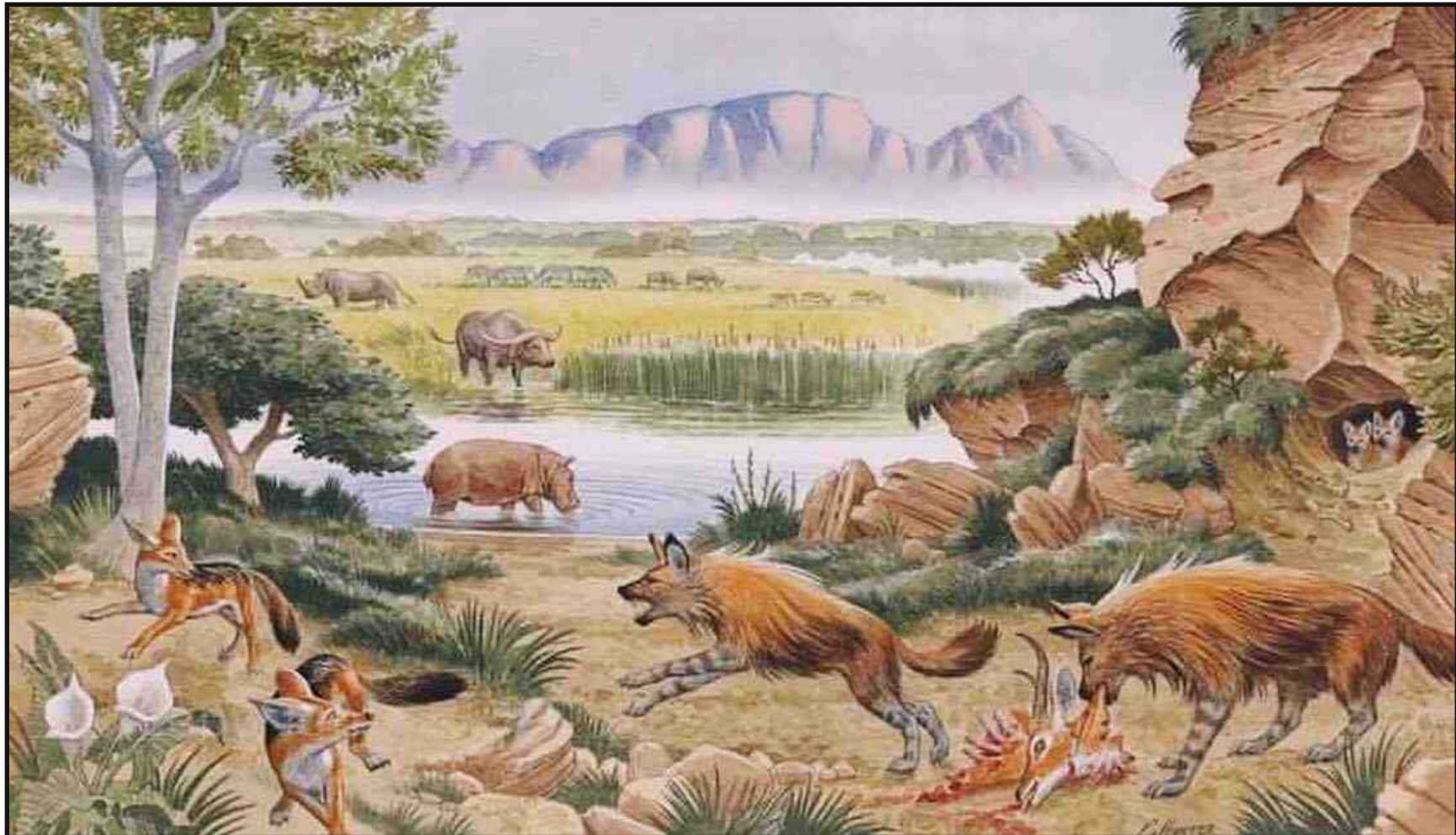


PalNews



Biannual newsletter of the Palaeontological Society of Southern Africa September 2017

