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(HALFJAARLIKSE NUUSBRIEF VAN DIE PALEONTOLOGIESE VERENIGING VAN SUIDER AFRIKA)

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Front cover:

Glossopteris leaves from the Kwa Yaya locality in KwaZulu-Natal, Upper Permian, Emakwezini Formation of the Lebombo Basin (scale bar = 1cm).
(Photo: Rose Prevec).

EDITORIAL

Many thanks to many contributors for this edition of PalNews. At first I was worried that this would be a thin volume as contributions were slow in arriving but a couple of email prods did the job. Something that came across my desk from **Mike Raath** was an interesting website that houses the Paleobiology Database at Macquarie University, Australia. It is called "Fossilworks" (www.fossilworks.org). In a nutshell

"Fossilworks provides query, download, and analysis tools that utilize the [Paleobiology Database](http://www.fossilworks.org)'s large relational database assembled by hundreds of paleontologists from around the world. The two websites and their predecessors have been used by professional researchers, students, and the public since 1998. The Fossilworks copy is refreshed daily. The data are owned by the contributors and the website and software were created by [John Alroy](http://www.fossilworks.org)." This web based resource appears to be something very useful and South African palaeontologists should consider signing up. It was evident that no SA researchers or institutions were listed. Just a thought



Cheers!

Billy de Klerk (ed)

PRESIDENT'S CORNER - Marion Bamford ESI at Wits Marion.Bamford@wits.ac.za



See some of Marion's activities on p.28

oOo

NEWS FROM: Martin Pickford & Brigitte Senut – Paris
Département Histoire de la Terre in the [Muséum national d'Histoire](#)



Namibia Palaeontology Expedition

Brigitte and Martin spent the month of May surveying the Palaeogene and Early Miocene rocks of the Northern Sperrgebiet, Namibia. Because mining activities at Bogenfels have ceased, they were free to examine outcrops that had previously been difficult to access due to diamond security considerations. It was clear from previous surveys carried out by the Namibia Palaeontology Expedition that there were serious problems with the established stratigraphy of the Cainozoic rocks of the region. The so-called Pomona Schichten have been correlated to the Cretaceous for more than a century and frequently correlated to the Africa Surface, yet in 2008 the NPE found Lutetian and Bartonian fossils in several outcrops previously included in this unit.

While in the field, the type area of the Pomona Schichten was examined more closely and it was found that none of it is Cretaceous, the oldest sediments in the beds, the Pomona Quartzite, recently renamed the Kätchen Plateau Formation, being Ypresian-Lutetian in age, and the youngest previously called the Pomonakalke, being Plio-Pleistocene!! The original mapping published in 1926 grouped all the well-indurated rocks of the region into the Pomona Schichten, and all the unindurated rocks into a suite of Post-Eocene strata. Sediments in the Sperrgebiet were indurated by several processes including silicification (during the Lutetian- Bartonian), ferruginisation (Oligo-Miocene) and calc-encrustation (Miocene and Plio-Pleistocene). Thus the concept of the Pomona Schichten as a stratigraphic unit must be abandoned.

Important fossils were discovered including abundant lebenspuren in the Kätchen Plateau Quartzite (probably Ypresian-Lutetian), indicating a shallow marine depositional environment, ammonites in the Wanderfeld IV occurrence (Cretaceous, but is it *in situ*?), and hyracoids and anthracotheres in the Eoridge carbonates (Bartonian). The anthracothere is identified as *Bothriogenys gorringei*, a species common in Priabonian to Rupelian strata in the Fayum, Egypt. During acid digestion of carbonate blocks to release the skulls and mandibles of the Eoridge large mammals, several amphibians (anurans) and small mammals were found, including rodents and potamogalids, indicating that the Namibian fauna is older than that from the Fayum, probably Late Bartonian. The Namibian

Palaeogene limestones are now known to comprise a vast palaeontological archive which shows that the subcontinent was a major centre of evolutionary activity which culminated, in the fullness of time, in the Cape Floral Realm and the Cape Faunal Zone, already well established by the Lutetian-Bartonian judging by the endemic chrysochlorids, macroscelidids, tenrecids and potamogalids. Three taxa of primates have been identified, and ten of rodents, among which a new genus shows inner ear morphology similar to that of South American rodents such as the *Chinchilla*.



Brigitte Senut surveying Plio-Pleistocene Namib Calc-crust previously called the Pomonakalke and correlated by most geologists to the Cretaceous. The huge boulders trapped

in the calc-crust are of Ypresian-Lutetian Kätchen Plateau Quartzite (KPQ).



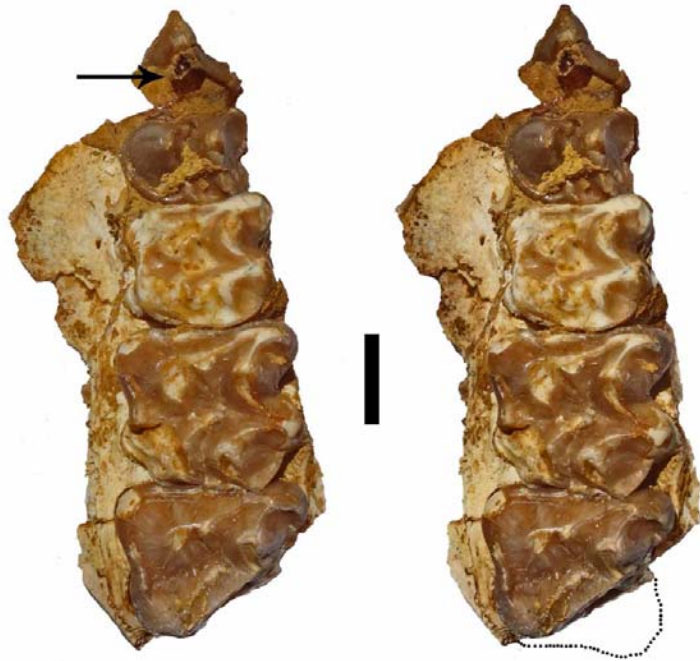
Vertical cylindrical structures in the KPQ at Tafelberg Nord, Sperrgebiet, Namibia, interpreted to be lebenspuren.



Block of sandy limestone from Wanderfeld IV containing several shells of the ammonite *Proplacenticerus merenskyi*, previously known only by the holotype. This taxon was taken to provide definitive evidence that Cretaceous rocks existed in the Sperrgebiet, BUT... are the fossils *in situ*?



Extraction of hyracoid remains from the Eoridge Limestone required rock cutters and pneumatic drills. Brigitte (on right), wondering how to unstuck the car while Morne Van Jaarsfeld and Stephan Steenkamp excavate the skull with a rock cutter.



This maxilla of *Bothriogenys gorringei* from Eoridge confirms the Eocene age of the deposits and extends its previously known geographic range southwards by more than 6000 km (scale: 10 mm)

oOo

Helke Mocke - National Earth Science Museum, Geological Survey of Namibia - Windhoek.

The Namibia Palaeontological Expedition, comprising Drs Pickford and Senut, visited the Sperrgebiet National Park from 26 April to 27 May and have found new fossils resulting in the need to rethink the age of some deposits in the park. Some of the highlights of this trip included the discovery of an anthracothere, excellent carnivore material and three shells of the enigmatic ammonite *Proplacenticerias merenskyi*.

Collaboration with Italian scientists has resulted in a scientific publication on dinosaur tracks from the Waterberg. I attended various conferences, including the Heritage Talk Conference held on the 15th May at the Safari Court Conference Centre in Windhoek, Namibia. On the 19-20 May the 25th Anniversary conference and AGM of the Museums Association of Namibia took place in the beautiful coastal town of Swakopmund, Namibia.

Helke handed in her final M.Sc. dissertation, titled: "*The postcranium of the carnivorous cynodont Chiniquodon from the Middle Triassic of Namibia and the palaeo-environment of the Upper Omingonde Formation*", on the 18 June at the ESI, Witwatersrand University. The Namibian *Chiniquodon* is one of the most complete chiniquodontid specimens known worldwide, in terms of the postcranial skeleton and provides the first evidence of elements from the foot in chiniquodontids.



The pes of the Namibian *Chiniquodon* specimen.

oOo

Rob Gess - Albany Museum, Grahamstown.

Rob Gess has had an exciting last six months. He has been granted a three year NRF/DST Centre of excellence bursary to pursue his work on Devonian marginal marine and terrestrial ecosystems, based at the Albany Museum. He is continuing his work with **Michael Coates** on early chondrichthyans, with **Kate Trinajstić** on placoderms and with **Cyrille Prestiani** on Devonian plants. Important papers with all of these collaborators are taking shape.



Grahamstown coelacanth reconstruction by Rob Gess
(painting by Anton Brink)

Recently his paper on shark fossils from the Waterloo Farm lagertätte, which was published on line last year, came out in print in Palaeontologische Zeitschrift. July or August this year will see the release of his work on the Devonian coelacanth nursery at Waterloo Farm in the Zoological Journal of the Linnean Society of London.

Rob is looking forward to presenting at the 13th International Symposium on Early and Lower Vertebrates in early August in Melbourne. A pre-conference fieldtrip to the Frasnian (Late Devonian) Gogo Station lagertätte in the north western Australian outback will fulfil a long held ambition of his. Networking with leaders in the field at the conference, reconnecting with old associates and getting up to date with the many new developments in understanding the base of the gnathostome tree will be a fantastic opportunity.

Whilst in Melbourne he is planning to meet up with **Norton Hiller**, who is now resident there, in order to discuss earliest Devonian brachiopods - that will contribute to a project on the Bavianskloof Formation in the Eastern Cape.

Till next time.... Rob

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Billy de Klerk - Albany Museum, Grahamstown.

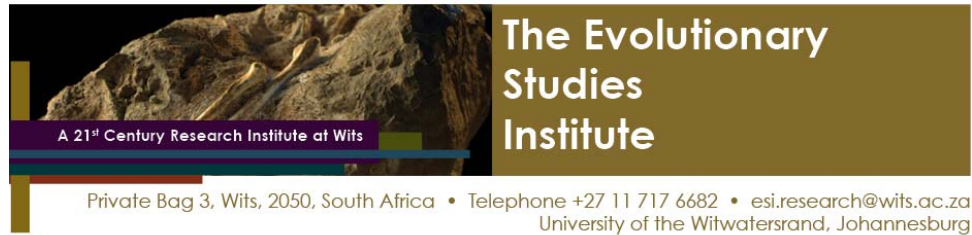
My involvement in palaeontology research over the past nine months has been rather limited as I was wading through the quagmire of bureaucracy. Getting my paperwork in order to retire from the clutches of the Eastern Cape, Dept. of Sport Recreation Art and Culture - not an easy feat!. I have now been retired since the beginning of April'15. On reflection I had been based in the same office at the Albany Museum for 30 years - and what a wonderful time it has been! The Museum very kindly gave me a wonderful parting function at which time it was announced that the Museum's Board of Trustees had approved my appointment as Curator Emeritus for the foreseeable future. This effectively means that I will retain my office and continue my research. I will also be focusing on my woodwork and Viv and I plan to do a lot more travelling while we are able.

