924). The complete turtle material, presently known and accessible, is summarised and systematically revised. The research of the complicated conditions within the type material is especially emphasized. With the exception of *Pleurosternon koeneni* Grabbe 1884 all type specimen could be ascertained.

Staesche, K., **H.-V. Karl** and U. Staesche. On fossil turtles from Turkey

Abstract: Several sites in the western part of Turkey yielded remnants of fossil turtles. Of special interest in on nearly complete juvenile and the plastron of an adult giant land tortoise. The material which was shortly noted by Staesche (1975) is here newly interpreted and described in detail. The Turkish samples include members of the Testudinidae, Emydidae, Batagurinae and Trionychinae. Based on these forms, a

palaeoecological reconstruction is given as well as a synopsis of Eurasiatic giant land tortoises.

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Research Statement

For my master's thesis I described some middle Miocene turtles from the Rhenish Lignite Formation near Cologne, Germany. Based on numerous isolated shell fragments, I was able to identify *Chelydropsis murchisoni*, *Trionyx*, *Ocadia sophiae*, *Clemmydopsis*, and a land tortoise (Testudinidae). From the same locality Walter Joyce and I identified the peripheral of a carettochelyid turtle. Currently, I am unable to undertake much fossil turtle research, but I remain interested in various aspects of fossil and extant turtle and tortoises research, mainly morphology and paleoecology.

Current turtle projects include the description of an Upper Miocene carapace of an testudinoid turtle from the Rhenish Lignite Formation, Germany, the description of a Pliocene mandible of *Chelydropsis*, also from the Rhenish Lignite Formation, Germany, and the identification of two possible turtle costals from the Late Triassic (Norian) locality Frick, Switzerland.

Publications 2004 and 2004:

Joyce, W. G., N. Klein, and T. Mörs. 2004. A carettochelyid Turtle from the Neogene of Europe. *Copeia* 2004:405-410.

Klein, N. and T. Mörs. 2003. Die Schildkröten (Reptilia: Testudines) aus dem Mittel-Miozän von Hambach (Niederrheinische Bucht, NW-Deutschland). *Palaeontographica, Abteilung A* 268:1-48.

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Research Statement

I am a second year graduate student at the University of Iowa. I am currently working on a description of the Eocene turtle *Baptemys wyomingensis* with comparison to its sister taxon *Dermatemys mawii*. I am interested in searching for additional phylogenetic characters that have not been perviously included in phylogenetic analysis.

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Research Statement

More than one year after my retirement from the MNHN, I am still active with fossil turtle research working both from home and the MNHN. However, given the permanent difficulties I am having with my MNHN email address, I am asking my colleagues to please contact me using the private email addresses provided herein.

I am currently working on a project with Gérard Breton regarding some plesiochelyids from the Kimmeridgian of Le Havre, France. The material includes a carapace and (more importantly) a partial plastron of *Tropidemys* and a carapace of a turtle attributable to *Craspedochelys* s.l.

Together with French and German colleagues, I am also studying the fauna from a new Lutetian locality in southern France that includes some interesting crocodylian and chelonian material. This study is interesting because some of the taxa are represented by cranial material for the first time in France, although shell/cranium associations are lacking.

Publications 2003 and 2004

Gaillard, C., P. Bernier, G. Barale, J.-P.

Bourseau, **F. de Lapparent de Broin**, E. Buffetaut, R. Ezquerro, J.-C. Gall, S. Renous, and S. Wenz. 2003. A giant Upper Jurassic turtle revealed by its trackways. *Lethaia* 36:315-322. [available as PDF]

Godinot, M., and **F. de Lapparent de Broin**. 2003. In favour of a mammalian and reptilian dispersal from Asia to Europe during the Paleocene-Eocene boundary interval. *Deinsea* 10:255-275. [available as PDF]

Lapparent de Broin, F. de. 2003. *Neochelys* sp. (Chelonii, Erymnochelyinae), from Silveirinha, early Eocene, Portugal. *Ciencias da Terra (UNL)* 15:117-132.