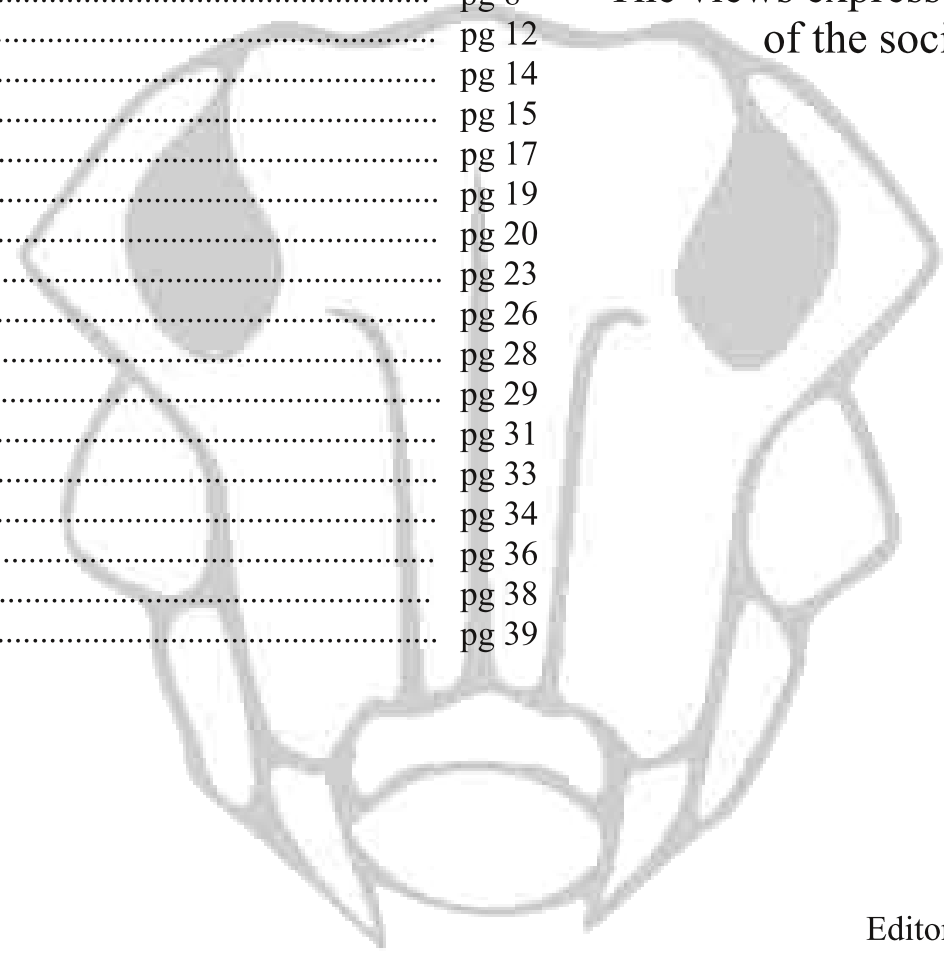


Local talent lost: A reconstruction of prehistoric Cape Town done by the late Cedric Hunter who passed away earlier this year.

In this issue...

From the Editor.....	pg 3
Cedric Hunter tribute.....	pg 4
News From	
Roger Smith.....	pg 8
Mike Day.....	pg 12
Julien Benoit.....	pg 14
Kimberley Chapelle.....	pg 15
Pia Viglietti.....	pg 17
Safiyyah Iqbal.....	pg 19
Silindokuhle Mavuso.....	pg 20
Francis Thakeray.....	pg 23
Steve Tolan.....	pg 26
Lara Sciscio.....	pg 28
Christian Kammerer.....	pg 29
Ellen Palestrant.....	pg 31
Gideon Groenewald.....	pg 33
Ragna Redelstorff.....	pg 34
Recipe Corner	pg 36
Comic Corner	pg 38
Email list	pg 39

PalNews is published by the Palaeontological Society of Southern Africa for its members. The views expressed are not necessarily those of the society or its officers.