As I leave I am particularly pleased that my post has been filled by **Dr Rose Prevec** who now take over the reigns as Head of the Albany Museum's Palaeontology Department. I have full confidence in Rose and I know that she will do a great job into the future....

Cheers Billy

oOo

NEWS FROM:



CENTRE OF EXCELLENCE
PALAEOSCIENCES



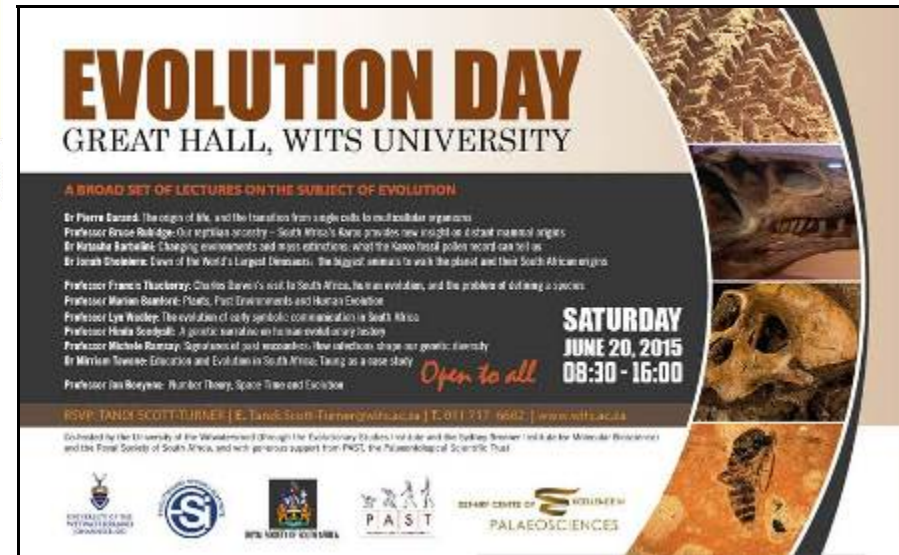
EVOLUTION DAY AT WITS, JUNE 20, 2015

Francis Thackeray, Evolutionary Studies Institute, WITS

A series of public lectures, on a wide range of topics concerning evolution, was given on "Evolution Day" (June 20, 2015) in the Wits Great Hall. It was co-hosted by the University of the Witwatersrand and The Royal Society of South Africa, with support from the Palaeontological Scientific Trust (PAST) and the DST-NRF Centre of Excellence in Palaeosciences. It was well attended, and stimulated a great deal of interest.

Organisations that supported the Evolution Day event included the Palaeontological Scientific Trust (PAST), the DST-NRF Centre of Excellence in Palaeosciences, the Evolutionary Studies Institute, the Sydney Brenner Institute for Molecular

Bioscience, the Origins Centre and the Royal Society of South Africa.



The programme and abstracts are given below.

Opening Address: Professor Andrew Crouch, Deputy Vice Chancellor (Academic), University of the Witwatersrand

Professor Zebulon Vilakazi, Deputy Vice-Chancellor (Research). On the topic of **"What happened seconds after the Big Bang"**.

The origin of life, and the transition from single cells to multicellular organisms. Dr Pierre Durand, Department of Molecular Medicine and Haematology, University of the Witwatersrand

Our reptilian ancestry: South Africa's Karoo provides new insight on distant mammal origins. Professor Bruce Rubidge, Evolutionary Studies Institute, University of the Witwatersrand



Changing environments and mass extinctions: what the Karoo fossil pollen record can tell us. Dr Natasha Barbolini, Evolutionary Studies Institute, University of the Witwatersrand

Dawn of the world's largest dinosaurs: the biggest animals to walk the planet and their South African origins. Dr Jonah Choiniere, Evolutionary Studies Institute, Wits.



Charles Darwin's visit to South Africa, human evolution, and the problem of defining a species. Professor Francis Thackeray, Evolutionary Studies Institute, University of the Witwatersrand



Plants, Past Environments and Human Evolution. Professor Marion Bamford, Evolutionary Studies Institute, University of the Witwatersrand.

The evolution of early symbolic communication in South Africa. Professor Lyn Wadley Evolutionary Studies Institute, University of the Witwatersrand

A genetic narrative of human evolutionary history.

Professor Himla Soodyall, Division of Human Genetics, National Health Laboratory Service & University of the Witwatersrand



Signatures of past encounters: How infections shape our genetic diversity. Professor Michele Ramsay, Sydney Brenner Institute for Molecular Bioscience, University of the Witwatersrand



Education and Evolution in South Africa: Taung as a case study. Dr Mirriam Tawane, Evolutionary Studies Institute, University of the Witwatersrand

The Golden Ratio, Space-Time and Evolution.

Professor Jan Boeyens, Centre for the Advancement of Scholarship, University of Pretoria



www.wits.ac.za/newsroom/newsitems/201506/26773/news_item_26703.html

ABSTRACTS

Plants, Past Environments and Human Evolution

Professor Marion Bamford, ESI, Wits

We are all interested in where we came from, in what kind of environment we started and evolved. What did we eat? This talk will take you through the African vegetation and climate from the Early Miocene time (early primates), through the drying out of the continent, shifting vegetation, shrinking forests and expanding grasslands to the diverse vegetation that we have today.

**Changing environments and mass extinctions:
what the Karoo fossil pollen record can tell us
Natasha Barbolini, ESI, & Wits**

Palynomorphs (organic-walled microfossils, including fossilized plant spores and pollen grains) are an unrivalled biostratigraphic tool as well as a highly useful palaeoecological proxy. The South African fossil pollen record in the main Karoo Basin can reveal much about environmental change during the Carboniferous to Jurassic periods, including vegetation dynamics and ecosystem response over two of the "Big Five" global mass extinctions, namely the end-Permian and end-Triassic events. There is significant debate over whether these extinction events affected continental floras in the same ways, and to the same extent, as the marine and vertebrate realms. In the Karoo Basin, the greatest decline in plant species diversity occurs at the end of the Permian, where nearly 90% of marine species and 70% of terrestrial vertebrates died out. This dramatic loss of pollen species is concurrent with a sudden and catastrophic event among Permian floras, in contrast to other studies suggesting a time lag between terrestrial ecosystem collapse and plant extinctions. Although the precise causes of the extinction remain uncertain, aberrant trisaccate and tetrasaccate pollen found only at the Permo-Triassic boundary may suggest degradation of the ozone layer and increased levels of ultraviolet radiation reaching Earth's surface, possibly affecting plant reproduction. Conversely, the end-Triassic event is reflected in the fossil pollen record as a protracted

extinction among floras, coupled with a faunal change from large basal sauropod and prosauropod dinosaurs to smaller taxa such as *Massospondylus* in the Jurassic. Intriguingly, a major palynological turnover is seen in the Upper Elliot formation, currently considered to be early Jurassic in age, and at present, it is uncertain whether this reflects a previously undocumented extinction in the rock record, or perhaps a hiatus in deposition. Future application of plant microfossils to reconstructing past environments offers new possibilities for refining the timing and causes of extinction events, and may shed light on both faunal and floral continental biodiversity changes across Gondwana.

**The Golden Ratio, Space-Time and Evolution
Jan Boeyens, Centre for the Advancement of Scholarship,
University of Pretoria**

Prime numbers are often playfully referred to as the atoms of the number system. On arranging the natural numbers on a spiral with a pitch of 24 some logic behind this statement becomes apparent. All prime numbers are of the form $6n \pm 1$ and hence they appear on eight radial arms of the spiral, reminiscent of what was known as the Lewis model of the atom. The spiral displays some amazing numerical regularities that invite continuation of the game to relate atomic structure to prime numbers. If each cycle represents 8 atoms in a periodic array, the total of 24 should refer to the non-radioactive isotopes of these atoms. Examination of a graphical display,

mapping isotope composition of proton-to-neutron ratio as a rational fraction, changes the game into serious science. It will be shown in discussion how a periodic function, with the periodic table of the elements as a subset, is implied by the rules of elementary number theory, without empirical input from chemistry or physics. An *ab initio* prediction based on the properties of pure numbers. The fundamental parameter that predicts the periodic structure is rigorously derived as the golden ratio. It is readily inferred from the numerical data how atomic composition responds to environmental pressure, which is interpreted as a function of space-time curvature. The results point at a new model for nucleogenesis and space-time topology, conditioned by the golden ratio. Of interest for this symposium it will be shown how the modular periodic structure of atomic matter mirrors the appearance of the golden ratio as the parameter that differentiates between biological species, as discovered by Francis Thackeray. As a space-time characteristic the algorithm must apply at the cosmic scale, which means that the evolutionary process observed on this planet, must occur in the same form elsewhere. *We are not alone!*

**Dawn of the world's largest dinosaurs:
the biggest animals to walk the planet and their South
African origins**

Jonah Choiniere, ESI, Wits

Sauropod dinosaurs were the largest animals to ever walk the Earth. The biggest of them may have tipped the scales at over

70 tonnes and measured more than 40m from snout to tail. Being big isn't necessarily easy, and sauropods needed to solve all kinds of basic biological problems - for example, how to eat enough to support a massive body with such a tiny head. I will discuss the unique challenges to being an animal of such immense size, and I will review the evidence for how sauropods evolved unique ways of coping with them. Finally, I will reveal how fossils from right here in South Africa tell the opening chapters in sauropod evolutionary history.

**The origin of life, and the transition from single cells to
multicellular organisms**

Dr Pierre Durand, Dept Molecular Medicine & Haematology, Wits

Evolution is the organising principle in biology. Some of the basic tenets and principles of evolutionary biology are discussed and the listener is taken on an exploration of two of the most fundamental questions in biology. Why did life begin at all? And once cellular life was established, why did multicellular forms evolve from unicellular ones? Given what we know about the early biochemistry on Earth, the most parsimonious explanation for life's origins is presented. The likely biomolecules at the very beginning were involved in chance and deterministic events, ecological trade-offs and evolutionary constraints and the resulting increases in complexity allowed for a primitive living system to take hold. Multicellular life emerged from unicellular organisms. A tractable system for examining this transition is the green algal model lineage known

as the volvocines. Recent advances in experimental evolution and genomics have allowed us to uncover some of the steps that would have taken place as multicellular volvocines evolved from less complex unicellular ones. Our understanding of these past events informs our expectations of the future of life on Earth.

