



SESSIONS OF THE ACADEMIA BRASILEIRA DE CIÊNCIAS

SUMMARY OF COMMUNICATIONS

PALEONTOLOGICAL TOPICS

ALEXANDER W. A. KELLNER (ORGANIZER)

MODE OF LIFE OF THE MACROFOSSILS FROM THE CABEÇAS FORMATION (DEVONIAN), PARNAÍBA BASIN, BRAZIL

CLEBER F. DA SILVA¹ AND

DEUSANA M.C. MACHADO²

¹Estagiário do Laboratório de Comunidades Paleozóicas, Departamento de Ciências Naturais, ECB, CCBS, UNI-RIO, Av. Pasteur 428, Urca, Rio de Janeiro – RJ.

²Laboratório de Comunidades Paleozóicas, Departamento de Ciências Naturais, ECB, CCBS, UNI-RIO, Av. Pasteur 428, Urca, Rio de Janeiro – RJ.

Presented by DIOGENES DE ALMEIDA CAMPOS

The Cabeças Formation belongs to the Canindé Group and corresponds to the Devonian depositional sequence of the Parnaíba Basin. This unit is divided in two members, from base to top: Passagem and Oeiras. The Passagem Member is of marine-deltaic origin and yielded the macrofossils studied here; the Oeiras Member is afossiliferous and was deposited under fluvio-deltaic conditions. Fifteen taxa of the twenty-five known from the Passagem Member were found in the studied samples, as follows: six brachiopods, six bivalves, one trilobite and one tentaculitid. Besides those, five additional ones are reported for the first time in this unit: two brachiopods (lingulid and Terebratulidae indet.), one indetermined bivalve and two crinoids [*Hexacrinites* (?) sp. and *Pentagonostipes* (?) sp.]. These species fell under seven modes of life: (1) reclined epibenthic suspension feeders, represented by *Pleurochonetes comstocki* (Rathbun 1874) and *Mucrospirifer* (?) *pedroanus* (Rathbun 1874);

(2) attached epibenthic suspension feeders, represented by *Pustulatia* (?) *curupira* (Rathbun 1874), Mutationellinae indet. D, Rhipidothyrididae *sive* Mutationellidae indet. B, Rhipidothyrididae *sive* Mutationellidae indet. D, Terebratulidae indet., *Hexacrinites* (?) sp. and *Pentagonostipes* (?) sp.; (3) infaunal suspension feeders, represented by *Grammysioidea lundi* (Clarke 1899), *Grammysioidea* sp. A and *Tentaculites* sp. (cf. *T. eldregianus* Rathbun 1874); (4) semi-infaunal suspension feeders, represented by *Spathella pimentana* (Rathbun 1874); (5) infaunal deposit feeders, represented by *Cucullella triquetra* (Conrad 1841), *Nuculites* (*Nuculites*) aff. *N. (N.) oblongatus* (Conrad 1841) and *Palaeoneilo* sp. A; (6) mobile epibenthic predator, represented by *Metacryphaeus meloi* (Carvalho et al. 1997); and (7) mobile epibenthic herbivore, represented by *Plectonotus derbyi* (Clarke 1899). These habits and their abundance agree with the previous suggestion that the Cabeças Formation was deposited in a shallow marine environment near the coast with moderated disturbance from marine currents. — (December 20, 2001).

PALEOGEOGRAPHIC DISTRIBUTION OF *NUCULITES* CONRAD, 1841 AND *CUCULLELLA* McCOY, 1851 (MOLLUSCA/BIVALVIA)

DEUSANA M.C. MACHADO^{1*} AND

VERA M.M. FONSECA^{2**}

¹Laboratório de Estudos de Comunidades Paleozóicas, Departamento de Ciências Naturais, ECB, CCBS, UNI-RIO, Av Pasteur, 428, Urca, Rio de Janeiro, RJ.

²Departamento de Geologia e Paleontologia, Museu Nacional / UFRJ, Quinta da Boa Vista s/n, São Cristóvão, Rio de Janeiro, RJ.

Presented by ALEXANDER W.A. KELLNER

The genera *Nuculites* and *Cucullella* have originated in different geographic areas, with the oldest record found in the Llandovery (Lower Silurian). The former was reported in Gondwana with two subgenera, *Nuculites* and *Trilobonuculites*, while the latter is found in Avalonia. Due to environmental and tectonic factors, those taxa became associated and distributed throughout Gondwana, Avalonia, Kazakhstan and Laurussia from the Late Silurian to the Late Devonian. The subgenus *Trilobonuculites* appeared firstly at the Pitinga Formation, Amazon Basin, Brazil, and the subgenus *Nuculites* is only recorded in the Silurian from the Tabuk Formation, Saudi Arabia. *Cucullella* was found in the Ross Brook Formation of New Scotia, Canada. Since the Late Silurian (Ludlow), which is marked by a marine transgression, *Trilobonuculites* and *Cucullella* started to occur associated, invading other paleocontinents, confirmed by the presence of *Cucullella* in the Gondwana (Bolivia) and *Trilobonuculites* in Avalonia (New Scotia). This suggests that the environment in these areas became more uniform due to the rise of the sea level and the narrowing of the ocean Rheic. The Silurian-Devonian boundary is marked by a marine regression followed by a new transgression, with maximum in the Frasian, and the collision of Avalonia/Baltica and Laurentia forming Laurussia. At this point, the subgenus *Nuculites* reappeared. Still in the Lower Devonian (Pragian-Emsian), the genus *Nuculites* diversified, dominating by the subgenus *Trilobonuculites*, while *Cucullella* was only represented by a sole species from Kazakhstan. In the Middle Devonian (Eifelian-Givetian) the subgenus *Nuculites* predominated while *Trilobonuculites* was restricted to the Maecuru Formation (Brazil). The only species of *Cucullella* dispersed to the oriental Laurussia and North and Occidental Gondwana. In the Late Devonian (Frasnian), the occurrence of these taxa was restricted to the Armorican Massif, Northeastern of Brazil and some doubtful occurrences in Bolivia. At that time, the oceans deepened, dysaerobic and anoxic environments spread out and Gondwana and Laurussia were approaching. These factors, associated with thermal stress, led to extinction of several taxa at the Frasnian/Fammenian boundary, including those studied here. The paleogeographic distribution of *Nuculites* and *Cucullella* agrees with the sea level curves and the movement of the continents suggested to have taken place during the Silurian and Devonian. — (December 20, 2001).