Editor: Pia Viglietti
Email: pia.pristerodon@gmail.com
Address: 1 Jan Smuts Avenue, Palaeosciences Centre,
Evolutionary Studies Institute, University of the Witwatersrand

From the Editor

This issue is dedicated to one of South Africa's greatest palaeoartists Cedric Hunter, an unsung talent who sadly passed away in March of this year. Many in the South African palaeontological community knew Cedric well, but others who did not will definitely know him through his art. He made a career as an illustrator at Iziko South African Museum reconstructing South Africa's natural history, bringing it all back to life in exquisite detail. In this issue you will read all about Cedric's life and how he came to work at the museum in Cape Town, and also meet Roger Smith with whom he collaborated with for over 34 years.

Cedric had an amazing attention to detail with his work, and being the amateur naturalist he was he also wanted to know in intimate detail everything about the animal he was working on. This contributed greatly to the quality of his reconstructions, and some of his best works are also showcased in this issue. Farewell Cedric, you will be sorely missed by many in the community.

Pia



Cedric Hunter in his home office in Gardens, Cape Town. Image credit: Roger Smith

Obituary to Cedric Michael Hunter (1941-2017)

By Roger Smith

Iziko South African Museum, ESI affiliate, Wits University
rsmith@iziko.org.za

Cedric Michael Hunter: naturalist, illustrator, artist, sculptor, marine engineer and devoted family man, died on 20th March 2017 soon after suffering a heart attack. His untimely passing leaves a void in the palaeontological community of South Africa because he represented one of our few great palaeoartists.

Born in Mowbray, Cape Town in 1941, he lived his whole life, all 75 years, within walking distance of Table Mountain. Schooled at SACS, then 2 years at technical college before completing 5 years as an apprentice artist with a Cape Town printing firm. An avid climber in those days he met and eventually married Eva, a fellow climber, in 1965. Four years later their daughter Catherine was born - an event that finally settled Cedric into the family life he cherished. In 1973 he showed his portfolio of natural history illustrations and artwork to Dr Tom Barry, then the Director of the South African Museum, who immediately recognized his talent and offered him a job. There he worked as an artist/illustrator until 2002 when he opted for early retirement to pursue his career as a freelance artist. While at the museum, and for several years after, Cedric produced countless drawings, paintings and sculpts for the exhibitions, education activities, popular publications and scientific journals. Perhaps his most lasting legacies to the palaeontological community are his illustrations for Mike Cluver's *Fossil Reptiles of the South African Karoo* and Brett Hendey's *Langbaanweg: a record of past life*.

Nature lover:

Cedric Hunter leading a nature and geology hike up one of his favourite places - Platteklip Gorge, Table Mountain. Image credit: Iziko South African Museum



When I started working at the museum in 1983 Cedric had already proven himself in his talent for his life-like reconstructions of long extinct organisms. And he continued to impress when he illustrated several of my research publications, as well as other popular articles for our in-house quarterly *Sagittarius* magazine and *Muse News*. Later Cedric began helping with an update to Boonstra's Karoo exhibit called *Stone Bones*. He reconstructed ancient Karoo ecosystems, and made beautiful sculptures of Permian therapsids. His *Heterodontosaurus* sculpture features in the *African Dinosaurs* exhibit, and his African bear at the West Coast

Cedric's Art

Fossil Park at Langebaanweg. When at work he immersed himself in orchestral music surrounded by his precious books, his desk never cluttered, everything always shipshape, aligned and in its proper place. I always admired his attention to detail - attention that some found excruciatingly ponderous - but I found it fascinating and it was what set his work apart from the rest. Before setting pen to paper he needed to understand what he was tasked to illustrate by asking endless questions. He also found satisfaction in doing his own research to understand how organisms work, and then used that information to add the minutest details to his biological illustrations. It was during these early morning progress sessions, in his front room studio, that we really connected. When Cedric, with Eva looking on, dramatically unveiled his maquettes or latest colour artwork, both watched for my instant reaction - had he done it or not? And when the hairs stood up on the back of my neck I knew he had.