Signatures of past encounters: How infections shape our genetic diversity

Professor Michèle Ramsay, Sydney Brenner Institute for Molecular Bioscience (SBIMB) & Professor in the Division of Human Genetics, University of the Witwatersrand

African populations have great genetic diversity in their genomes. This reflects an evolutionary history that has been shaped by different forces. Some diversity has its origins in population migration and admixture, and some of it is just chance. Another contributor is natural selection by an environmental force that affects fertility. New mutations occur with every child that is born. It is estimated that a child has between 25 and 35 new genetic mutations that are not present in either of its parents. Most of these mutations have no discernable impact on the body, but occasionally a mutation arises that is selected for in a certain environment. Through this process the mutation that provides a fitness advantage will be more likely to be passed on successfully through many generations, and with time, may become quite frequent in that population. In the presence of malaria, the sickle cell mutation confers a selective advantage on carriers of the mutation, and

thus this mutation has attained high frequencies in areas where malaria has been, and may still be, endemic. Sleeping sickness has been common in regions of Africa and two mutations in the *APOL1* gene confer resistance to infection by *Trypanosoma brucei*, the bacterium that causes sleeping sickness. Over many years these variants became relatively frequent in many African populations. More recently it has been documented that Africans have a four times higher risk of developing severe kidney disease and this risk is even higher in the presence of HIV infection. The two *APOL1* mutations that protect individuals from getting sleeping sickness have now been shown to predispose them to HIV-associated kidney disease. These are examples of how three infectious epidemics have contributed to shaping genetic diversity in Africa.

Our reptilian ancestry: South Africa's Karoo provides new insight on distant mammal origins

Professor Bruce Rubidge, ESI, Wits

Rocks of the South African Karoo Supergroup, deposited more than 200 million years ago during the time of the giant supercontinent Gondwana, host the world's best fossil record tracing the distant ancestry of mammals. This remarkably complete record, unravelled by the observations of several generations of palaeontologists, chronicles changes in body structure on the 100 million year evolutionary pathway to mammals at a time when these species had global distribution. New information provides exciting evidence on the physiology,

ecosystems, rate of evolution, the daily lifestyle of our most distant land-living ancestors. Field data reveals the devastating results of extinction events which nearly prevented the origin of mammals.

A genetic narrative of human evolutionary history

Himla Soodyall, Division of Human Genetics, National Health Laboratory Service & University of the Witwatersrand.

Since the late 1980s our laboratory has made use of haploid genetic markers - mitochondrial DNA (mtDNA) and Y chromosome DNA - to examine the prehistory of sub-Saharan African populations. Our most recent GWAS studies (Schlebusch et al. 2012) have provided additional support for our findings from both mtDNA and Y chromosome DNA research, but with the added benefit of including diploid inheritance. These studies have shown quite convincingly that the present-day San and Khoe populations of southern Africa have returned the oldest genetic signatures that have evolved for over 100,000 years. Moreover, the application of computational methods like structure, has revealed that the partitioning of genetic signatures among the Khoe and San can be distinguished from non Khoe-San populations within the African continent. Selection appears to have driven changes in genes involved in development among African populations, and to some extent to immunological responses among southern Africans. Given that the sub-Saharan African region is vastly different, it is possible that regional selective pressures could

have contributed to regional differences to adaptation to varying environments. This paper highlights the historic narrative of how genetic research has contributed to our understanding of variation among sub-Saharan African populations and also review how other factors like migration within Africa and contact from outside of Africa have contributed in shaping the genetic landscape of present day sub-Saharan African populations.

Education & Evolution in South Africa: Taung as a case study **Miriam Tawane, ESI, Wits.**

At the border of the North West Province and Northern Cape, one finds a town rich of culture, historical sites and events. Taung is found within the far end of North West, when one is en-route to the Northern Cape. Taung is inhabited by a community of Tswana speaking people. The Taung fossil site was declared a World Heritage Site in 2005. It is well known for the famous hominin fossil called *Australopithecus africanus* nicknamed "the Taung child". This was the first human ancestor or hominin discovered in Africa. The Taung child was discovered in a limestone quarry in the village of Buxton in the Taung District. It was introduced to the world by Raymond Dart in 1925. Despite the discovery of the skull so many years ago, the Taung community, school teachers and school learners know very little about the famous fossil, or the site itself.

Teaching or even grasping the concept of evolution has proven to be quite a challenge, irrespective of whether you are from a

rural or urban area, rich or poor, religious or not. These challenges of course differ based on the upbringing one has had, the exposure to the subject, and one's open mindedness regarding the subject.

Taung is no different at all. As a sub-rural setting, it has its own set of challenges when it comes to teaching evolution and to the subject's perception by locals. One of major challenges is access to the subject materials. Lack of resources in the area is robbing learners the opportunity to choose Palaeo-sciences as a subject of choice.

Palaeontology is a foreign topic to the majority of the school learners growing up in Taung, despite the presence of the heritage site in the area. From 2008 to 2010, the University of the Witwatersrand, together with the partnership of a local non-profit organization and the government, held an annual activity to change this. The activity was held on the 24 September and accommodated about 500 learners from 19 high schools from the area. I had the opportunity to lecture the learners about palaeontology, and human evolution, when I shared the significant finds and the contribution our country has made to the scientific world concerning this rather complex subject. The activities have since stopped, and the school learners continue to be lacking the knowledge and the history of the site, therefore limiting the careers that they may choose from when that time arrives. Some of the teachers teaching this subject complain about its complexity and they always worry about misinforming the learners.

Human evolution is an important part of the National Life Sciences Curriculum. With the opportunity I had to lecture the Taung local scholars, I saw first-hand the need for this information to be shared among teachers and learners and the general community. Similar activities could create consciousness about this subject and its related field (evolutionary biology), and encourage learners who may be interested in pursuing a career in this field e.g, palaeontology, anthropology, and other related fields. This could just lead to a palaeo-conscious Taung and change the local's perception towards their national heritage and evolution.

**Charles Darwin's visit to South Africa, human evolution,
and the problem of defining a species**
Professor Francis Thackeray, ESI, Wits

Charles Darwin visited South Africa in 1836. He recognized that Africa was the continent from which humanity evolved. This was based on the morphology of modern chimpanzees and gorillas which are found only in Africa, and which shared a common ancestor with humans. Darwin did not live to witness the remarkable discovery of at least 20 species of hominins such as *Australopithecus africanus*, *A. afarensis* and *Homo habilis*, but such discoveries have confirmed the view that Africa is the "Cradle of Humankind". Darwin had recognized the difficulty of discerning boundaries between species when sample sizes of each species increased (as in the case of his studies of barnacles). The same problem applies today in the

context of palaeo-anthropology. In order to try to address this issue, Thackeray has outlined a probabilistic definition of a species, applied to hominin fossils in the context of what is called "sigma taxonomy" as opposed to "alpha taxonomy" defined by Ernst Mayr *et al* (1953).

The evolution of early symbolic communication in S. Africa

Lyn Wadley, ESI, University of the Witwatersrand

Symbolism is coded communication that is understood by the cultural group in which it originated. Such communication is sometimes expressed through ornaments or decorated possessions used by individuals or by groups. Symbolic communication dates to at least 100 000 years ago in South Africa. Engraved geometric designs were created on ostrich eggshell water bottles at both western Cape and southern Cape rock shelters. Amongst modern hunter-gatherers, engraved eggshell water bottles signify ownership, but we do not know whether this was also the case in the past. Repetition of particular designs suggests that group traditions were adhered to. By about 75 000 years ago, people used perforated marine shells as ornaments strung on twine. At Blombos, shells appear to have been strung to create designs distinguished by colours and shapes. The early South African evidence for symbolic communication involves the use of analogy which is arguably the root of all complex cognition.

oOo

A snippet from Francis Thackeray, ESI at Wits



Francis Thackeray in Paris at the house of Leclerc Buffon adjacent the Grand Gallery of Evolution. Buffon and Darwin are my heroes. Both wrote about the lack of clear boundaries between species. Leclerc Buffon spoke about the "nuance" of

variation between species. Which is why I am pursuing "palaeospectroscopy" in relation to my statistical (probabilistic) definition of a species and an approximation of a biological species constant ($T = -1.61$), I spoke about this in Paris in early February, and the concepts are attracting growing attention. Long Live Buffon! I met up with **Brigitte Senut, Martin Pickford** and others at two official meetings in Paris. One meeting was to celebrate 20 years of co-operation between France and South Africa in relation to Palaeontology.

All the best, **Francis**

We look forward to more on this in the next PalNews (ed).

Francis Thackeray - "Species without boundaries: a new way to map our origins" <http://theconversation.com/species-without-boundaries-a-new-way-to-map-our-origins-42646>

Congratulations to Jose Braga, Francis Thackeray and their team on their recent publication "Disproportionate Cochlear Length in Genus Homo Shows a High Phylogenetic Signal during Apes' Hearing Evolution.

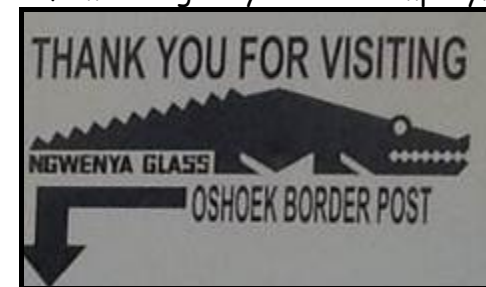
PLOS ONE | DOI:10.1371/journal.pone.0127780 June 17, 2015

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News from Jonah Choiniere, ESI at Wits

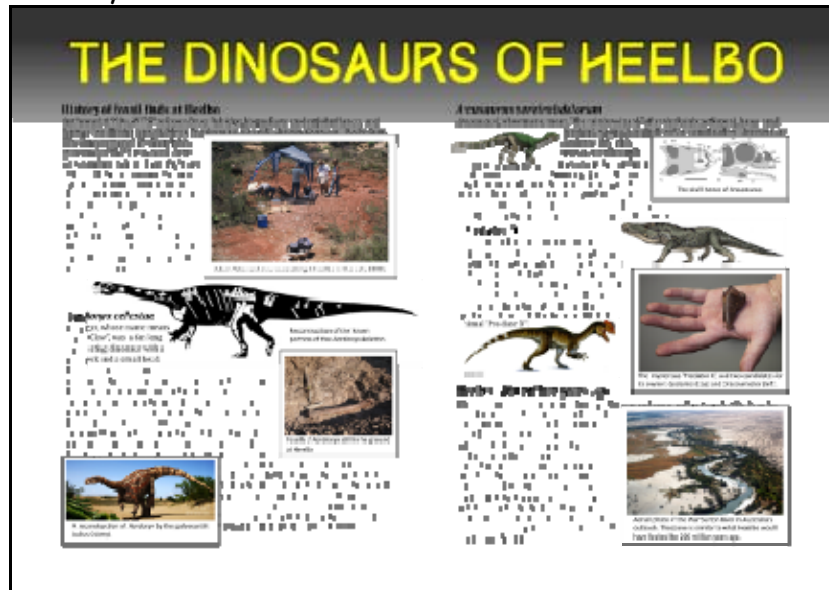
Although the fieldwork Gods have only smiled upon my lab a little bit this year, the foreign travel Muses have favored us considerably more.

In February, I was invited to speak at the Natural History Society of Swaziland. As part of a palaeo-evening put together by Kathleen Dollman, I discussed the evolution of feathers. For my efforts, I was given a traditional Swazi welcome of cold Sibebe and grilled beef and sent home with treats from the famous Ngwenya Glass Company.