* E-mail: fsr@centroin.com.br

**E-mail: vmedina@acd.ufrj.br

SOME DEVONIAN CHONETOIDEA (BRACHIOPODA) FROM THE AMAZON AND PARNAÍBA BASINS, BRAZIL, AND THEIR STRATIGRAPHIC AND PALEOGEOGRAPHIC IMPLICATIONS

VERA M.M. FONSECA^{1*} AND

DEUSANA M.C. MACHADO^{2**}

¹Departamento de Geologia e Paleontologia, Museu Nacional / UFRJ, Quinta da Boa Vista s/n, São Cristóvão, Rio de Janeiro, RJ.

²Laboratório de Estudos de Comunidades Paleozóicas, Departamento de Ciências Naturais, ECB, CCBS, UNI-RIO, Av Pasteur, 428, Urca, Rio de Janeiro, RJ.

Presented by DIOGENES DE ALMEIDA CAMPOS

Montsenetes Rachebouef and *Pleurochonetes* Isaacson were identified in the Amazon and Parnaíba basins. The first genus, represented by a new species, occurs in the Maecuru Formation (Lontra Member), at the Maecuru river (Pará State) and in the Pimenteiras Formation, at Picos (Piauí State), represented by the species *Montsenetes* cf. *M. boliviensis* Rachebouef. The second taxon is represented by *Pleurochonetes comstocki* Rathbun in the Ererê Formation, at the Monte Alegre dome (Pará State) as well as in the Cabeças Formation at Picos and Oiti (Piauí State). Although benthonic organisms are not suitable for accurate dating, the presence of these genera agrees with subsurface palynological datings that suggest an eifelian age for the macrofossiliferous horizons of the Maecuru and Ererê formations (Amazon Basin). The *Montsenetes* species of the Maecuru Formation (similar to the Venezuelan *M. notius*) and the *Pleurochonetes* species of the Ererê Formation (similar to the Bolivian *P. anteloi*) display compatible morphotypes with mesodevonian species of these genera. In the Parnaíba Basin the species *Montsenetes* cf. *M. boliviensis* (Pimenteiras Formation) does not provide any specific age due to the controversy about its stratigraphical position in Bolivia. However, the presence of *Pleurochonetes comstocki* in the Cabeças Formation suggests an eifelian age for the fossiliferous horizons of the outcrops situated at the eastern border of the Parnaíba Basin, where an age cannot be obtained by palynomorphs. The paleogeographic distribution of *Montsenetes* and *Pleurochonetes* shows changes in the connections between the Amazon and Parnaíba Basins during the Eifelian. The presence of one species of *Montsenetes* similar to Venezuelan *M. notius* in the Amazon Basin, suggests that, during the lower Eifelian, the two areas had some connection, while in the Parnaíba Basin the presence of *Montsenetes* cf. *M.*

boliviensis indicated a connection between this area and Bolivia. At the upper Eifelian, the Ererê Formation (Amazon Basin) and the Cabeças Formation (Parnaíba Basin) shared a significant part of their benthonic invertebrate fauna, showing a direct connection between them. One of the taxa shared is *Pleurochonetes comstocki*, which is related to the Bolivian form *P. anteloi* Isaacson, suggesting a link to the Bolivia area. — (*December 20, 2001*).

* E-mail: vmedina@acd.ufrj.br

**E-mail: fsr@centroin.com.br

ON A FOSSIL LOBSTER (DECAPODA, MALACOSTRACA, CRUSTACEA) FROM THE RIACHUELO FORMATION, ALBIAN OF THE SERGIPE BASIN, BRAZIL

CAIO V.G. TURBAY¹; PEDRO CESERO¹ AND EDUARDO A. KOUTSOUKOS²

¹Departamento de Paleontologia e Estratigrafia, UERJ.

²PETROBRAS / CENPES.