Cedric loved nature and found all things natural both curious and inspirational, not only for his artwork but for his emotional well being. His greatest joy was rambling on Table Mountain with like-minded friends. He was rarely negative about anything except his constant battle with electronic gadgets, traffic and especially “noise” of popular music. He also had strong feelings about the burgeoning destruction of the natural world and described himself as “a disappointed humanist”. From the tributes read at his wake it became clear that Cedric was well-liked by everyone who knew him and his open-hearted gentleness will not be forgotten.

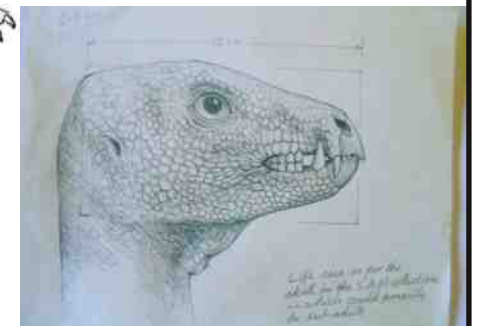
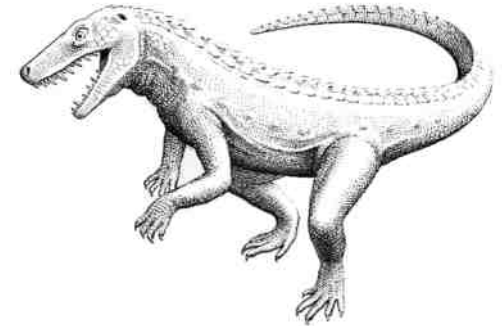
***Special thanks to Eva Hunter for the biographical information.

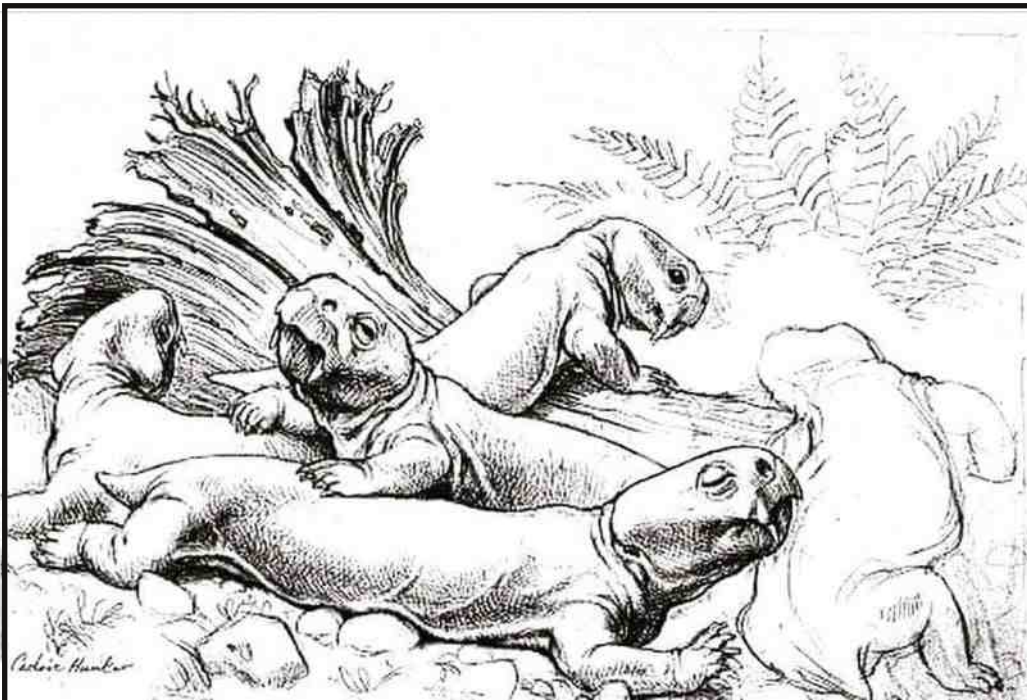


A Piece from Mike Cluver's *Fossil Reptiles of South Africa's Karoo*.