Lapparent de Broin, F. de. 2003. The Miocene chelonians from the southern Namibia. *Memoirs of the Geological Survey of Namibia*, 19:67-102. [available as PDF]

Néraudeau, D., R. Allain, V. Perrichot, B. Videt, **F. de Lapparent de Broin**, F. Guillocheau, M. Philippe, J. C. Rage, and R. Vullo. 2003. Découverte d'un dépôt paralique à bois fossiles, ambre insectifère et restes d'Iguanodontidae (Dinosauria, Ornithopoda) dans le Cénomanién inférieur de Fouras (Charente-Maritime, sud-ouest de la France), *Comptes Rendus Palevol* 2(3):221-230. [available as PDF]

Lapparent de Broin, F. de. 2004. A new Shachemydinae (Chelonii, Cryptodira) from the Lower Cretaceous of Laos: preliminary data. *Comptes Rendus Palevol* 3:387-396. [available as PDF]

Lapparent de Broin, F. de, X. Murelaga Bereikua, and V. Codrea. 2004. Presence of Dortokidae (Chelonii, Pleurodira) in the earliest Tertiary of the Jibou Formation, Romania: Paleobiogeographical implications. *Acta Palaeontologica Romaniae* 4:203-21. [available as PDF]

Publications In Press

Lapparent de Broin F. de, M. S. de la Fuente and M. Fernandez. *Notoemys* (Chelonii, Pleurodira), late Jurassic of Argentina: new examination of the anatomical structure and comparisons. *Revue de Paléobiologie*.

Abstract: *Notoemys*, a basal pleurodiran turtle of the Upper Jurassic from South-Argentina, is reconsidered with respect to the evolutive process of some anatomical structures: proportions of the skull, back skull, neck and suture of the pelvis to the carapace. Comparison of these structures between different monophyletic groups of turtles shows the presence of many homoplasies or pretended homoplasies. Suggestions are given concerning the relationships of the primitive taxa. *Notoemys* is here considered as the sister-taxon of *Caribemys*.

Older Publications Now Available as PDFs

Lapparent de Broin, F. de. 2000. The oldest pre-Podocnemidid turtle (Chelonii, Pleurodira), from the early Cretaceous, Ceará state, Brasil, and its environment. *Treballs del Museu de Geologia de Barcelona* 9:43-95.

Lapparent de Broin, F. de. 2000. African chelonians from the Jurassic to the Present. A preliminary catalog of the African fossil chelonians. *Palaeontologia Africana* 36:43-82.

Lapparent de Broin, F. de. 2001. The European turtle fauna from the Triassic to the Present. *Dumerilia* 4(3):155-216.

Lapparent de Broin, F. de, and M. S. de la Fuente. 2001. Oldest World Chelidae (Chelonii, Pleurodira), from the Cretaceous of Patagonia, Argentina. *Comptes Rendus de l'Académie des Sciences Paris II* 333:463-470.

Lapparent de Broin, F. de, and R. Molnar. 2001. Eocene chelid turtles from Redbank Plains, southeastern Queensland, Australia. *Geodiversitas* 23(1):41-79.

Carvalho, P., J. Bocquentin, and **F. de Lapparent de Broin**. 2002. Une nouvelle espèce de *Podocnemis* (Pleurodira, Podocnemididae) provenant du Néogène de la formation Solimões, Acre, Brésil. *Geobios* 35(6):677-686.

Lapparent de Broin, F. de. 2002. *Elosuchus*, a new genus of crocodile from the lower Cretaceous from the north of Africa. *Comptes Rendus Palevol* 1:275-285.

Murelaga, X., X. Pereda Suberbiola, **F. de Lapparent de Broin**, J.-C. Rage, S. Duffaud, H. Astibia, and A. Badiola. 2002. Amphibians and reptiles from the Early Miocene of the Bardenas Reales of Navarre (Ebro basin, Iberian Peninsula). *Geobios* 35(3):347-365.

Prasad, G. V. R., and **F. de Lapparent de Broin**. 2002. Cretaceous crocodile remains from Naskal (India): comparisons and biogeographic affinities, *Annales de Paléontologie* 88(1):19-71.