Heelbo Farm, near Senekal, is one of the premier localities for Elliot dinosaurs. In the early 2000s, Adam Yates and his field crew excavated three new sauropodomorph species there. The owners of this farm, the Bremer Family and Cobus Visser, as well as the farm stewards, Mr. Human and Mr. Gordon, have been great friends to palaeontologists over the years. In early March, Johann Neveling, Blair and I put together a little information table for the folks at Heelbo for their

annual meeting as a way of saying 'thank you' for all of the help over the years.



A flyer from the Heelbo exhibition

In mid-March, my students Kimi Chapelle, Blair McPhee, Kathleen Dollman, and I visited the "Holy Trinity" of northeastern USA vertebrate fossil collections: The American Museum of Natural History (AMNH), the Yale Peabody Museum (YPMNH), and the Harvard Museum of Comparative Zoology (MCZ). While Blair and Kimi were looking at sauropodomorphs, Kathleen was regarding basal crocodylomorphs and I was flitting

to and for making sure everyone was working hard (as well as doing some data collection of my own).



From left, Kathleen Dollman, Kimi Chapelle, and Blair McPhee raise the roof to the AMNH during our collections visit in March.



Blair McPhee logging data next to an exquisite mosasaur skull in the Yale Peabody collections area.



Pizza, wine, and tons of fossils. Kathleen Dollman is content at the AMNH!



It wouldn't be a proper visit to Boston without a stop at the Bull and Finch Pub (or as it is more commonly known, Cheers).

In early May, I made the long journey down to Rhodes University, where I filled in for the recently-retired (finally!!!) Billy de Klerk to teach Palaeontology to third-year *Geosciences* students. I had a wonderful time on what is surely the most beautiful campus in South Africa and was graciously hosted by Dr. Rose Prevec and her husband Steve. I even managed to sneak in an hour of fieldwork at a new prospective micro-site in the Kirkwood Formation, and my graduate student Blair joined me to do some research on a new paper on sauropods from the same strata!



Blair McPhee and yours truly at a possibly micro-site in the Kirkwood Formation.

Late May brought an illuminating week of fieldwork in the Elliot Formation with Dr. Emese Bordy and soon-to-be Dr. Lara Sciscio of UCT. That dynamic duo joined Blair and I to scout famous dinosaur localities and establish their provenance. The highlight of the trip was a three-night stay in the western Transkei where we identified dozens of promising new sites that we'll hit this spring.



Lara Sciscio with a particularly exciting veldt discovery.



Blair McPhee entertains Emese Bordy during a morale-boosting lunch break in an abandoned town just outside of Sterkspruit.



From left: Lara Sciscio, Emese Bordy, Blair McPhee, and local farmer Augustus at the *Blikanasaurus* type locality in the western Transkei.

In early June, I traveled with Casey and Kathleen to London to do specimen work at the NHM. A week later, Casey and Kathleen headed to Germany to look at specimens in the Humboldt museum in Berlin and at the Museum fur Naturkunde in Stuttgart (and quaff a few estimable German braus in the evenings).



Casey Staunton and Kathleen Dollman contemplating the verisimilitude of an equestrian statue in the British Museum.



The ESRF facility in Grenoble.

Meanwhile, I headed off to the European Synchrotron Radiation Facility in Grenoble, France, where I met Kimi and former ESI postdoctoral fellow Vincent Fernandez. We spent a week synchrotron scanning the famous *Massospondylus* embryos

and testing the local fromages (sadly our night shifts more or less excluded wine from the menu).



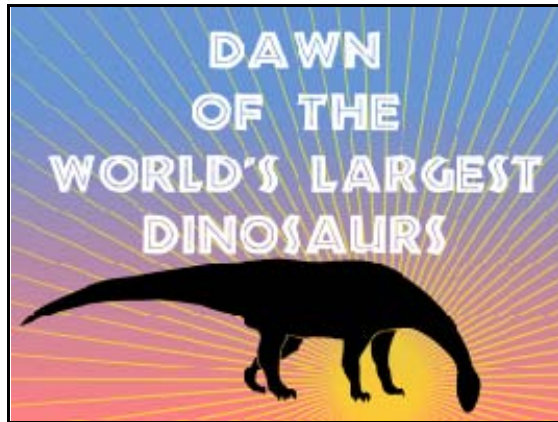
Kimi and Vincent showing off the synchrotron beamline used to scan *Massospondylus*.



Vincent is well chuffed with the results.

Preliminary results are very good indeed, and we anxiously await the fully reconstructed scans!

Not long after coming back from France, I gave a talk on the 'Dawn of the World's Largest Dinosaurs' at Wits Evolution Day. The series of talks from scientists across Wits' many departments studying evolution was attended by more than 500 people!



Student News

Blair McPhee was awarded a PAST fieldwork grant and has completed his manuscript on the sauropods of the Kirkwood Formation. He recently led a one-week fieldtrip to the Elliot Formation to establish the provenance of important sauropodomorph taxa.

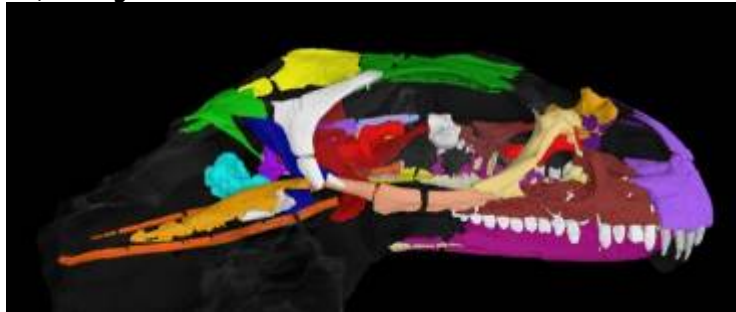


Blair McPhee being his usual helpful self.

Kimi Chapelle has been segmenting CT data like a fiend, most recently the skull of "Big Momma." She has received a grant from the ESRF, and from the CoE to support her graduate studies. Together with Kathleen Dollman and Dominic Stratford, she recently put together our first "Palaeo Quiz Night," which was a boisterous success (see report by Marc Van den Brandt below).



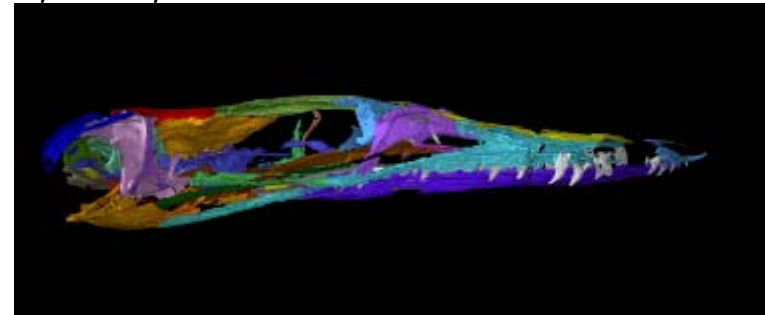
Kimi with the winners (contested due to rampant cheating) of the first Palaeo Quiz Night at the ESI.



One of Kimi's latest segmented skulls.

Kathleen Dollman has also been segmenting croc skulls at a breakneck pace, and has been forging new collaborations with Drs. Jim Clark and Mark Norell. She has been dubbed the "Fat-Dog Queen" by those in the know! She organized a series of

talks by Wits Palaeosciences students at the Swaziland Natural History Society.



The skull of *Littargosuchus*, recently segmented by Kathleen Dollman.

Casey Staunton has mastered the art of photogrammetry and is working on optimizing the method for museum and field use. She's most recently built a 3D model of the forelimb of the rare sauropod *Cetiosauriscus*, housed at the Natural History Museum in London.



A 3D reconstruction of the forelimb of *Anchisaurus* done by Casey Staunton using photogrammetry.

Nadia Afonso is continuing her work on burrows in *Cynognathus* Subzone C.



Nadia's honours project showing scratch marks.

...and last but not least, I'd like to heartily welcome **Katherine Clayton** to the lab! Katherine is an MSc student co-supervised by me and Zubair Jinnah (Wits Geosciences), and she is looking into the sedimentology and taphonomy of the dinosaur assemblages from the Lebombo and Tshipise Basins. Katherine comes from the University of Utah, where she was a star student. She's just come back from Kruger with tales of many a dinosaur bone lying about!



Katherine Clayton, near a hot spring in Yellowstone National Park, USA



Katherine's field assistants, the many fossils they found in Kruger, and some dung of relatively large caliber.

oOo

Marc Van den Brandt – ESI, Wits University

Marc has been hard at work in the basement of the ESI studying the skull of the type specimen of the basal Middle Permian pareiasaur *Embrithosaurus schwarzi*. Pareiasaurs were a group of large, herbivorous parareptiles, the named for "cheek-piece of a helmet-lizard" after the expanded cheek regions of their skulls. Currently, 4 species are recognised from the *Tapinocephalus* Assemblage Zone: *Bradysaurus seeleyi*, *B. baini*, *Embrithosaurus schwarzi* and *Nochelesaurus alexanderi*. A detailed cranial description has never been completed for *Embrithosaurus* and the type specimen has been obtained on loan from the Iziko South African Museum. The first draft of the description has just been completed. Supervised by **Bruce Rubidge** and **Fernando Abdala**, Marc plans to complete the description and drawings this year, with a view to update the diagnostic features of all species in the group thereafter, which would include a trip to London to study the type specimens of *Bradysaurus*. Marc aims to update the biostratigraphic occurrences of each species by the end of 2016, through re-identification of all specimens held in South Africa. Several well preserved pareiasaurian skulls being used by **Marc** for his cranial studies and also to entertain and amuse the school groups and journalists that trot through the ESI collections on an almost daily basis.



On Friday evening the 22nd of May 2015 the ESI at Wits University held its first ever Palaeo quiz evening, brilliantly organised by **Kimi Chapelle** and **Kathleen Dollman**. Eight teams of 4-5 members each vied for top honours across six categories of questions ranging from archaeology through to palaeoanthropology, famous palaeontologists and entertainment. The evening was a tremendous success and looks to become an annual part of the ESI calendar. Congratulations goes to "Team Giant Hyrax" (so named after an alleged field trip spotting of a survivor of the extinct giant Eocene species) Mike Day, Fernando Abdala, Marc Van den Brandt and Pia Viglietti, (pictured above under Kimi Chapelle)), showing that four Karoo palaeontologists can hold their own across a diverse range of palaeo topics.

oOo

Natasha Barbolini – ESI, Wits University

Including **Marion Bamford**, **Ashley Kruger** and **Steve Tolan** on their recent fieldwork in Zambia. Zambia saw the return of **Natasha Barbolini** in June 2015, this time accompanied by **Marion Bamford** and **Ashley Kruger** to further explore and document the rich palaeobotanical diversity of the Mid-Zambezi Valley. They joined **Steve Tolan** from Chipembele Wildlife Education Trust, Mfuwe, along with **Joseph Museba** from National Heritage Conservation Commission and set out for Chirundu Fossil Forest, a World Heritage Site in the Gwembe District.



The Green Team 2015. Clockwise from back left: Natasha, Joseph, Steve, Marion, Ashley, John, Emmanuel

The site has many fossilised tree trunks up to 10m in length and with good cellular preservation. Amazingly, these were some of the smaller fossil trees seen on the trip!