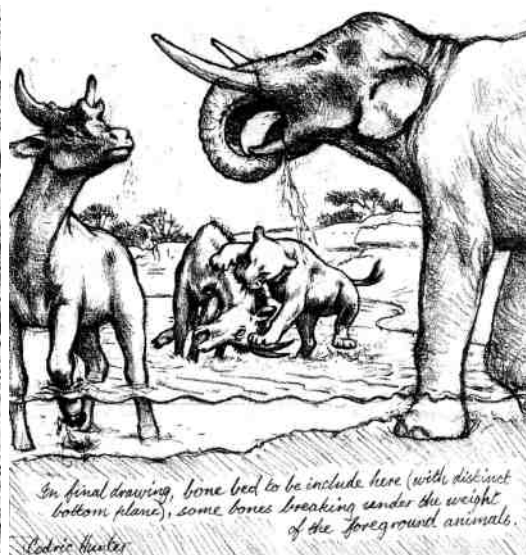
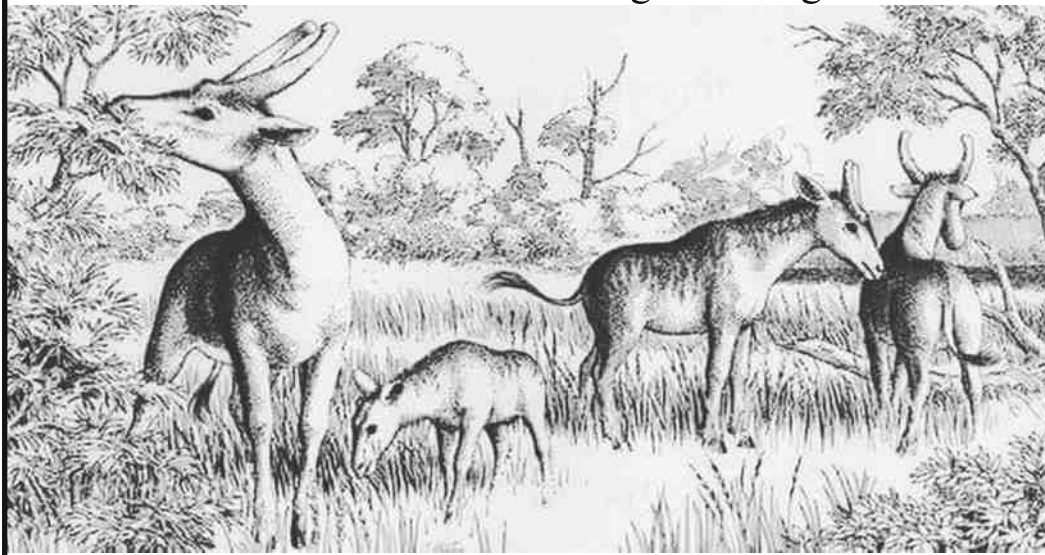


Left: Drawings from Mike Cluver's book. **Right (above):** Reconstruction of the Late Permian Karoo Basin. **Right (below clockwise):** Sketches of a Late Permian Gorgonopsian and dicynodont, *Euparkeria*, and *Heterodontosaurus*.





Above: Sketch of a basking brood of *Diictodon*. **Below and right:** Drawings from Brett Hendey's book and the museum at the West Coast Fossil Park at Langebaanweg.



News from the Iziko Karoo Fossil Lab

By Roger Smith

Iziko South African Museum, ESI affiliate, Wits University
rsmith@iziko.org.za



Left: Prof. Claudia Marsicano pointing out some interesting features on the skull roof of the new Early Permian temnospondyl from Namibia. **Below left:** some of the fangs.

Well it is another year since I reported back to PSSA with news of our imminent move into the new state-of-the-art palaeo lab and collections facility- but sadly we are still in temporary accommodation working under duress of endless hammer drilling and other loud noises that make the working day quite stressful. Nevertheless, the preparators have had a very productive year and we have lots of new and interesting specimens to be

studied by myself and visiting researchers before those with the most interesting stories are put on display.