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Research Statement

Current research projects include Blancan turtles from Arizona (*Terrapene*, *Kinosternon*, *Gopherus*, and *Hesperotestudo*), *Gopherus* in general, and Cretaceous turtles of Arizona and Sonora. Some or all of these might see publication in 2005, if heading the SVP host committee doesn't kill me first.

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Research Statement

I am working on the final stages of a book with 36 contributing authors on the biology and conservation of Florida turtles. It will appear in the Chelonian Monograph Series produced by the Chelonian Research Foundation. We are trying to get it printed in time for the herpetology meetings in Tampa this year. The volume is a result of two symposia that were held at Eckerd College in 1994 and 1999. It involves fossils only in that I have written family introductions for each of the seven families found in Florida that try to emphasize

the great age of each of them rather than just the ancient age of turtles in general.

As project this takes up less of my time, I am devoting more time to fossils and phylogenies, in particular projects with Gene Gaffney on side-necked turtles. I continue to do some research on living marine and freshwater turtles.

Publications In Press

Near, T. J., **P. A. Meylan**, and H. B. Shaffer. 2005. Assessing concordance of fossil calibration points in molecular clock studies: an example using turtles. *American Naturalist* 165(2):137-146.

Recent Publications

- Gaffney, E. S., H. Tong and **P. A. Meylan**. 2002. *Galianemys*, a new side-necked turtle (Pelomedusoides: Bothremydidae) from the Later Cretaceous of Morocco. *American Museum Novitates* 3379:1-20.
- Parmalee, P. W., W. E. Klippel, **P. A. Meylan** and J. A. Holman. 2002. A late Miocene - early Pliocene population of *Trachemys* (Testudines: Emydidae) from east Tennessee. *Annals of the Carnegie Museum* 71:233-239.
- Sánchez-Villagra, M. R., R. J. Asher, A. D. Rincón, A. A. Carlini, **P. Meylan** and R. W. Purdy. 2004. New faunal reports for the Cerro La Cruz locality (Lower Miocene), north-western Venezuela; pp. 105-112 in M. R. Sánchez-Villagra and J. A. Clack (eds.). Fossils of the Castillo Formation, Venezuela: Contributions in Neotropical Palaeontology. *Special Papers in Palaeontology* 71:105-112.
- Abstract: Here we describe remains of taxa unrecovered until now for the Cerro La Cruz

locality, including the oldest report of a trionychid turtle from South America and the second continental mammal from Castillo, represented by two isolated teeth of a tardigrad, either a megatheriid or a mylodontid sloth. We also report on a new fossil skull belonging to the podocnemidid turtle *Bairdemys* sp. Fragmentary material demonstrates the presence of additional shark species and a sirenian. The Cerro La Cruz fauna includes at least 23 species of vertebrates. Earlier fossil discoveries from Cerro La Cruz indicated a near-shore marine environment; the latest discoveries indicate in addition fluvial and terrestrial (perhaps coastal) deposits. Elements of the fauna (including fish of the subfamily Serrasalminae and potentially an odontocete) are consistent with the hypothesis that a tributary and/or delta of the Orinoco existed in this area of north-western Venezuela during early Miocene times.

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Research Statement

My paper on the Turtles from the Purbeck Formation of Dorset was published in Part 4 of *Palaeontology* in December. I sent out pdfs to the mailing list, but anyone who did not receive one should contact me. Other projects are in limbo at present while I complete a cluster of amphibian papers.

Publications 2004

Milner, A. R. 2004. The turtles of the Purbeck Limestone Group of Dorset, Southern England. *Palaeontology* 47(6):1441-1467.

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Publications 2004

Lapparent de Broin, F. de, **X. Murelaga Bereikua**, and V. Codrea. 2004. Presence of Dortokidae (Chelonii, Pleurodira) in the earliest Tertiary of the Jibou Formation, Romania: Paleobiogeographical implications. *Acta Palaeontologica Romaniaae*, 4:203-21.