Presented by DIOGENES DE ALMEIDA CAMPOS

The occurrence of a fossil lobster in a sandstone layer of the Riachuelo Formation (Albian), Sergipe Basin is recorded here. The fossil was collected nearby Laranjeiras city, in the Brejo Quarry (UTM coordinates: 0701754; 8807678), Riachuelo Formation, Sergipe Basin. Biostratigraphic studies show that the quarry lies within the *Mortonicerias* biozone, of Late Albian age. The Riachuelo Formation represents the open marine stage of the drifting process and is formed by high-energy shelf carbonate deposits (oncolitic-oolitic-peloidal-bioclastic packstones and grainstones), interbedded with lagoonal mudstones and siltstones, and fan-delta like siliciclastic rocks. The fossil was found in a fine-grained sandstone layer of the Angico Member, which is very exposed in the uppermost section of the Brejo Quarry. The main outcrop comprises three shallowing-upward carbonate cycles, overlain by siliciclastic storm layers with microhummocky structures. The studied specimen is badly preserved showing only the quitinous skeleton that was fossilized by carbonization as denoted by its thin and very fragile surface. Five abdominal segments and the cephalothorax as well as the rostrum are exposed. The sedimentary facies of the Brejo Quarry is characteristic of a shallow carbonate shelf environment with sandy barriers generated under high-to-moderate energy conditions. A restricted lagoon was formed backwards to the carbonate shelf. Siliciclastic sediments filled in the platform as a result of gravitational flows from the basin borders. This fossil lobster probably lived in the muddy bottom of a lagoonal environment near the fan-

delta systems, and was subsequently reworked by storms and preserved in the sandstone layer where it was recovered. — (*December 20, 2001*).

THE IMPORTANCE OF FOSSIL TAXA IN THE KNOWLEDGE OF NEOPTERYGIAN INTERRELATIONSHIPS

PAULO M. BRITO, LÚCIO P.C. MACHADO,

CESAR R. AMARAL AND DIOGO DE MAYRINCK

Departamento de Biologia Animal e Vegetal, Universidade do Estado do Rio de Janeiro.

Presented by ALEXANDER W.A. KELLNER

Since the beginning of the 1970's the Neopterygii are considered a monophyletic group, composed by two clades: the Ginglymodi, represented nowadays by the extant gars, and the Halecostomi, represented by the extant *Amia calva* (Halecomorphi) plus the Teleostei. The discovery of new Mesozoic taxa, the amount of new morphological and ontogenetic data, plus the advance of new techniques and methodologies led us to generate new hypothesis of phylogenetic relationships for the Neopterygii.

The principal results obtained were: a) even if the Neopterygii form a monophyletic group, the relationships between this inclusive clade are still unresolved; b) in our hypothesis, the Ginglymodi are considered the sister group of the halecomorphs or they form a clade with the teleosts; c) the Halecostomi are not a monophyletic group; and finally d) these results corroborate some hypothesis of relationships proposed using molecular biology. — (*December 20, 2001*).

REMARKS ON THE ENCHODONTID FISHES FROM THE ATLÂNTIDA FORMATION, PELOTAS BASIN

PABLO M. COELHO, VALÉRIA GALLO AND

FRANCISCO J. DE FIGUEIREDO

Departamento de Biologia Animal e Vegetal; Instituto de Biologia Universidade do Estado do Rio de Janeiro.

Presented by DIOGENES DE ALMEIDA CAMPOS

The Pelotas Basin is a passive margin basin type spreading from the coast of Uruguay to the south of Brazil. It has an area of 210,000km², from which 15% are emergent regions. This basin reaches eastward the isobath of 2,000m. Since 1995, the Brazilian petroleum company PETROBRAS has extracted drill-core samples from this basin, particularly in the Atlântida Formation, at a sediment depth around 4,000m, revealing the occurrence of fishes and mollusks. This stratigraphic unit consists of shales, siltstones, and carbonates, suggesting a neritic pa-

leoenvironment from outer shelf. Calcareous nannofossils and palynomorphs indicate a range from upper Albian to lower Turonian age. Concerning the paleoichthyofauna, we identified an enchodontid as belonging to the genus *Enchodus* based on the morphological pattern of the skull roof. This genus comprises about 26 species, listed for Cretaceous formations of the Old and New Worlds, mostly described on the basis of mandible and teeth remains. The taxon from the Atlântida Formation is similar to *Enchodus venator* from the Upper Cretaceous of Morocco in various features (e.g., shape and position of the nasals; large and knobby frontals covering most of the skull roof; topographical position of the dermosphenotic; and trajectory of the sensory canals of the skull roof). Nevertheless, this fish can be distinguished from *E. venator* by the presence of a medioparietal skull, enlarged mesethmoid, triangular dermosphenotic, digitate fronto-parietal suture and pterotic with a sharp posterior border.

Another enchodontid fish of the Pelotas Basin is *Rharbichthys ferox* also known of the Cenomanian of Africa (Morocco) and Cenomanian-Turonian of Europe (Italy). It is represented by bony elements of the hyobranchial apparatus and mandibles.

Enchodontids, in association with dercetids and primitive holocentroids, occur in faunal assemblages of Cretaceous formations of Africa, Italy, and Brazil indicating probable ancient ecological relations between those demersal predators. These taxa are widely distributed along this large geographic belt and in the case of *Rharbichthys* is unaffected by sequential vicariant events that determined major geological aspects in the Tethyan Sea. — (December 20, 2001).

AN OVERVIEW OF THE *LEPTOLEPIS*-LIKE FISHES FROM THE SANTANA FORMATION, NORTHEASTERN BRAZIL

FRANCISCO J. DE FIGUEIREDO AND VALÉRIA GALLO

Departamento de Biologia Animal e Vegetal; Instituto de Biologia Universidade do Estado do Rio de Janeiro.