Namibia-Earliest Tetrapods in Gondwana project

Sibusisu has spent an entire year preparing the Gai-As temnospondyls that we collected from Namibia in 2015. Claudia Marsicano (Buenos Aires) visited again in May this year to describe the spectacular new large temnospondyl and give Sibusisu guidance on the final touches. During her May visit Claudia and I submitted a new funding proposal to National Geographical Society for funds to continue exploring the Gai-as outcrops in the Huab river valley as well as moving down section into the Tsarabis Fm in the search of even older tetrapods. We along with the rest of the team (Adriana Mancuso, Helke Mocke, Ansgar Wanke, Sibusisu Mtungata and Paul October) hope that our results to date will be impressive enough to leverage full funding. If successful, we plan to do another trip in August 2018 when these fine specimens will be returned to Windhoek, hopefully to go directly on display.

***Marsicano C. A., Latimer, E., Rubidge, B. and **Smith, R.M.H.** (2017). The Rhinesuchidae and early history of the Stereospondyli (Amphibia, Temnospondyli) at the end of the Palaeozoic. *Zoological Journal of the Linnean Society* XX:1-28.

TANZAM project

This is a collaborative project headed up by Chris Sidor and Ken Angielczyk focussed on the Permian and Triassic tetrapods of Tanzania (Ruhuhu Basin) and Zambia (Luangwa and northern Zambezi basins) with a



Above: Sterling Nesbitt lying on the bonebed surface frantically searching for the few missing elements of *Teleocrater*. **Below:** Michelle Stocker helping me excavate a beautiful scattered skeleton of the Triassic rhyncosaur *Stenaulorhynchus*.

view to refine the biostratigraphy and geochronology, better understand the depositional and climatic conditions and taphonomic pathways that led to the vertebrate fossil accumulations, and to discover new taxa. This we have done very successfully with field seasons almost every year since 2005 totalling 10 to date. In 2015 we found a

new bone-bearing level very close to the base of the Lifua Member that is yielding an interesting new faunal assemblage that has affinities to *Cynognathus* B of the main Karoo Basin.

In May /June 2017 we revisited this Lower Lifua locality and spent 10 days excavating an entire bonebed (measuring some 6 m x 3 m x 0.25 m) containing hundreds of bones, mostly disarticulated, of a large dicynodont (*Dolichuranus*), large cynodonts (*Cynognathus*), temnospondyls, small reptiles, and at least two archosauromorph reptiles. This chaotic melange of semi-articulated, disarticulated and reworked bones associated with pedogenically-mottled sandy siltstone is interpreted as having accumulated in a distal crevasse splay complex. In the middle to upper Lifua the bone accumulations are associated with floodplain pond and sheetwash deposits that contain partially-articulated archosaur (*Asilisaurus*, *Nundasuchus*) and cynodont (*Scalenodon*) skeletons along with vertebrate coprolites and non-marine bivalves ('*Unio*'). Currently, we are producing a special memoir for the Journal of Vertebrate Palaeontology that summarises our research results on the Triassic rocks and fossils of Zambia and Tanzania. Most of the manuscripts have been submitted, reviewed and re-submitted. My lead authored contribution is entitled: Taphonomy and paleoenvironments of Middle Triassic bone accumulations in the Lifua Member of the Manda Beds, Songea Group, (Ruhuhu Basin) Tanzania.

***S.J., Nesbitt., R.B., Butler., M.D. Ezcurra., P.A. Barrett., M.R. Stocker., K.D. Angielczyk., **R.M.H., Smith.**, C.A., Sidor, G. Niedzweidzki, A., Sennikov., A.J., Charig., (2017) The earliest bird-line archosaurs and assembly of the dinosaur bodyplan. *Nature* 544: 484-487.