Publications In Press

Murelaga, X., F. García Garmilla, and X. Pereda-Suberbiola. Primeros restos de vertebrados del Cretácico superior de Quecedo de Valdivielso (Burgos). *Geogaceta* (37).

Abstract: Chelonian plates, fish scales and crocodylian remains from the uppermost Cretaceous of the Burgos Province are described for the first time. All the remains have been found in the argillites of the Sobrepeña Formation (Middle-to-Upper Maastrichtian). The fossil bones have been found dispersed all around the outcrop. The bothremydid turtle plates are well preserved and represent the most abundant elements. The solemyid turtle plates are eroded and only a few fragments have been discovered. The bony fishes

are represented by one scale that could be referred to the family Lepisosteidae. The crocodilian remains consist of an isolated tooth and an osteoderm. The fossil assemblage is in agreement with the sedimentological interpretation of a lower energy lacustrine system. The bothremydid and solemydid turtles, bony fishes and crocodilians are common components of the continental vertebrate faunas of the Ibero-Armorican realm at the end of the Cretaceous.

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My research program combines paleontology, molecular systematics, and comparative morphology with temporal and geographic data. Museum studies and international collaboration are major components of my research program, which largely (but not completely) falls into four categories: 1) the diversification and evolution of terrestrial tortoises; 2) the origins and evolution of marine turtles; 3) the phylogeny and evolution of Asia's turtles; 4) The taxonomy of extant and extinct turtle lineages. I am principally asking questions about the origins of major turtle morphotypes, patterns of intercontinental dispersal (including role of tectonic events in shaping diversity), and what the differences between molecular and morphological

phylogenies tell us about convergence and adaptation in turtle evolution. In addition to these studies, I am also actively involved in turtle conservation efforts, especially in China, as well as biodiversity surveys of Iran.

I am presently a postdoctoral fellow at the Museum of Paleontology and the Joint Genome Institute (both part of the University of California). Although I am involved in too many projects, my most active study is the assembly of whole mt-genome databases for turtles (especially tortoises) based on museum specimens and the integration of these data with the paleontological record.

Publications 2004

Feldman, C. R., and **J. F. Parham**. 2004.

Molecular systematics of Old World stripe-necked turtles (Testudines: *Mauremys*).

Asiatic Herpetological Research 10:28-37.

Abstract: Nine extant species of *Mauremys* (including *Ocadia* and *Chinemys*) represent a geographically widespread yet morphologically and ecologically conservative group of batagurid turtles. Here we examine the evolutionary relationships of *Mauremys* using 1539 base pairs of mitochondrial DNA encoding portions of COI, ND4, and three adjacent tRNA genes. These data contain 246 parsimony informative characters that we use to erect hypotheses of relationships for *Mauremys*. Both maximum parsimony and Bayesian methods suggest that *Mauremys japonica*, *M. sinensis*, *M. nigricans*, and *M. reevesii* form a well-supported monophyletic clade, as do *M. mutica* and *M. annamensis*. Furthermore, our analyses show that *M. mutica* is paraphyletic with respect to *M. annamensis*. The western taxa *M. leprosa*, *M. caspica*, and *M. rivulata* remain problematic and do not form a monophyletic group sister to the Asian taxa. Nevertheless, an east-west biogeographic hypothesis cannot be discounted with our molecular genetic data. [The need for integration of these data with fossil data are discussed]

Joyce, W. G., **J. F. Parham**, and J. Gauthier. 2004. Developing a protocol for the conversion of rank-based taxon names to phylogenetically defined clade names, as exemplified by turtles. *Journal of Paleontology* 78(5):989-1013.

Abstract: See Joyce

Parham, J. F., B. L. Stuart, R. Bour, and U. Fritz. 2004. Evolutionary distinctiveness of the extinct Yunnan box turtle revealed by DNA from an old museum specimen. *Proceedings of the Royal Society: Biology Letters* 271(1556[S6]):391-394.