Measuring toppled tree trunks at Chirundu Fossil Forest

The team then moved on to in-situ fossil wood sites discovered by **Steve Tolan** that exhibit an extraordinary diversity of wood types and preservation. These sites were

documented using photogrammetry techniques and small samples of wood taken - as the complete trunks would take a bulldozer to lift! Although the Permian is not currently known for a wider diversity of fossil woods, the excellent preservation visible to the naked eye hints at much greater diversity.



One of Zambia's Big Trees, with Marion for scale.

Next up was a fossil wood site on the banks of Lake Kariba, first noted in the 1950's by Ron Tavener-Smith as having "many acres of fossil trees". At the time Lake

Kariba did not yet exist and so it is likely that many more acres are now underwater, but since at least three people fall prey to crocodiles in the area every year, no one will be scuba-diving to investigate further. At another site, huge trees are preserved as toppled stumps and fragmented logs up to 1.8m in diameter. Even Marion, who is usually very reserved in her judgement, could not suppress a "Wow, these must be the biggest trees in Africa!" Not far away an even bigger surprise awaited the team. Buried in a stream bed but noticed by Steve's eagle eye was a large fern caudex that elicited many "Wows" and more. While photographing the excavation, Natasha found an even bigger fern, then Ashley found one and finally Steve found another, all within 6 metres of one another! Not one surprise but four! Watch this space



Fossil logs make good seats!

In addition, a Late Permian macroplant site was excavated and further pollen samples collected from areas worked on by Chris Sidor and Ken Angielczyk's team in the Mid-Zambezi Valley and these will help date the deposits and determine the palaeoenvironment. The trip ended with Fedex boxing over 100kg of fossil plants, wood and pollen to ship home to South Africa, so it can be said that the trip was a highly successful one.



Before we could have a cold beer, those fossils needed to be catalogued.

Cheers, Natasha.

oOo

Latest press articles from the ESI, Wits

"Who is the Boss" - Juan Carlos Cisneros, Fernando Abdala and Tea Jashasvili, 2015, *Tiarajudens eccentricus* and *Anomocephalus africanus*, two bizarre anomodonts (Synapsida, Therapsida) with dental occlusion from the Permian of Gondwana. *Royal Society Open Science*..

http://www.wits.ac.za/newsroom/newsitems/201507/26873/news_item_26873.html



Congratulations to **Mike Day, Fernando Abdala, Bruce Rubidge** and their international colleagues on their paper in the *Proceedings of the Royal Society B*.

"When and how did the terrestrial mid-Permian mass extinction occur? Evidence from the tetrapod record of the Karoo Basin, South Africa"

wits.ac.za/newsroom/newsitems/201507/26805/news_item_26803.html

Why South Africa's Karoo is a palaeontological wonderland"
- Bruce Rubidge & Mike Day -

<http://theconversation.com/why-south-africas-karoo-is-a-palaeontological-wonderland-43045>

Two articles on SA Dinosaurs in one newspaper paper! In "Die Burger". **SA se dino-eiers geskandeer**

<http://www.netwerk24.com/nuus/wetenskap/2015-06-25-sa-se-dino-eiers-geskandeer> Congratulations to Jonah, Anusuya & Kimi!



"Beendere lê 80 jaar en wag op roem" - Die Burger 12 July 2015
<http://www.netwerk24.com/stemme/profiele/2015-07-12-beendere-l-80-jaar-en-wag-op-roem> **Go Jonah!**

Jonah Choiniere on "Dinosaur eggs get ready to hatch their secrets – 200 million years later" <http://theconversation.com/dinosaur-eggs-get-ready-to-hatch-their-secrets-200-million-years-later-43413>

Vincent Fernandez – ESRF, France / ESI, Wits

A tough egg to crack:

Oldest lizard embryos discovered in fossil eggs

In 2003, a team led by the Thai palaeontologist Varavudh Suteethorn (Department of Mineral Resources, Bangkok) visited the locality of Phu Phok near Sakon Nakhon. This locality was known for many years to be rich in fossils and has yielded several remains of dinosaurs, turtles, fishes and crocodiles. The top of the hill (*Phu*, pronounced Pooh, meaning 'hill' in Thai) is represented by rocks from the Sao Khua Formation, Early Cretaceous floodplain deposits most likely late Barremian in age (Racey 2009; Racey et al. 2009; Tumpeesuwan et al. 2010). Each year, the team visit several localities after the monsoon as the rain remove a significant amount of sediment on the ground, exposing fossils to the surface. After many successful campaigns, the team discovered in 2003 some quite peculiar fossils: two small eggs, slightly crushed, not bigger than a sparrow's eggs. Five others followed the successive years, unfortunately not in a nest structure but scattered on a relatively small area (about 2m²). One egg in particular was so badly preserved that it seemed fit for thin sectioning and analyses of the eggshell. A first article came out in 2005 (Buffetaut et al.) describing the eggshell, its morphology and microstructure: The eggshell consisted of three distinct layers of calcites, like bird's eggs, and was covered by tiny knobs, like some non-avian theropod dinosaur's eggs. One of the eggs was

showing some embryonic bones from one of its broken surface. But given the size of the minute embryonic bones, it was unthinkable to try physical or chemical preparation. The question was unsolvable, was it a small theropod dinosaur or a bird that laid these eggs?

Luckily, the 2000s were the dawn of synchrotron imaging for fossils. The specific properties of the X-ray beam produced by synchrotron radiation allowed the use of techniques that were solving problems in palaeontology. Notably, using phase contrast tomography, being several orders of magnitudes more sensitive to density variation in an object, one could produce data where bones were outlined by dark and bright fringes. The eggs were then flown from the Sirindhorn Museum (Northeast Thailand) to the European Synchrotron Radiation Facility (ESRF, Grenoble, France). While some bones were completely invisible using classic absorption computed tomography (CT), phase contrast synchrotron CT allowed all the bones to be observed, segmented and finally studied (Fernandez et al. 2012).

As always, in palaeontology, things take time: back in 2007, the data from the scans of these eggs were 20 Gb large, even after intense compression, but still too large for the best available computer at ESRF with 8 Gb of RAM; The new computer available in 2008 could open the data but then it was the software used for processing that was not suited for handling such a large data set. In 2009, with all the appropriate equipment, the data were finally processed, each bone virtually extracted, one after the other. The virtually extracted bones

were also 3D printed, magnified 40 times to be easily handled and then start a long jigsaw puzzle.

The bones from the first analysed egg were not giving any significant clue: a lot of ribs, vertebrae and long bones lacking epiphyses and just a few skull bones. After 6 months of work, the answer of the question was still at its initial state. The second analysed eggs showed more cranial bones and notably both dentaries and maxilla. Scrutinizing the two 3D printed bones we noticed something odd: The teeth were only at the surface of the bones, with no visible roots. Was that an artefact of preservation, a lack of resolution? Difficult to say as, even using the magnified 3D printout, the teeth were only 1-2mm.

The Eureka moment came during the same week, while I was away teaching in Chambéry University (France), I got a call from my supervisor, Paul Tafforeau: "I have a good news and a bad news; good news is I know what the embryos are; bad news is I know what the embryos are". The unrooted teeth suddenly made sense "it's a lizard".

The new diagnose of these embryos as squamates was the new starting point. From the Early Cretaceous of Thailand, there was no mention of squamate at all in the fossil record except two consecutive vertebrae discovered at the same locality of Phu Phok. Clearly the embryos were a new undescribed species. The advanced state of ossification indicated that the embryos died close to hatching, so many morphological features were relevant for identification. But it could not eventually lead to the erection of a new species.

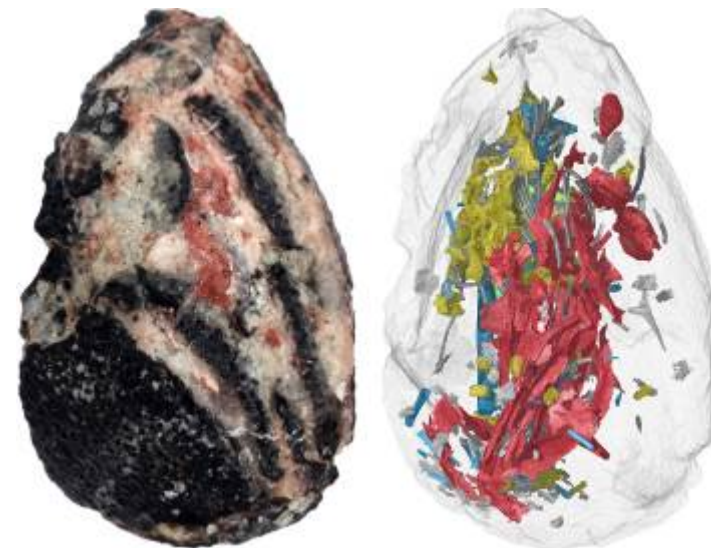
Nevertheless, several features were indicating anguimorph affinities within squamates: opening of the Meckelian canal rostral to the splenial, absence of tubercle on the medial surface of the retroarticular process, no more than 13 teeth in the maxilla. Within Anguimorpha, the maxillary tooth row located anterior to the orbit, the absence of a subdental shelf on the dentary and the long low rostral process of the coronoid, among other features were suggesting more affinities with platynota than Anguioidea. Conversely, the embryos present a fracture plane on the first caudal vertebrae for self amputation (i.e. autotomy), a feature absent in most platynotans. The complete analyses of these morphological features showed an interesting mixture of characters within Anguimorpha, suggesting more affinities with Platynota than Anguioidea; the later hypothesis could not have been ascertained. The isolated vertebrae from the same locality showing long, narrow centra with concave lateral margins and clearly posterodorsally facing condyles were also positively assigned to Anguimorpha. But that was as far as one could go with the present material.

Now, what were anguimorph lizards doing in theropod/bird eggs? And what do we know about squamate eggs and reproduction mode? Modern squamates display an unparallel range of mode of reproduction from oviparity to viviparity. Oviparous squamates also lay very different type of egg: most eggs are soft with a leathery aspect with no or very little calcite component, the exception being geckoes laying highly calcified hard-shelled eggs. There are also a few reports on

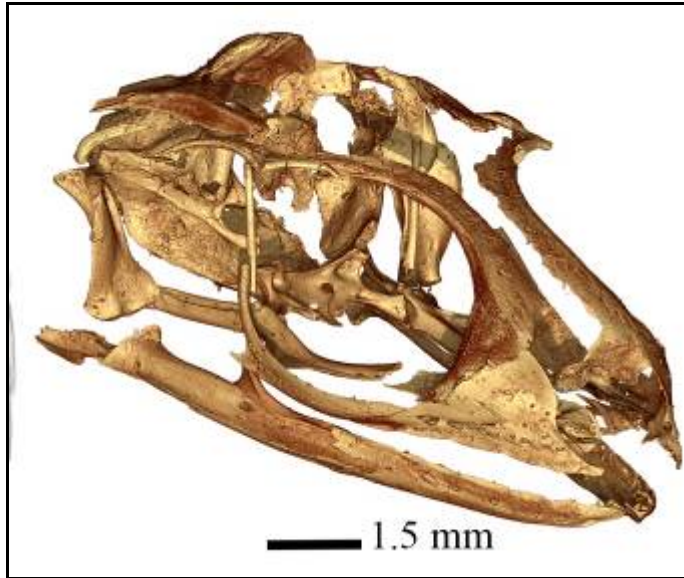
fossil squamate eggshell, tentatively assigned to gekkota as it was the only known group with this type of eggs in squamates. As it seemed important to review the analyses of the eggshell, we restudied the thin section, adding to that a series of virtual thin sections from the synchrotron tomography data, SEM analyses on the small left-over fragment from the egg used for thin-sectioning and finally a synchrotron X-ray diffraction analysis of the eggshell. The new set of data showed that the eggshell was in fact not consisting of three distinct layers but a unique one constituted of compact adjacent columns made of calcite, which characterize the eggs microstructure of geckoes.