Presented by DIOGENES DE ALMEIDA CAMPOS

Silva Santos (1958, Not. Prel. e Estudos, DGM/DNPM, 108:1-15) described a small fish from the Santana Formation, "*Leptolepis*" *diasii*, based on a few small-sized specimens preserved in carbonate concretions. At that time he included this new taxon in the genus *Leptolepis* which became a "waste-basket" for several poorly known taxa. Later, Maisey (1991, Santana Fossils: An Illustrated Atlas. T.F.H. Publications, Neptune

City, New Jersey, 459p.) described and illustrated an incomplete caudal skeleton and briefly discussed the validity of "*Leptolepis*" *diasii*. Silva Santos (1991, Fósseis do Nordeste do Brasil: Paleioictiofauna da Chapada do Araripe. UERJ, 64 p.) concluded that this genus does not occur in Brazilian strata, erecting *Santanichthys* as a substitute name for "*Leptolepis*" *diasii* and proposed a different reconstruction of the caudal skeleton. Afterwards, Silva Santos (1995 An Acad Bras Cienc 67:249-258) reviewed *Santanichthys* (= *Leptolepis*) *diasii*, and based on new cranial and post-cranial elements, pointed out that the caudal skeleton figured by him in 1991 belongs to a new taxon. In this paper, Silva Santos did describe but did not illustrate the tail of *Santanichthys*, which appears to be the same as described previously by Maisey (1993, Am. Mus. Nov., 3076:1-15).

While reviewing the material of *Santanichthys* mentioned by Silva Santos in 1995, and based on new specimens from the Araripe and the Sergipe-Alagoas basins, we clearly distinguished this specimen as being a new taxon. It differs from *Santanichthys* in many anatomical features, such as the absence of skull fontanels and fenestrae, presence of teeth in certain dermal bones, and the pattern of the caudal skeleton. The presence of an extrascapular fused with the parietal, a large triangular 'beryciform' foramen and a second hypural fused with first ural centrum suggest its inclusion within Clupeomorpha. Nevertheless, the new taxon lacks pleurostyle, *recessus lateralis*, and dorsal and ventral scutes, which are regarded as primitive features. — (December 20, 2001).

ALLOMETRIC SCALING AND HETEROCHRONY IN MESOSAURIDS (AMNIOTA, SAUROPSIDA) FROM THE IRATI FORMATION (PERMIAN OF THE PARANÁ BASIN, BRAZIL)

MAURO J. CAVALCANTI*

Setor de Paleovertebrados, Departamento de Geologia e Paleontologia, Museu Nacional / UFRJ – 20940-040, Rio de Janeiro, RJ.

Presented by ALEXANDER W.A. KELLNER

Mesosaurids were aquatic to semi-aquatic sauropsids (a sister group to Reptilia) that appear as abundant elements of the fossil record from the Irati and Whitehill formations (Lower Permian) of the Paraná (Southern Brazil) and Karoo (South Africa) basins. In an attempt to investigate patterns of ontogenetic and evolutionary allometry in this group, a study of allometric scaling was undertaken using a bivariate regression procedure. The material in-

cluded 37 specimens from the Irati Formation belonging to three species: *Mesosaurus tenuidens* Gervais, 1864 (n = 20); *Stereosternum tumidum* Cope, 1886 (n = 13) and *Brazilosaurus sanpauloensis* Shikama and Ozaki, 1966 (n = 4) and are housed at Museu Nacional/UFRJ. Data published by Araújo (An Acad Bras Cienc 48: 91-116, 1976) were also included in the analysis. The measurements taken on each specimen comprised the length of the skull and of the neck.

Allometric coefficients were computed for each species using the reduced major axis (RMA) method, a Model II bivariate regression procedure adequate when neither variable can be regarded as independent and both are subject to error, thereby violating the assumptions of Model I regression analysis based on the least-squares method. Due to the very small sample sizes available for each species, a bootstrap resampling procedure was used for the computation of confidence limits for the RMA coefficients, using a variation of the algorithm provided by Plotnick (Syst Zool 38: 144-153, 1989). A BASIC program, adapted to IBM-PC microcomputers, was used in the calculations, and is available from the author upon request.

The analyzed variables showed positive allometry between *Mesosaurus* and *Stereosternum*, and negative allometry for *Brazilosaurus*. These results suggest an heterochronic shift as the explanation of major evolutionary changes in the morphology of this group and provide additional support for the current hypothesis of phylogenetic relationships among the mesosaurids, that place *Brazilosaurus sanpauloensis* as the most distinct taxon in the family Mesosauridae. — (December 20, 2001).

* E-mail: maurobio@acd.ufrj.br

GONDWANA BIOGEOGRAPHY: A PHYLOGENETIC APPROACH

LEONARDO S. AVILLA^{1*}, CARLOS R.A. CANDEIRO², PAULO A. BUCKUP¹ AND LÍLIAN P. BERGQVIST²

¹Departamento de Vertebrados, Museu Nacional / UFRJ, RJ.

²Instituto de Geociências, Departamento de Geologia, UFRJ, RJ.