Abstract: *Cuora yunnanensis* is an extinct turtle known from 12 specimens collected from Yunnan, China, before 1908. We used ancient DNA methods to sequence 1723 base pairs of mitochondrial DNA from a museum specimen of *C. yunnanensis*. Unlike some rare 'species' recently described from the pet trade, *C. yunnanensis* represents a lineage that is distinct from other known turtles. Besides *C. yunnanensis*, two other valid species (*C. mccordi*, *C. zhoui*) are unknown in the wild but are supposedly from Yunnan. Intensive field surveys for surviving wild populations of these critically endangered species are urgently needed. [Though not a fossil turtle, *C. yunnanensis* was thought to be extinct. But see Zhou and Zhao (2004) in 'Additional Literature' below]

Publications In Press

Danilov, I. G., and **J. F. Parham**. A reassessment of the referral of an isolated skull from the Late Cretaceous of Uzbekistan to the stem-testudinoid turtle genus *Lindholmemys*. *Journal of Vertebrate Paleontology*.

Abstract: See Danilov

Holroyd, P. A., **J. F. Parham**, and J. H. Hutchison. A reappraisal of some Paleogene

turtles from the southeastern United States. *Journal of Vertebrate Paleontology*.

Parham, J. F. A reassessment of the referral of sea turtle skulls to the genus *Osteopygis* (Late Cretaceous, New Jersey, USA). *Journal of Vertebrate Paleontology*.

Abstract: Specimens referred to *Osteopygis* (Late Cretaceous-Paleocene, North America) represent a chimera, a polyphyletic mixture of taxa. The holotype of *Osteopygis* (AMNH 1485) and more complete referred postcranial specimens resemble non-marine stem cryptodires ("macrobaenids"). Because the skull material historically referred to *Osteopygis* shares synapomorphies with cheloniid sea turtles, all current workers accept *Osteopygis* as a stem-cheloniid sea turtle. Multiple lines of evidence combine to support the hypothesis that sea turtle cranial material is not attributable to *Osteopygis*. These lines of evidence include: phylogenetic hypotheses of character evolution, the tenuous historical attribution of specimens, and the taphonomy of the Hornerstown Formation. The name-bearing *Osteopygis* material and referred postcrania are best considered Eucryptodira incertae sedis (cf. "Macrobaenidae"). The cranial specimens formerly assigned to the Osteopyginae now are restricted to the clade *Euclastes* and those referred to *Osteopygis emarginatus* are here referred to *Euclastes wielandi* (comb. nov.). The 'decapitation' of *Osteopygis* reconciles morphological trends within stem cheloniids.

Parham, J. F. Turtles; in D. Gifford-Gonzalez, The fauna of Adrar Bous; in J. D. Clark, E. A. A. Garcea, D. Gifford-Gonzalez, A. B. Smith, and M. A. J. Williamson (eds.; D. Gifford-Gonzalez general ed.) Adrar Bous: Archaeology of a Central Saharan Granitic Ring Complex Niger. Archaeology, Royal Africa Museum, Tervuren, Belgium.

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Publications 2004

Reynoso, V. H. and Montellano-Ballesteros, M. 2004. A new giant turtle of the genus *Gopherus* (Chelonia: Testudines) from the Pleistocene of Tamaulipas, México and its bearing on the phylogeny and biogeography of gopher turtles. *Journal of Vertebrate Paleontology* 24(4):822-837.

Abstract: The new giant turtle species *Gopherus donlaloii* is described from a partial skeleton with skull collected in the Rancho Labrean deposits in northeastern México. The skull resembles the skull of extant turtles *G. polyphemus* and *G. flavomarginatus* but shows unique skull and shell features. Shell meristic variation of the new species, *G. berlandieri*, and *G. laticuneus* is discussed denoting problems in the assessment of species based on extremely variable shell characters. Lack of diagnostic features in shells of *G. edae* and *G. hexagonatus* suggests their status as nomina vana. Cladistic strict consensus tree suggests that *Gopherus* is a monophyletic group where *G. mohavetus* falls within the outgroup questioning its status as a *Gopherus*. Oligocene *G. laticuneus* is sister to all *Gopherus* after which Recent *G. berlandieri* and *G. agassizii* branched out paraphyletically. *Gopherus* sensu stricto is monophyletic but the relationships among its taxa are unknown; and include the Miocene *G. brevisternus*, *G. pansus*, and *G. vagus*, the Plio-Pleistocene *G. canyonensis* and *G. donlaloii*, and the Recent *G. polyphemus* and *G. flavomarginatus*. A second analysis excluding most incomplete taxa retains the polytomy *G. berlandieri*, *G. agassizii*, and *Gopherus* sensu stricto, but resolves the