Finally the eggs were not that special in their microstructure, as they present a general pattern already and only known in squamate. What is special however is to find such an egg outside of the gecko lineage. It highlights the fact that squamate present a very peculiar plasticity when it comes to the evolution of their reproduction mode. It was already known that the calcite component could be suppressed up to complete retention by females that would not lay the egg but give live birth. But it was not known that the increase of calcite did not occur only in geckoes and that it occurs in at least another lineage. It eventually cast doubts on the previously reported isolated fossil eggshell from several localities and time periods as these eggs could be those of geckoes or anguimorphs... or something else?

- Buffetaut E., Grellet-Tinner G., Suteethorn V., Cuny G., Tong H., Kořir A., Cavin L., Chitsing S., Griffiths P. J. & Tabouelle J. 2005. Minute theropod eggs and embryo from the Lower Cretaceous of Thailand and the dinosaur-bird transition. *Naturwissenschaften*, vol. 92, p. 477-482.
- Fernandez V., Buffetaut E., Maire E., Adrien J., Suteethorn V. & Tafforeau P. 2012. Phase Contrast Synchrotron Microtomography: Improving Noninvasive Investigations of Fossil Embryos In Ovo. *Microscopy and microanalysis*, vol. 18, p. 179-185.
- Racey A. 2009. Mesozoic red bed sequences from SE Asia and the significance of the Khorat Group of NE Thailand. *Geological Society, London, Special Publications*, vol. 315, p. 41-67.
- Racey A. & Goodall J. G. S. 2009. Palynology and stratigraphy of the Mesozoic Khorat Group red bed sequences from Thailand. *Geological Society, London, Special Publications*, vol. 315, p. 69-83.
- Tumpeesuwan S., Sato Y. & Nakhapadungrat S. 2010. A New Species of *Pseudohyria* (*Matsumotoina*) (Bivalvia: Trigonioidea) from the Early Cretaceous Sao Khua Formation, Khorat Group, Northeastern Thailand. *Tropical Natural History*, vol. 10, p. 93-106.



One of the eggs from Phu Phok (SK1-1) that was scanned at the ESRF showing the numerous bones preserved inside. In the 3D rendering, the colour code is: red, skull and mandibles; yellow, vertebrae; blue, limbs, dark grey, ribs; light grey, fragments.



Skull and mandible reconstruction using bones from two eggs (SK1-1 and SK1-2).

See press release and more pictures at - <http://www.dailymail.co.uk/sciencetech/article-3163687/World-s-oldest-lizard-embryo-discovered-125-million-year-old-baby-discovered-inside-fossil.html>

Cheers, Vincent

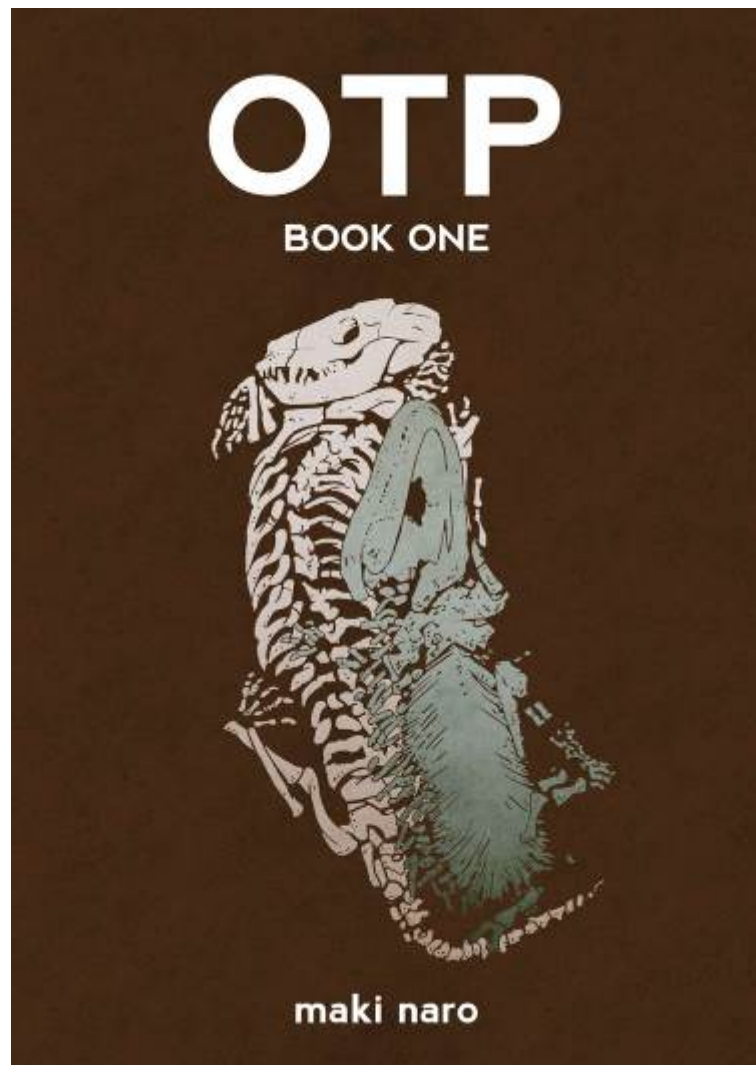
Vincent has also been working with cartoonist **Maki Naro** and they have produced a wonderful cartoon focusing on the *Thrinaxodon-Broomistega* burrow research that he produced at Wits a couple of years back (See PalNews July'13) - ed.

Turning science articles into delightful comics, **Maki Naro** is an artist and science communicator. He catches the essence of discoveries from many scientific topics and transcribes it into a very lively way. In 2013, the publication of the *Thrinaxodon-Broomistega* burrow caught his eye and he started a new series of comic depicting this unusual cohabitation in a burrow.

OTP - for One True Pairing - tells the story of two animals from the Early Triassic trying to survive during the most dramatic of all mass extinctions. From the original series, published one page at the time for almost a year describing various scenes, he is now publishing a remastered cohesive minicomics on our two heroes. His work can be found on the 'Popular Science blog' (<http://www.popsci.com/popsci-authors/maki-naro>) and a preview of the OTP minicomics as well:

<http://www.popsci.com/meet-prehistorys-one-true-pair>

oOo



**James Brink - Florisbad Quaternary Research Dept.,
National Museum, Bloemfontein & Centre for
Environmental Management, Univ. Free State.**

Projects:

1. *Early & Middle Pleistocene evolution of large mammal faunas and modern landscapes in southern Africa.*

We had two field seasons at the Cornelia-Uitzoek fossil vertebrate locality - in May and in October 2014. We continued to cut into an upper bone occurrence in sediments dated to between 0.78 and 0.99 Ma. **Prof. John Gowlett** (Liverpool) joined us again to continue his study of the Acheulean stone tools from the excavations and from survey work of the Schoonspruit and the nearby Venterspruit.

During July and August I joined **Prof. John Gowlett's** team for the field season at the Kilombe Acheulean site and at Chesowanja, an early Acheulean fossil vertebrate locality, central Rift Valley, Kenya. After the fieldwork I spent time in the collections of the National Museums of Kenya in Nairobi to study bovid fossils from East Turkana.

Publication:

Brink, J.S. In press 2015. Faunal evidence for mid- and late Quaternary environmental change in southern Africa. In: Knight, J. and Grab, S.W. (eds) *Quaternary environmental change in southern Africa: physical and human dimensions*. Cambridge University Press.

2. *Micromorphological study of the Florisbad & Cornelia-Uitzoek sediments*

Dr. Michael Toffolo joined us in 2014 as postdoc to do a study of the micromorphology of Florisbad sediments and to test the hypothesis that the bone bed at Cornelia-Uitzoek was predominantly a carnivore-collected assemblage. In January and February 2015 **Dr. Toffolo** studied the slides of the sections at the Simon Fraser University, in collaboration with **Dr. Francesco Berna**, and he is now writing up the first results of this work.

3. *A study of the Erfkroon late Quaternary fossil locality*
In collaboration with **Prof. Brit Bousman**, Texas State University, we have now almost completed the first round of analyses of the field seasons 2006 - 2013. The work on the fluvial exposures of the Modder River is continuing and shows much further promise for Quaternary palaeontology.

Publication:

Brink, J.S., C.B. Bousman & R. Grün. In press 2015. A reconstruction of the skull of *Megalotragus priscus* (Broom, 1909), based on a find from Erfkroon, Modder River, South Africa. *Palaeoecology of Africa*, vol 33.

4. *The analyses of fossil vertebrate remains from Wonderwerk Cave*

In collaboration with **Liora Horwitz** and **Sharon Holt** we have now completed the study of the basal layers of excavation 1 at Wonderwerk Cave.

Publication:

Brink, J.S., S. Holt & L. Kolska Horwitz. 2015. Preliminary Findings on Macro-Faunal Taxonomy, Taphonomy, Biochronology and Palaeoecology from the Basal Layers of Wonderwerk Cave, South Africa. In: I. Thiaw & H. Bocoum (eds). Proceedings of the 13th Panafrican Congress on prehistory and related studies, Dakar, November 2010. Mémoires de L'ifan - C. A. Diop, n° 93, Dakar. pp. 137-147.

Conferences:

We organised a conference in honour **Prof. Louis Scott** in Bloemfontein in early July 2014. The conference was well attended with over 100 delegates and was followed by a field excursion to fossil sites in the western interior, including Wonderwerk Cave and Kathu Pan. There are two volumes now in preparation that will contain some of the proceedings of the conference (<http://lscott-tribute.co.za>).

I gave an invited presentation on southern Africa mammal evolution and turnover at a conference organised by **Prof. Mattias Jakobsson** (Uppsala) "Tracing human history in southern Africa using genetics and archaeology, September 2014, Visby, Sweden".