Ecology of Early Triassic Tetrapods in the main Karoo Basin

Despite the upheavals and uncertainties surrounding Iziko's building plans, in the last 9 months we have managed to do 2 of the proposed three fieldtrips for this project— both based on and around the Bethulie PTB section. We currently have a total of 665 stratigraphically positioned in-situ tetrapod fossils from Lootsberg, Bethulie and Nieu Bethesda areas. The majority have been collected, and most are prepared to identification stage. Highlights of the recent efforts are a plethora of small taxa (mainly due to our modified prospecting techniques) mostly therocephalians, cynodonts, procolophonids, temnospondyls and archosauromorphs but also a beautiful terminal chamber containing skeletons of at least 2 juvenile *Lystrosaurus* of different ages. A selection of these specimens have been CT scanned at Stellenbosch CAF, and Anton Du Plessis's students are working on the renderings for their honours and masters projects. Another highlight from this locality is the recovery of a *Lystrosaurus murrayi* “graveyard” where several fully-articulated spread-eagled skeletons have been mapped and at least one shows evidence of preserved skin (more convincing when viewed under ultra violet light).

***Viglietti, P.A., Rubidge, B.S. and **Smith, R.M.H.**, 2016. Revised lithostratigraphy of the Upper Permian Balfour and Teekloof formations of South Africa's Karoo Basin. South African Journal of Geology. 120:45-60.

Rey K., Amiot, R., Fourel, F., Abdala, N.F., Fluteau, F., Jalil, N.E., Jun L., Rubidge, B. S., **Smith, R.M.H.**, Steyer, J.S., Viglietti, P.A., XU W., Lecuyer, C., 2017 Oxygen isotopes suggest elevated thermometabolism within multiple Permo-Triassic therapsid clades. eLife 2017;6:e28589. DOI: 10.7554/eLife.28589.



Left: Sibusisu with the terminal chamber of a burrow cast that after initial prep by Shandre has now revealed the scattered skeletons of at least 2 juvenile *L. murrayi*. **Right:** Nolusindisu logging an in-situ *Lystrosaurus* skeleton at the Bethulie study site using one of the 3 new GPS units donated by the Friends of the South African Museum.



Left: Picnic lunch on top of Old Wapadsberg and preparation demonstration at the Kitching Centre in Nieu Bethesda with interesting use of water to enhance the bone/matrix contact.

Right: Fake-camp pitched in a 15 m diameter circle with as much symmetry as possible – just for the one drone shot. Setting up the cynodont burrow cast excavation with walk on by meerkat shot. British camera crew obviously pleased with the results despite inclement weather.



In August 2016 Bruce Rubidge and I took 20 delegates of the International Geological Congress on a 9-day Karoo Transect field excursion visiting outcrops representing the entire Karoo succession as well as some Garden Route tourism. It was well-received by the mainly foreign participants. We produced a guidebook that should serve as a useful summary of Karoo stratigraphy, hopefully this will be made available for download from the Geological Society website. Two Friends trips have been done since my last report- one to Meltonwold near Victoria West where we found a very interesting gorgonopsid skull. Tiffany has prepared most of it and Christian Kammerer is very interested. It seems to be an *Eriphostoma*-like specimen from the base of the *Pristerognathus* AZ. The second trip was in July with 25 Friends of the Museum and based at Ganora near Nieu Bethesda. Apart from Tiffany's cordon-bleu picnic lunches trip highlights were

a set of three *Cistecephalus* skulls and a beautiful *Ictidosuchoides* skull and anterior skeleton.

After the March field trip Sibb, Cindi and I drove, with the full camp, to Old Wapadsberg Pass and re-pitched it at the base of the pass for the filming of a Nat Geo funded documentary series called *One Strange Rock*. Our episode deals with mass extinctions and the director, the infamous Darren Aronofsky, decided that the End-Permian was the least publicised, and therefore the best one to focus on. We spent a week filming on the pass at the PTB, and on top where Sibb actually found a beautiful *Thrinaxodon* skull and curled up skeleton whilst we were filming. Despite inclement weather and uncooperative meerkats, the crew were happy with their footage and apparently so is the director. We will have to wait till next year for the results of our efforts.