relationships within *Gopherus* sensu stricto. *G. brevisternus* is sister to the rest of the clade followed by *G. flavomarginatus* after which there is a polytomy formed by *G. canyonensis*, *G. donlaloii* and *G. polyphemus*. Bootstrap and branch support analyses indicate that the clades within *Gopherus* sensu stricto are well supported. Reanalysis of the biogeographic relationships based on the phylogeny suggests that the origin of *Gopherus* sensu stricto can be traced to the Miocene on the Central Plains, later extending southward from eastern Arizona to Florida and from northern Texas to Aguascalientes during the Plio-Pleistocene. The extinction of giant gopher turtles in Texas and eastern Mexico associated to the invasion of their distribution area by *G. berlandieri* is the best hypothesis to explain the recent disjunct distribution of *G. polyphemus* and *G. flavomarginatus*.

Previous Publications

García R. and **V. H. Reynoso**. 2002. The southern most record of the turtle *Bothremys* (Testudine: Pleurodira) in the Cerro del Pueblo Formation, near Saltillo, Coahuila, México. *Journal of Vertebrate Paleontology* 22(3):56A.

García, R. and **V. H. Reynoso Rosales**. 2002. Dos caparazones de tortugas del género *Bothremys* y su importancia en la Biogeografía de la familia Bothremydidae. *Libro de ponencias del VIII Congreso Nacional de Paleontología, Sociedad Mexicana de Paleontología, Museo de Paleontología de Guadalajara, Guadalajara*, 51.

Montellano, M. and **V. H. Reynoso**. 2002. New giant gopher turtle from northeastern Mexico and the Morafka's paradox. *Journal of Vertebrate Paleontology* 22(3):89A.

Reynoso, V. H., M. A. Cabral Perdomo, and J. M. Clark. 2000. The reptiles of the Tlayúa Formation; pp. 106-110 in Carranza

Castañeda O. and W. Miller (eds.) Guide
Book of the Field Trips. Society of Vertebrate
Paleontology. *Avances en Investigación*,
Univ. Autón, Edo. Hgo. Special Publication.

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Research Statement

I am working in collaboration with Marcelo de la Fuente and Guillermo Rougier on *Palaeochersis talampayensis* a Late Triassic turtle from La Rioja, Argentina. I also started working on my doctoral thesis project regarding the systematics and paleobiogeography of terrestrial Jurassic turtles from Patagonia, Argentina.

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Research Statement

I am interested in non-dinosaurian reptiles, especially Cretaceous turtles from Mongolia. I am currently working on an Upper Cretaceous trionychid turtle from the eastern Gobi desert.

Publications 2004

Suzuki, S., and P. Narmandakh. 2004. Change of the Cretaceous turtle faunas in Mongolia. *Hayashibara Museum of Natural Sciences Research Bulletin* 2:7-14.

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Publications 2004

Claude J., P. C. H. Pritchard, **H. Tong**, E. Paradis, and J.-C. Auffray. 2004. Evidence for flexibility in the evolution of skull of Testudinoidea (Reptilia: Testudines): a geometric morphometric assessment. *Systematic Biology* 53(6):937-952.

Claude J., and **H. Tong**. 2004. Early Eocene Testudinoid Turtles from Saint-Papoul, France, with Comments on the Origin of modern Testudinoidea. *Oryctos* 5:71-113.

Claude J., **H. Tong**, W. Naksri, P. Jintasakul, S. Paladej, and V. Suteethorn. 2004. Fossil

turtles of Thailand. 8th BRT annual Meeting, Surathanee, 14-17 October.