Presented by ALEXANDER W.A. KELLNER

Reconstruction of biogeographic events associated with the breakup of Gondwana supercontinent has attracted attention of biogeographers for over a century, but progress has been hampered by the scarcity of phylogenetic data. The widespread use of cladistic methodology

in phylogenetic studies during the last decades, however, has made it possible to compile enough phylogenetic data to test biogeographic hypotheses using parsimony methods. We have analyzed seven phylogenetic data sets using Brooks Parsimony Analysis (BPA) in order to produce a comprehensive hypothesis of the historic relationships among Gondwanan sub-units.

Our data set includes phylogenies of Dipnoi (lungfishes), “peirosaurids” (extinct Crocodylomorpha), Neoceratosauria (theropod dinosaurs), “Titanosauria” (sauropod dinosaurs), Ratites (ostriches and relatives), Nataloidea (bats), and Gondwanatheria (group of extinct mammals) obtained from the literature. Presumptive areas of endemism within the former supercontinent were delimited according to (putative) distribution of terminal taxa. To produce a matrix of areas versus taxa, ancestral taxa specified by the phylogenies were coded according to the presence of their descendants in each presumptive area of endemism. A single most parsimonious area cladogram was selected using global parsimony analysis (consistency index = 0.77; retention index = 0.83). The following set of area relationships was specified: (Mongolia (New Zealand, Australia), (Africa (Brazil (Argentina (Madagascar, India)))))). According to this hypothesis, the first vicariant event associated with the break up of the Gondwanan supercontinent was the separation of Australia and New Zealand from the remaining landmasses (Upper Jurassic-Early Cretaceous). As expected, the formation of the South Atlantic Ocean and the Strait of Mozambique subsequently lead to early isolation of Africa from the surrounding continental plates (Albian-Aptian). Surprisingly, however, the South American continent does not appear as a monophyletic entity. The Andean-Patagonian portion of the continent is more closely related to India and Madagascar than to the (currently) tropical portion. Such relationship may be explained by a lasting connection of the southern tip of South America to Antarctica and the Indian subcontinent (which was adjacent to Antarctica during most of the Cretaceous). Although Antarctica is not represented in any of the available phylogenies, we predict that further fossil discoveries in that continent will reveal taxa closely related to species in Argentina, India and Madagascar. — (December 20, 2001).

* E-mail: lavilla@sv.compuland.com.br

A BRIEF NOTE ON THE PALEOFAUNA OF “TARTARUGUITO SITE”, ADAMANTINA FORMATION, BAURU GROUP, BRAZIL

DEISE D.R. HENRIQUES¹, JOSÉ M. SUÁRES²,
SERGIO A.K. AZEVEDO¹, RAMSES CAPILLA¹
AND LUCIANA B. CARVALHO¹

¹Setor de Paleovertebrados, Departamento de Geologia e Paleontologia, Museu Nacional / UFRJ - 20940-040, Rio de Janeiro, RJ.

²Universidade Estadual Paulista, Presidente Prudente, SP.

Presented by ALEXANDER W.A. KELLNER

The Bauru Group is mainly composed of fluvial sandstones, siltstones and mudstones, representing the most extensive continental Cretaceous deposits from Brazil. In the years 2000 and 2001, fieldwork was carried out by the researchers of the Paleovertebrate Sector of the Museu Nacional/UFRJ, in conjunction with researchers from UNESP, to the outcrops of the Adamantina Formation near Pirapozinho, Presidente Prudente and Álvares Machado localities, all situated in the State of São Paulo. Emphasis was placed at the site known informally as “Tartaruguito”, located in the municipality of Pirapozinho, which is mainly known for the numerous turtle skeletons and carapace fragments found there. A great excavation was made at this *Lagerstätte* and several turtle remains were collected, some fairly complete with cranial and postcranial elements. Other reptilian taxa previously unknown from that site were found associated with them and are still being prepared. Preliminary taphonomic studies of this site indicate that this accumulation was due to a drought that resulted in an accumulation of fossil vertebrates. — (December 20, 2001).

MORPHOLOGICAL VARIATION AMONG THE APPENDICULAR BONES OF THE TITANOSAURIDAE (DINOSAURIA: SAUROPODA) FROM THE BAURU BASIN (UPPER CRETACEOUS) OF PEIRÓPOLIS (MG), BRAZIL

MARCELO N.F. TROTTA

Setor de Paleovertebrados, Departamento de Geologia e Paleontologia, Museu Nacional / UFRJ, Rio de Janeiro, RJ.

Presented by DIOGENES DE ALMEIDA CAMPOS

Several appendicular bones from the collection of the Departamento Nacional de Produção Mineral (DNPM/RJ) are being described for the first time. The bones were collected by L. I. Price between 1949 and 1974, and were unearthed from three main quarries: “Site 1 or Caieira” (which also includes vertebral series and two sacra); “Serra da Galga” and “Rodovia” (Campos DA

and Kellner AWA, 1999, *Nat Sci Mus Mongr* 15:143-166). None of these sites has yielded a single individual. The bones vary in size; most bear distinct morphological features, which allow their classification into different morphotypes. The scapulae display two morphotypes, based on the presence or absence of a medial prominence on the inner face. The biggest scapulae show further variation in the upper distal margin of the blade, which bears doubled expansions. The coracoids do not vary, but one displays a unique protuberance on its anterior upper corner. Based on overall shape and frontal profile, the sternal plates are either triangular or “T” shaped. The ulnae display two different morphotypes, based on the presence or absence of an excavation on their distal articular areas. This excavation gives the distal surface of this element a reniform outline. The radii have been grouped into four morphotypes based on the overall robustness, shape of the distal articular facets, development of the proximal medial projection, and the presence of ridges running along the shaft. The pubes display three morphotypes based on the presence of a longitudinal ridge on the pubic apron and features of the iliac pedicle. The ischia display three morphotypes based on the presence or absence of a reentrance below the pubic pedicle and shape of the distal shaft. The femora may be either robust or slender. The fibulae display two morphotypes based on the presence or absence of an anterior trochanter and a medial oblique ridge. — (December 20, 2001).