Cheers, James

oOo

Herbie Klinger (retired), Ex-Iziko Museum, Cape Town

My apologies for the long silence. Since compulsory retirement from the Museum I sold my house in Pinelands and moved out to the countryside in Porterville. Why Porterville? During my honours year at Stellenbosch, **Izak Rust** sent me out to Porterville to collect fossils from the Cedarberg Formation he had discovered - the first fossils from the Table Mountain

Group at that stage. While at the South African Museum, I visited the site several times, some with the Friends of the Museum. So, with money from the sale of the house in Pinelands I found an old house in Porterville with a large garden and adjoining granny flat. Apart from fixing cracks and all sorts of problems in the hundred-year old house, I resettled my invertebrate library in one of the rooms. I still continue editing African Natural History - with internet access this is no problem. To return to the Ordovician fossils from the Cedarberg Formation, I successfully applied for a permit from Heritage Western Cape, and am awaiting permission from the landowners of the Groot Winterhoek Reserve to get down to collecting.

I have joined the council of the local Jan Danckaert Museum and hope to add a display of the fossils to the current displays of generally social importance. Apart from gardening - in an area half the size of a football field, I have also joined the local lawn Bowls club to keep busy. I really enjoy the peace and quiet out here, and if I run low on delicatessen and books, Cape Town is only about an hour and a half away from here.

oOo

John Anderson - Pretoria

Honorary Research Associate (Palaeobotany), ESI,
Wits; AEON, NMMU, PE.

'Gondwana-Earth-Africa Alive' Triptych

We are deep into the Anthropocene, the Sixth Extinction! As Edward Wilson put it, "*The Sixth Great extinction spasm of geological time is upon us, grace of mankind*" (1992). Or as I put it in our '*Towards Gondwana Alive*' (1999), "*Imagine an asteroid the diameter of central Sydney slamming into the Earth. We humans are that asteroid*".

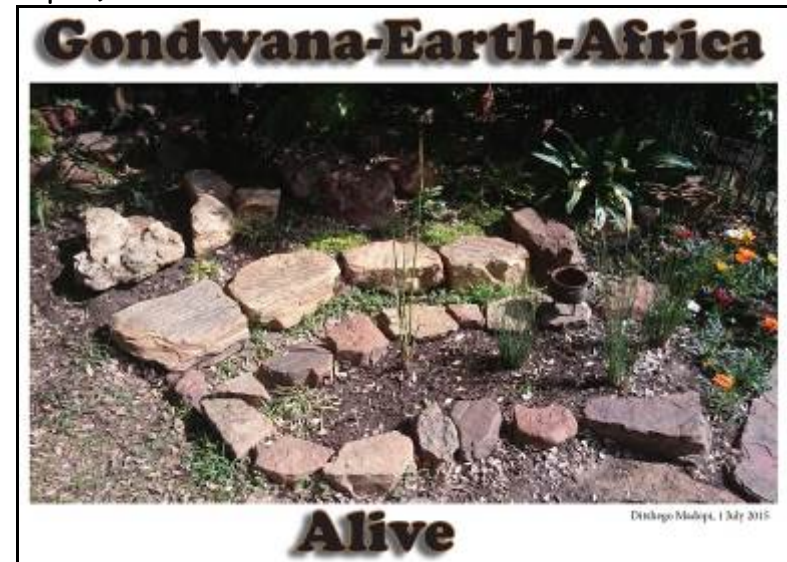
Sadly, things have got worse since 1999! A lot worse! I have a rock-and-plant sculpture garden here at home, '*The Amphitheatre*', in Pretoria. There are 43 sculptures at any one time (I was born in 1943). They continually evolve, morph from this into that, shift location—as is the way in our world. They are a microcosm of our world, full of symbolism.

The GA-EA-AA Triptych, seen in the photos, is the latest sculpture to evolve. It is built mostly of Magaliesberg quartzites, deposited when our Earth was around half its current age.

'Gondwana Alive' (GA), to the left (top), is formed of two well-eroded quartzite slabs clearly spelling out *G* and *A*. It was put in place on 30 June this year, for the *'Gondwana Alive'* gathering of 20 persons we held here the next day. Tracey Phillips our *GA* CEO for the past half-dozen years or so, was up from the Cape Peninsula. She is doing a wonderful job keeping the initiative alive, working currently on biodiversity trails locally with previously disadvantaged students and communities—whilst dreaming globally.



'Earth Alive' (EA), in the middle, consists of 4 ripple-marked sandstone slabs telling of the beach sands of the sea stretching across the early KaapVaal continent around 2,5 billion years back. The quartet of slabs represent a whole range of things: the 4 seasons of the Earth year; the 4 points of the compass, the 4 primitive plant groups, mosses, liverworts, lycopods and ferns, planted alongside; the 4 generations of our family who have lived here at the Amphitheatre; my 4 grandchildren, who speak for *'the children of today's world and the children of tomorrow's world'* (Mandela, 1999). EA was created on Earth Day 2015 (22 April).



'*Africa Alive*' (AA), to the right, traces out the shape of Africa. The single sprig of *Equisetum* near the front (in Gauteng so to speak) comes from a large clump of the plant over at the '*Evolutionary Studies Institute*' (ESI), Wits. It represents the Molteno horsetail volume Heidi and I will finally have completed (after reviewers comments) a bit later this year. The great flush of colour of the *Gazania*s suggests the diversity of the tropical forests. AA was conceived—though created later--on Africa Day 2015 (25 May) when I was down in Port Elizabeth with Maarten de Wit working on our '*Africa Alive Corridors*' project. Cheers - John



Christian Kammerer -

Museum für Naturkunde, Berlin, Germany

It is a busy summer of Permo-Triassic research for me, as work continues on descriptive and systematic studies of assorted therapsid taxa. Taxonomic revision of the ever-problematic gorgons has been high on my 'to-do' list for a while now, and so far this year I have published redescrptions of the Late Permian genus *Arctognathus* and the Middle Permian *Eriphostoma*, the latter in collaboration with **Roger Smith** at the SAM and **Mike Day** and **Bruce Rubidge** at the ESI, Wits. More is on the way! Several new students have been added to the Fröbisch Working Group, who are currently hard at work reconstructing the cranial anatomy of various small Karoo dicynodonts and gorgonopsians utilizing CT scans of specimens housed in New York and here in Berlin. Small, '*Emydops*' or '*Pristerodon*'-like dicynodonts are generally in need of revision: earlier this year **Ken Angielczyk**, **Jörg Fröbisch** and I published a redescription of the rare emydopoid *Digalodon* from Graff-Reinet, but much remains to be done, and hopefully our students will be able to sort some of this out. It is a busy time for research travel as well: our student **Leda Piculjan** recently returned from a very successful first trip through the South African

collections (part of her PhD studies on cryptodont dicynodonts) and thanks everyone there for their help and hospitality.

Regrettably, there is no time for a Karoo trip for me this year: I've just returned from working in Switzerland and northern Italy on their Triassic tetrapod faunas, then am taking two weeks off for my honeymoon in Scotland (thankfully my wife has permitted me to spend a day examining the remarkable Cutties Hillock dicynodonts *Gordonia* and *Geikia* in Elgin), and then it is off to Kazan, Russia for the 18th International Congress on the Carboniferous and Permian, where I will be speaking on Late Permian tetrapod correlations between South and East African faunas. I hope to see some of you there, and if not then, at the 75th Annual Meeting of the Society of Vertebrate Paleontology in October!

All the best - Christian

Congratulations to Christian on recently getting married! (ed)
oOo

Heidi Anderson-Holmes & Keith Holmes - Australia

It is with much sadness that we received the news of Val Krassilov's death on 10th February 2015. We recently met up with him at the EPPC congress in Padua, Italy.

These photos were taken after the opening ceremony. With great sympathy and mourning the loss of a great palaeobotanist. (Val Krassilov on left and centre).



Gideon, David and Patricia Groenewald - Clarens.

Susan Groenewald

A True Friend of Palaeontology (1960-2015)

Walking into Golden Gate Highlands National Park during 1986 was an experience of true Palaeontological joy. The Information Officer knew every bit of detail you needed for understanding the geology and what was then known about the fossils in the Park. The person who lived this information was Sue Groenewald (nee Smuts), an enthusiastic fossil hunter. She loved the natural world and everything in it and her love of palaeontology started at a young age, with **James Kitching** introduced her fossils when she accompanied her father on a visit the BPI at age 11. Sadly we had to say goodbye to Sue on 18 April 2015. Her legacy lives on forever (palaeontologists can better understand this time interval), written into the lives of the people of Clarens where she initiated the Dinosaur FunWun that is held every April during the Easter Weekend. As part of the Clarens Dinosaur Tours, visitors can also experience her legacy and some of the tales she helped to unravel over the years, and we will remember her for her great love for God, family, nature and all her friends.

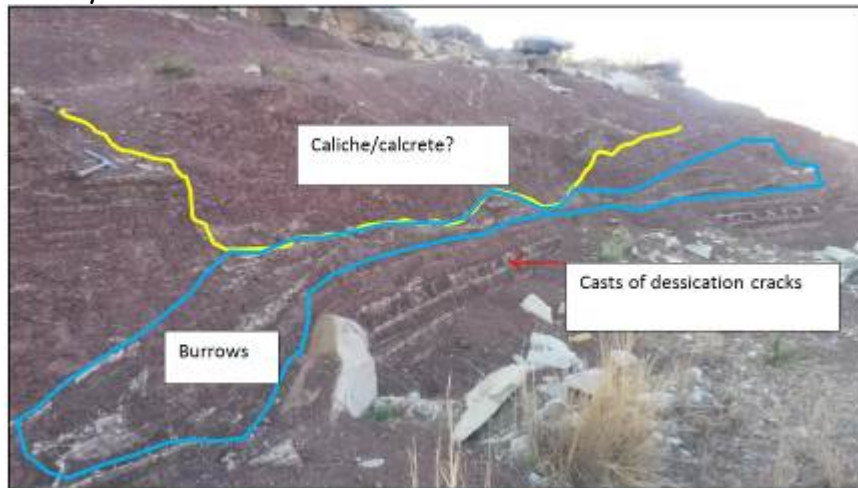
Sue, as wife and mother, motivated us to explore our world, including the tracks of ancient reptiles and dinosaurs.

At present **Gideon** is running the Clarens Dinosaur Tours and doing various consultation projects with PIAs and Groundwater. **Patricia** is working with **Pippa Haarhoff** at the West Coast Fossil Park near Langebaanweg and **David** is completing his BSc Hons year in Palaeontology at WITS.

Interesting Fossil Sites at Tsomo, Eastern Cape
Gideon Groenewald

On a field trip to Tsomo (Transkei) we investigated a road cutting in a red coloured mudstone of the Katberg Formation and was not surprised to see many well preserved vertebrate fossil remains. The mudstone is about 140m below the upper contact of the Katberg Formation with the overlying Burgersdorp Formation. According to the geological maps the Katberg Formation must have a total thickness of 400m in that area. What really caught our attention was a very well-defined palaeosoil, with very large pseudo gypsum crystals (desert roses?) and a well-defined caliche deposit of varying thickness, with an erosive lower contact with laminated mudstone and a layer with large scale casts of desiccation cracks. The upper contact with overlying massive mudstone and sandstone is abrupt.