Tong, H., E. Buffetaut, V. Suteethorn and P. Srisuk. 2004. First carettochelyid turtle from the Lower Cretaceous of Thailand. *Abstract, 2nd European Association of Vertebrate Paleontologists, Brno.*

Tong, H., Ji, S.-A. and Q. Ji, 2004. *Ordosemys* (Testudines: Cryptodira) from the Yixian Formation of Liaoning Province, northeastern China: new specimens and systematic revision. *American Museum Novitates* 3438:1-20.

Publications In Press

Tong, H. and R. Hirayama. First Cretaceous dermochelyid turtle from Africa. *Revue de Palaeobiologie.*

Additional Literature 2004

Agnolin, F. 2004. Breve nota sobre una nueva especie del género *Podocnemis* (Chelonii, Podocnemididae) del Mioceno de Catamarca, Argentina. *Studia Geologica Salamanticensia* 40:85-89.

Abstract: In this note a new species of the genus *Podocnemis*, coming from Upper Miocene of Catamarca province is described and nominated as *P. freibergi*. This species constitutes the latest record for the family Podocnemididae in Argentina and indicates the survival of podocnemidids in this country in post-oligocene times.

Agnolin, F. 2004. Comentarios sobre las tortugas Testudinidae (Reptilia, Chelonii) del Pleistoceno de Argentina. *Studia Geologica Salamanticensia* 40:91-101.

Abstract: In this paper a new species of terrestrial turtle of the genus *Chelonoidis*: *C. santafecina* nov. is described. Additionally the fossil record of Pleistocene Argentinian testudinid turtles is reviewed. Finally, a new hypothetical phylogeny of the genus *Chelonoidis* is proposed.

Biasatti, D. M. 2004. Stable carbon isotopic profiles of sea turtle humeri; implications for ecology and physiology. *Palaeogeography, Palaeoclimatology, Palaeoecology* 206:203-216.

Abstract: Analyses of sequential growth layers of marine turtle humeri indicate that diet is the primary influence on the carbon isotopic composition of sea turtle bone carbonate. However, secondary physiological and geographical factors, such as foraging locality, migratory range, physiological interactions with ocean water, and especially respiratory physiology, also influence carbon isotope values of biogenic structural carbonate. The difference in carbon isotope compositions between diet and bone structural carbonate is consistently smaller in the deep-diving leatherback (*Dermochelys coriacea*) and olive ridley

(*Lepidochelys olivacea*) turtles than in the shallow-diving green turtle (*Chelonia mydas*). Although diet has considerable influence on sea turtle bone carbonate delta (super 13) C, respiration appears to be an additional influence, because of the accumulation of respired CO (sub 2) in blood during extended breath-hold diving and the concomitant incorporation of blood-CO (sub 2) into bone carbonate. Preliminary analyses of collagen and muscle tissue do not show evidence of respiratory effects on their carbon isotope compositions.

Billon-Bruyat, J.-P., C. Lécuyer, F.

Martineau, J.-M. Mazin. 2005 Oxygen isotope compositions of Late Jurassic vertebrate remains from lithographic limestones of western Europe: implications for the ecology of fish, turtles, and crocodylians. *Palaeogeography, Palaeoclimatology, Palaeoecology* 216 :359-375

Abstract: Oxygen isotopes can be used to reconstruct the palaeoenvironmental conditions in which vertebrates lived, and thereby give an indication of their ecology. This has been done for faunas from the famous Late Jurassic lithographic limestones of Western Europe. Oxygen isotope compositions of phosphate from apatite were measured in aquatic or semiaquatic vertebrate remains (fish, turtles, and crocodylians) deposited in these protected coastal marine environments. The unknown water composition in the oxygen isotope fractionation equations between phosphate and water was solved for turtles by assuming that modern relationship between environmental water and turtle bone isotope compositions applies to the past. The results show that: (1) coastal marine waters were thermally homogenous at the regional scale of Western Europe; (2) oxygen isotope data discriminate between coastal marine and freshwater to brackish water inhabitants; (3) the plesiochelyid turtles were coastal marine inhabitants—their d¹⁸O values allow the calculation of the oxygen isotope

compositions of marine waters, thus refining the estimate of water temperatures by combining $d^{18}O$ values from fish; and (4) the marine isotopic signature and the cranial anatomy of plesiochelyid turtles lead us to propose that they had a salt-excreting system (i.e., the fundamental physiological feature that controls osmoregulation in the marine environment). These Late Jurassic turtles are proposed to be the first known marine turtles, several tens of million years before the chelonoids or 'sea turtles.'