DINOSAUR OSTEODERMS FROM THE ADAMANTINA FORMATION, UPPER CRETACEOUS OF SÃO PAULO STATE, BRAZIL

SANDRA R. TORRES¹, LEONARDO S. AVILLA²,
ÉRIKA A.L. ABRANTES¹ AND LÍLIAN P. BERGQVIST¹

¹Instituto de Geociências, Departamento de Geologia – Universidade Federal do Rio de Janeiro, UFRJ, RJ.

²Departamento de Vertebrados, Museu Nacional – Universidade Federal do Rio de Janeiro, UFRJ, RJ.

Presented by ALEXANDER W.A. KELLNER

In the austral spring of 2001, the Laboratório de Macrofósseis/IGEO/UFRJ conducted an expedition to some Cretaceous fossil localities in the state of São Paulo. The expedition produced several fossils, including microfossils, molluscs, fishes, turtles, crocodylomorphs, and dinosaurs. We describe herein two dinosaur osteoderms from the Fazenda Furnas (Adamantina Formation, Upper Cretaceous, Bauru Basin), Municipality of Jales, São Paulo State.

Reddish clays and sands of fluvial-lacustrine origin, deposited during times of warm and humid climates, dominate the Adamantina Formation. Based primarily on its vertebrate fossil content, the Adamantina deposits were formed between the Santonian and Maastrichtian.

The osteoderms are subquadrangular in shape, presenting the diagnostic ornamentation (coarse and fibrous texture, grooves, pits and tiny projections) observed in titanosaurid osteoderms already described. The function of all of these features is unclear - foramina were probably passages for blood vessels and rugosities for anchoring the osteoderms. However, both present some particularities: the largest one has a prominent ridge that separates the dorsal surface into two portions. Foramina are sparsely distributed along both surfaces. The rugose texture is found around the borders, except in a more straight one which presents a pattern of dorsoventral laminae. The ventral surface is broken superficially, and differs from dorsal surface by having a marked depression and a comparatively smoother fibrous texture. The other specimen is smaller and thinner. Some dorsal fractures permit to observe its cancellous bone internal constitution.

Stereoscopic microscopic analysis of the straight border shows no bone fractures, so we interpreted it as an articular surface. This indicates that the dinosaur that had it may bear dermic plates composed by two or more articulating osteoderms, or these dermal bones belonged to a different dinosaur to which osteoderms have not been described. As this feature has never been reported in a Titanosauridae, and the osteoderm, though similar, is distinct to the one previously described to Bauru Basin, we found no strong basis to assign it to a titanosaurid.

These findings add a new dinosaur locality for the Bauru Basin, and comprise the first record of dinosaur osteoderms in the Cretaceous of the São Paulo State. — (*December 20, 2001*).

METHODOLOGICAL PARAMETERS FOR THE IDENTIFICATION AND TAXONOMIC CLASSIFICATION OF ISOLATED THEROPODOMORPH TEETH

ALDIRENE C. FRANCO-ROSAS*

Instituto de Geociências, Departamento de Geologia, UFRJ, RJ.

Presented by ALEXANDER W.A. KELLNER

Isolated teeth of small theropods are relatively common in Brazilian Cretaceous deposits, where several well-preserved specimens have been found. Here we describe and present morphological and morphometric parameters

that can be used for the taxonomic identification of such material. This study is based on thirty teeth from four sites situated in the São Paulo and Minas Gerais states. This material comes from the Adamantina and Marília formations of the Bauru Basin and was examined under stereomicroscope and scanning electron microscope.

The following characteristics were considered effective for the characterization of different morphological classes, some of which were already mentioned in the literature: 1 – number of denticles per millimeter (DPM), which is measured in the central region of the posterior margin; 2 – tooth base diameter (BW); 3 – preserved portion of the tooth total height (AT); 4 – shape of the basal transverse section (FABL); 5 – shape of the denticles. Based on the features above three morphologic groups were identified, tentatively referred to the Maniraptoriformes (Dromaeosauridae, Velociraptorinae and Troodontidae) as follows:

Morphotype 1 – long, rounded denticles showing a non-uniform distal portion and different slopes, with slightly pronounced interdenticle spaces. This morphology is similar to the teeth described for Velociraptorinae and Troodontidae.

Morphotype 2 – long, sharp denticles in the distal portion, with deep rifts among them. This morphology is very similar to the one shown by North American specimens, associated with Dromaeosauridae.

Morphotype 3 – short, round denticles, with bow-shaped distal portion and deep interdenticle spaces, not recorded before. They might represent a new group, endemic for Brazil. — (*December 20, 2001*).