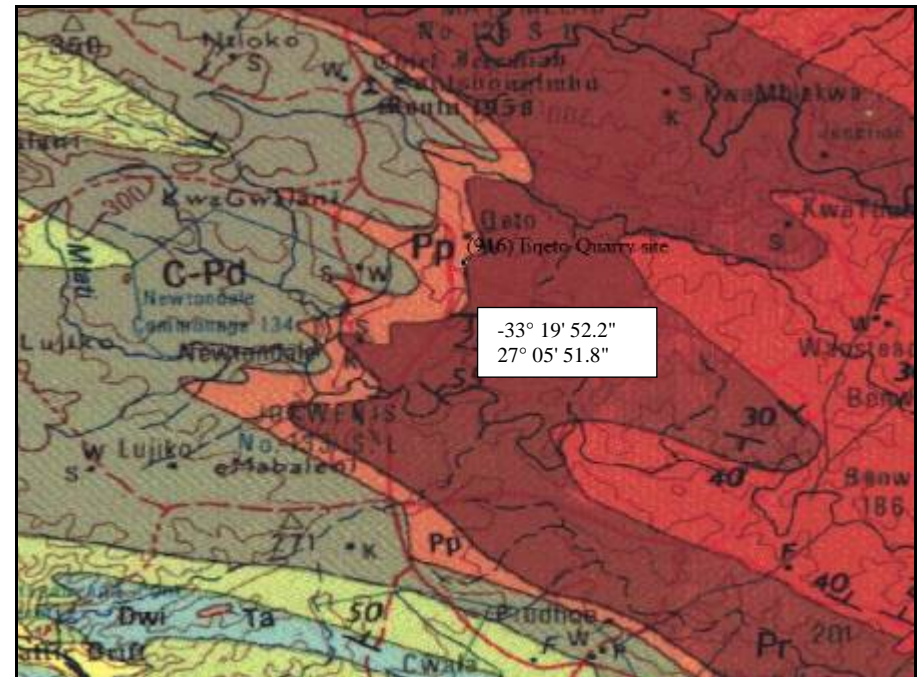
Of particular interest were several very well-defined casts of vertebrate burrows in the caliche layer, some burrows with the bodies of the vertebrates in the chambers. We did not have time or funding to collect any material, but assumed that we are looking at the *Lystrosaurus* Assemblage zone. We then went up the hill to the Burgersdorp Formation and discovered some very interesting plant fossils, preserved as impressions in a greenish coloured fine-grained sandstone/siltstone in the Burgersdorp Formation. What impressed us at the site in the Katberg Formation was the clearly defined palaeo-environments and the total number of casts of vertebrate burrows and fossils at this locality.



Interesting Geological Observation at Eqeto near Peddie, Eastern Cape. Gideon Groenewald

During a recent field trip into the Eastern Cape interior we came to a quarry close the village of Eqeto, south of Peddie. The geological map shows that the area is underlain by Eccca Group sediments, with no younger geology for many miles around.

On first impression it seemed as if a normal old Karoo sandstone is overlying a mudstone in the quarry. On closer inspection the sandstone however cut erosively into the underlying material and then we noticed that the underlying sediments are severely folded. It is therefore a well-defined unconformity with much younger material overlying the Eccca Group sediments. The palaeocurrent direction in the sandstone is well-defined to the north. Anybody with a suggestion as to what formation we are working with? We unfortunately did not find any fossils in the mud-pellet lag to indicate age and will have to find another way of aging the sandstone.



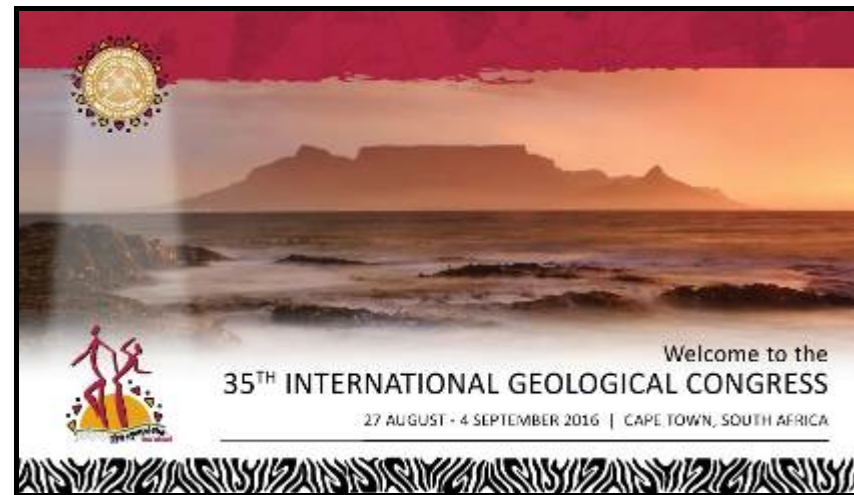


All the best - Gideon

Conferences, Palaeo art, recent fossil discoveries & press cuttings.

35TH INTERNATIONAL GEOLOGICAL CONGRESS

27 AUGUST - 4 SEPTEMBER 2016 | CAPE TOWN, SOUTH AFRICA



More information - www.35igc.org

There will be several sessions on palaeontology at the IGC'16 so please consider presenting some papers of international significance.

XVIII International Congress on the Carboniferous and Permian, to be held at the Kazan Federal University, City of Kazan, Russia, August 11 - August 15, 2015.

<http://kpfu.ru/iccp2015>

You might like to check out the *African Fossils* website to look at 3D models of fossils. To have a look, go to africanfossils.org

Fossil snake with four legs



Tetrapodophis specimen. Credit: Dave Martill

<http://phenomena.nationalgeographic.com/2015/07/23/a-fossil-snake-with-four-legs/>



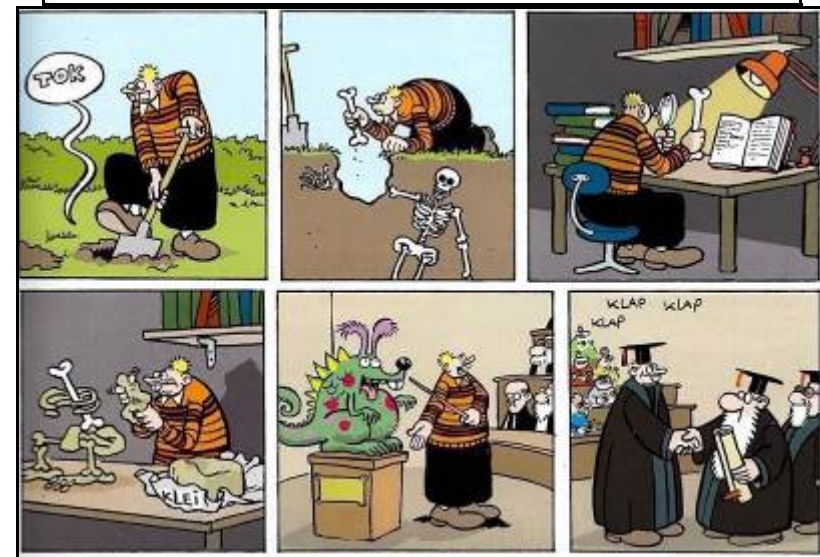
Tetrapodophis. Credit: Julius Csontonyi

Palaeontology Art by Gina Viglietti

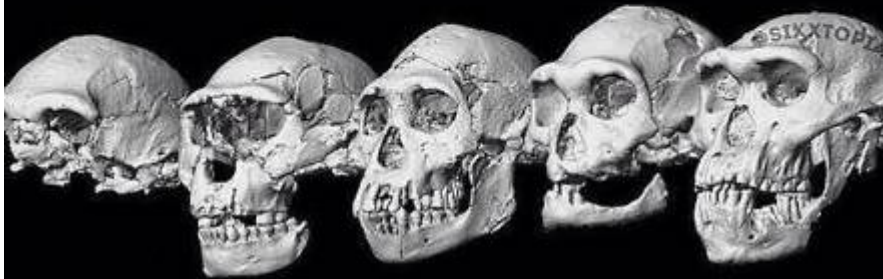
ginav.kirona@gmail.com

Gina, sister of Viglietti, is a digital artist based in Cape Town and she says that she has a not- so- secret love for paleontological and scientific art. She is open for commissions from those in the scientific community seeking the services of an artist. Gina mentioned that she had recently she created a hominid evolutionary diagram for Francis Thackeray, which he has published in one of his papers. Gina is advertising her services as a scientific artist to others in the scientific community. Examples of her work can be seen at:

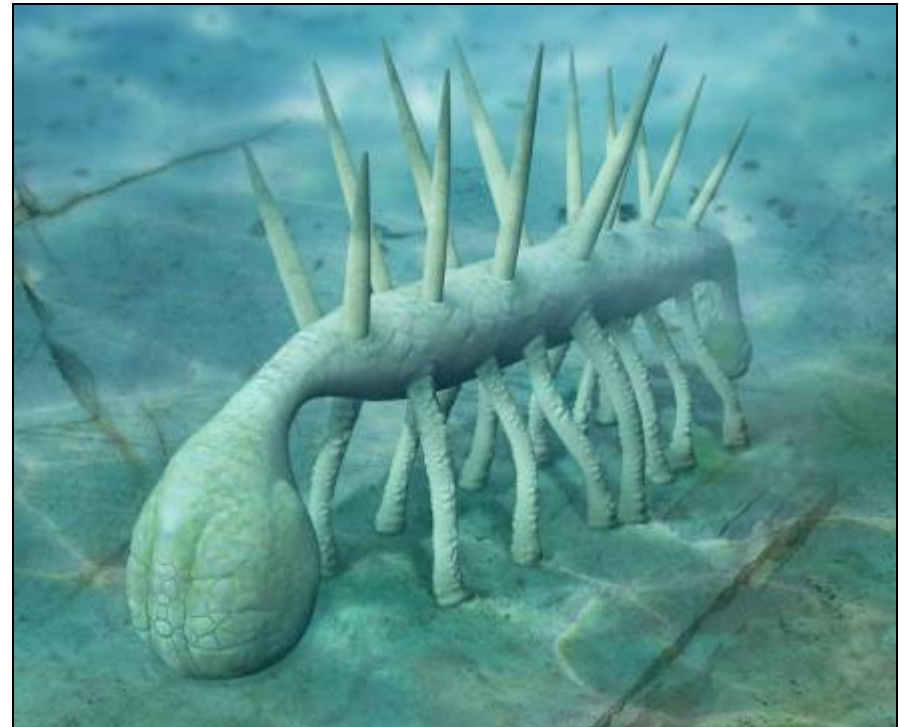
<http://ginaviglietti.deviantart.com/>



EVOLUTION



"Geology shows that fossils are of different ages. Palaeontology shows a fossil sequence, the list of species representing changes through time. Taxonomy shows biological relationships among species. Evolution is the explanation that threads it all together. Creationism is the practice of squeezing your eyes shut and wailing 'DOES NOT! DOES NOT!'"



Tailpiece - *Hallucigenia* is now recognized as a "lobopodian worm" and is considered to represent an early ancestor of the living velvet worms, close relatives of arthropods.

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