Engstrom, T. N., H. B. Shaffer, and W. P.

McCord. 2004. Multiple data sets, high homoplasy, and the phylogeny of softshell turtles. *Systematic Biology* 53:693-710.

Knoll, F. 2004. Review of the tetrapod fauna of the "lower Stormberg Group" of the main Karoo Basin (Southern Africa); implication for the age of the lower Elliot Formation.

Bulletin de la Societe Geologique de France 175:73-83.

Abstract: On the basis of its tetrapod fauna, the "Stormberg Group" of southern Africa can be divided into at least two zones. The lowest one is composed of the Molteno and Lower Elliot Formations. It has yielded remains of poorly known stereospondyls, unpublished rauisuchians, enigmatic carnivorous dinosaurs, numerous prosauropods, and rare sauropods and cynodonts. The presence of an ornithischian and a chelonian is alleged, but that of a dicynodont is quite doubtful. The age of the Lower Elliot Formation has been the subject of much speculation. A parallel is drawn with European Upper Norian-"Rhaetian" sites in which plateosaurid prosauropods constitute the vast majority of macrovertebrate remains. In conclusion, the Lower Elliot Formation is correlated with the Apachean "Land Vertebrate Faunachron," which suggests that it is not older than late Norian.

Lehman, T. M. and S. L. Tomlinson. 2004.

Terlinguachelys fischbecki, a new genus and species of sea turtle (Chelonioidae: Protostegidae) from the Upper Cretaceous of

Texas. *Journal of Paleontology* 78:1163-1178.

Matzke, A. T., and M. W. Maisch. 2004. New information and specimens of *Wuguia hutubeiensis* (Reptilia: Testudines) from the Lower Cretaceous Tugulu Group of the southern Junggar Basin (NW China). *Neues Jahrbuch für Geologie und Paläontologie Monatshefte* 2004:473-495.

Matzke, A. T., M. W. Maisch, S. Ge, H.-U. Pfretzschner, and H. Stöhr. 2004. A new xinjianchelyid turtle (Testudines, Eucryptodira) from the Jurassic Qigu Formation of the southern Junggar Basin, Xinjian, North-West China. *Palaeontology* 47:1267-1299.

Matzke, A. T., M. W. Maisch, H.-U. Pfretzschner, G. Sun, and H. Stöhr. 2004. A new basal sinemydid turtle (Reptilia: Testudines) from the Lower Cretaceous Tugulu Group of the Junggar Basin (NW China). *Neues Jahrbuch für Geologie und Paläontologie Monatshefte* 2004:151-167.

Robb, A. J., 2004, Vertebrate fossils from the Upper Cretaceous (Merchantville Formation: Early Campanian) Graham Brickyard locality of New Jersey. *The Mosasaur* 7:75-88.

Spinks, P.Q., H. B. Shaffer, W. P. McCord, and J.B. Iverson. 2004. Phylogenetic hypotheses for the turtle family Geoemydidae. *Molecular Phylogenetics and Evolution* 32:164-182.

Tanimoto, M., and S. Yamada. 2004. The first report of a turtle fossil from the Maastrichtian Izumi Group of Osaka Prefecture, Southwest Japan. *Chigakukenkkyu* 53:131-135.

Zhou T. and Zhao E. 2004. On the occurrence of living *Cuora yunnanensis* since fifty-eight years, and its description. *Sichuan Journal of Zoology* 23(4):325-326, 1 plate.

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Walter Auffenberg

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- Catalogue of American Amphibians and Reptiles, p. 212.1-2.
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