* E-mail: aldirene@terra.com.br

ON THE OCCURRENCE OF AN AVIAN VERTEBRA IN CRETACEOUS STRATA OF MOROCCO, AFRICA

DOUGLAS RIFF¹, ALEXANDER W.A. KELLNER¹,
BRYN MADER² AND DALE RUSSEL³

¹Setor de Paleovertebrados, Departamento de Geologia e Paleontologia, Museu Nacional / UFRJ, Rio de Janeiro, RJ.

²Long Island Natural History Museum, New York.

³Department of Marine, Earth and Atmosph. Science, North Carolina State University, North Carolina.

So far, osteological remains of Mesozoic birds in Gondwana are very limited, with some occurrences in South America (around 10 non-neornithine records), Australia (one), Antarctica (one), and Africa. In the latter, this record is restricted to incomplete limb elements and a par-

tial skeleton from Madagascar, and footprints from Late Cretaceous strata of Morocco. Here we report an isolated dorsal vertebra found in the Albo-Cenomanian sandstones of the Kem Kem region, Southeastern Morocco. The specimen is housed in the Canadian Museum of Nature (NMC 50852) and represents the first avian osteological record from Mesozoic strata of the Continental Africa.

The vertebra is well preserved but incomplete. The length of the centrum is 21.0 mm with a preserved height of 25.6 mm. In some areas the bone surface was broken off revealing the pneumatized internal structure (apparently less developed compared to most recent avian taxa). The centrum is elongated, amphicoelous, cylindrical and slightly constricted medially, with the ventral margins arched upwards; no pleurocoels or foramina are present on the lateral surface. The articular facets have a subcircular outline.

The main avian characteristic of NMC 50852 is the large neural canal, with the ratio between the height of the neural canal and the height of the cranial surface of the centrum of 0.67 (in extant birds, this ratio varies from 0.5 to 2.75 and in theropods it is lesser than 0.4). The neural arch is not very tall, being elongated and showing a cranial and caudal groove. The transverse processes and zygapophyses are not preserved. On the left side, a small prominence possibly represents the base of the parapophysis.

The characteristics of this vertebra differ from the main avian clades (Alvarezsauridae, Confuciornithidae, Enantiornithes, Hesperornithiformes, Ichthyornithiformes, Neornithes). The main similarities of the Moroccan specimen are observed in the dorsal vertebrae of *Rahona ostromi*, a basal bird from the Late Cretaceous of Madagascar. Notwithstanding, some differences such as the neural canal, which is larger in the Moroccan specimen, and the presence of pleurocoels in *Rahona ostromi* suggest that NMC 50852 belongs to a different taxon of basal birds. — (December 20, 2001).

METHOD FOR PALYNOLOGICAL PREPARATION: A TOOL TO INCREASE THE RECOVERY OF DINOFLAGELLATES

ANTONIO D. DE OLIVEIRA¹, JOÃO G. MENDONÇA-FILHO¹, MARCELO A. CARVALHO¹, TAÍSSA R. MENEZES¹, CECÍLIA C. LANA² AND WOLFRAM W. BRENNER³

¹Universidade Federal do Rio de Janeiro, IGEO / DEGEO / Laboratório de Palinofácies e Fácies Orgânica.

²PETROBRAS / CENPES / BPA – Gerência de Bioestratigrafia

e Paleoeologia Aplicada.

³Christian-Albrechts-Universität Kiel, Forschungszentrum für marine Geowissenschaften.

Presented by DIOGENES DE ALMEIDA CAMPOS

The purpose of this project is to develop a method that improves the recovery of dinoflagellates of holocene and pleistocene sediments from the Campos Basin. Samples were customarily prepared by the employment of the standard method for palynofacies study, whose main goal is to eliminate the mineral constituents by acids, thus concentrating the palynomorph assemblages on palynological slides. Here we improve this method applying a simple procedure: the panning process to eliminate the excess of heavy minerals in the samples after the use of hydrofluoric acid. Moreover, detergent and ultra-sonic to dissociate the amorphous organic matter were employed. An additional difference is the sieving of the suspension material (after decantation) which was previously discarded. There is also no necessity for the use of acetolysis (a standard procedure in palynological preparation of Quaternary samples), resulting in better preservation of dinoflagellates. The size of the sample can also be reduced (6 grams) which is another advantage of the present procedure.

To confirm the effectiveness of the method described here, one sample was prepared following both procedures. Using the traditional method, only two dinoflagellates were found, which made up only 1% of all palynomorphs recovered. By following the procedures presented here, the number of dinoflagellates has increased, reaching 78% of all palynomorphs. It should be noted that the increase of the dinoflagellates is not at the expense of other palynomorphs, because in both procedures there is no significant difference in the palynomorph count.

According to these results, it was possible to confirm that the new methodology employed here for the samples of the pleistocene and holocene sediments of the Campos Basin has improved extraordinarily the recovery of dinoflagellates, and might have a widespread use for the recovery of those microfossils in other deposits. — (December 20, 2001).

MIDDLE CRETACEOUS PALYNOLOGICAL ASSEMBLAGES RICH IN COPEPOD EGGS: THEIR PALEOECOLOGICAL SIGNIFICANCE

MITSURU ARAI

PETROBRAS / CENPES, 21949-900 Rio de Janeiro, RJ, Brazil.

Presented by ALEXANDER W.A. KELLNER

Animalian palynomorphs, of the zoomorph category

and considered to be copepod eggs, have been observed, often very abundant, during routine palynological investigations at PETROBRAS laboratories. Palynological assemblages exceptionally rich in these zoomorphs have been recorded recently in samples from middle Cretaceous sequences of several Brazilian basins. In some samples, copepod eggs attain proportions as high as 90% of the total assemblage, and in a few cases even reaching 100%. As copepods constitute heterotrophic zooplankton, grazing mainly on phytoplankton, one would infer that phytoplankton productivity would have been concomitantly high in order to sustain the copepod population. But, paradoxically, the assemblages very rich in copepod eggs are lacking organic-walled phytoplanktonic fossils. This may well have resulted from the copepod population undergoing a very sudden and rapid increase, thus depleting and ultimately exhausting the food supply. This could also account for the fact that the assemblages are poor even in continental palynomorphs (e.g., pollen and spores); hungry copepods are known to consume pollen grains, which are rejected under normal conditions.

Multidisciplinary analyses, involving sedimentology, geochemistry and micropaleontology, indicate that the assemblages abnormally rich in copepod eggs were probably produced by a combination of the following factors: (1) marine environment; (2) high plankton productivity; (3) low sedimentation rate; (4) low proportion of dissolved oxygen in the water; and (5) restricted basin with poorly ventilated bottom conditions. — (*December 20, 2001*).

OSTRACODES FROM THE RIO DA BATATEIRA FORMATION (LOWER CRETACEOUS, ARARIPE BASIN): PRELIMINARY RESULTS ON SYSTEMATICS, BIOSTRATIGRAPHY AND PALEOECOLOGY

VANESSA N. SYRIO¹ AND ARISTÓTELES M. RIOS-NETTO²

¹Laboratório de Micropaleontologia (LabMicro) / Depto. de Geologia / IGEO / UFRJ.

²Laboratório de Micropaleontologia / Instituto de Geociências / UnB.

Presented by DIOGENES DE ALMEIDA CAMPOS

The Araripe Basin occupies an area of about 8,000 km², in the northeastern part of Brazil (Ceará, Pernambuco and Piauí states). Besides being worldwide famous for its paleontological content, the study of the Araripe Basin is especially significant since its geological history can be partially correlated with the geologic development of some Brazilian marginal basins. The present study is

focused on the Rio da Batateira Formation, since there are some unsolved questions regarding this unit such as stratigraphic boundaries, depositional environment and correlation with other lithostratigraphic units. The sample studied in the first phase of the research was collected in an outcrop of the Batateira River, locality of Lameiro, Crato City, Ceará State (S 7° 14' 57.8"; W 39° 27' 11.6"). At this locality, the Rio da Batateira Formation is formed by dark grayish shales and carbonates, rich in microfossils (mainly ostracodes and conchostraceans). The following taxa were found: *Candona* sp., *Harbinia micropapillosa*, *Theriosynoecum silvai*, *Darwinula martinsi*, *Brasacypris* sp.1 and *Zonocypris* sp.1. Among these taxa, *Candona* sp. and *Harbinia* are characteristic from the Biozone 011 (Do Carmo 1998, D.Sc. Thesis, Curso de Pós-graduação e Geociências/UFRGS; Paulo Millhomem, personal communication), generally associated with the Alagoas stage (Late Aptian/ Early Albian). Furthermore, *Theriosynoecum silvai* and *Darwinula martinsi*, present in the sample, are also associated with this biozone. All ostracodes found in the sample are non-marine. Most of them can tolerate salinity variations from 0% to 10%, and *Darwinula martinsi* up to 15% (Do Carmo 1998, op. cit.). These preliminary analysis indicate fresh to mixohaline depositional environment. — (*December 20, 2001*).

RHABDOSPHAERA CLAVIGERA (CALCAREOUS NANNOFOSSILS) AS PALEOTEMPERATURE INDICATORS: A COMPARISON WITH ISOTOPIC DATA

MARIA DOLORES WANDERLEY¹ AND JERRY F. MCMANUS²

¹LabMicro / Depto de Geologia / IGEO / UFRJ – Rio de Janeiro – Brazil.

²Woods Hole Oceanographic Institution, Woods Hole, MA – USA.

Presented by DIOGENES DE ALMEIDA CAMPOS

The content of nannofossils and O¹⁸/O¹⁶ isotopic analysis on foraminifer carapaces of the sample (multicore) MC-58 was studied. The purpose of this project was to compare quantitative data of the species *Rhabdosphaera clavigera* (calcareous nannofossil) with O¹⁸/O¹⁶ isotopic information. The material was collected by the researchers of the Woods Hole Oceanographic Institution in a joint program with the LAGEMAR-UFF at the sea route 159-5 and was posteriorly deposited in the Laboratório de Micropaleontologia (LabMicro) of the Geology Department/UFRJ. The sample (multicore) MC-58 has a Pleistocene/Holocene age and is situated on the São

Paulo Plateau (continental margin of southeastern Brazil) at a depth of 4,015m. Among the 23 nannofossil species found, *Rhabdosphaera clavigera* is quite common and about 240 individuals of this taxon were recovered. This species is considered an indicator of tropical waters since it is abundant in waters with a temperature of 18.3°C. The

present study showed that there is a strong correlation between the abundance of *R. clavigera* and decreasing isotopic values of O^{18}/O^{16} , confirming the paleoecological interpretation proposed for this species. — (*December 20, 2001*) .