News from Wits ESI

By Michael Day
Evolutionary Studies Institute, Wits University
michael.day@wits.ac.za



A morning briefing: (Left to right) Bruce Rubidge, Rose Prevec, Aviwe Matiwane, Marc van den Brandt, Sifelani Jirah (only just), David Groenewald, Julien Benoit, Kevin Rey, Frank Schie, Alienor Duhamel (very obscured, sorry).

The last 6 months has been a period of introspection and writing; such periods are necessary from time to time. Alas, with three conferences attended last year, there was nothing left for me to say at SVP 2017, where colleagues are at this very moment exploring the Burgess Shale and Royal Tyrell Museum. That's not to say there was no room for fieldwork at all. The February trip this year took the Middle Permian team at the ESI to western Koup Karoo, to the old stomping grounds of the *Tapinocephalus*-crazed Lieuwe Boonstra. There we very much followed in his footsteps, even coming across a

specimen that he had (partially) excavated in the 1940s.

The area of the Western Koup, between Merweville and southern spur of the Komsberg escarpment, exposes Middle Permian rocks hosting fossils of the lower *Tapinocephalus* Assemblage Zone (AZ). It is one of the few areas where rocks of this age are exposed far enough north to be relatively horizontal, and therefore where the finding of fossils is easier. We were there in pursuit of the lower *Tapinocephalus* AZ, as part of our new project to understand how the ecosystem changed over the course of the late Middle Permian, a period of presumed peaceful continuity before the disruption of the late Guadalupian mass extinction.

During the course of the fortnight there we collected a satisfactorily abundant number of fossils and particularly of dicynodonts, something we were expecting fewer of at this time based on previous work in the area. It seems that Boonstra was more interested in the large beasts, as our sample differed from his and good specimens of thick-skulled dinocephalians and armoured pareiasaurs were rather rare. The most abundant species of dicynodont, making up nearly all the finds we made, is called *Eosimops newtoni*. Although described a century ago, this species languished in obscurity until only a few years ago, when Ken Angielczyk (Chicago) and Bruce Rubidge (ESI) re-described it and referred to it new specimens. We are now finding that it was quite common in the Middle Permian, and dominated the dicynodont fauna at certain times, and in certain places (you'll have to ask David Groenewald about this). During this time we also had the opportunity to visit a fossil fish site from the Witteberg Group near Matjiesfontein.



Left: The headless Dinocephalian partially collected by Boonstra in the 1970's. The tablet found with the remaining skeleton reads '*Dinosaurus bene*, 194(4 or 8).07.06, *Stafan Bothma*, *Braam Muller*, *Kom Kyk*'. We added our own note. **Middle:** One of the beautiful fossil fish from the Witteberg Group near Matjiesfontein. Do they get much better preserved than this? **Right:** Marc van den Brandt inspects outcrop just above the old railway line on the farm Nobelsfontein, close to the site where in 1920 Robert Broom found the holotype skeleton of the gorgonopsian, *Lycaenops ornatus*. The specimen was acquired by the American Museum of Natural History in 1928.

We continued our journey through time (20th Century time that is) by stopping for a few days at a place called Nobelsfontein in the Northern Cape, just north of Three Sisters.

In May I was lucky enough, along with Marc van den Brandt, to join Rose Prevec and the Albany Museum team collecting plants and insects at two marvellous localities near Sutherland in the Northern Cape. Rose will surely elaborate on the discoveries but it will suffice to say here that toiling in a quarry with the palaeobotanists made a drastic change from the lonely veld-wandering of the vertebrate palaeontologist!

But now I must leave my hammer and GPS handset aside, negotiate the tottering tower of cappuccino cups rising from the bin at the entrance to my office, and return to my books, papers and abused laptop computer (the real everyday tools of the palaeontologist!); I have a date with a burnetiamorph...

The century old secret of prehistoric monster's natural helmet

By Julien Benoit

Evolutionary Studies Institute, Wits University

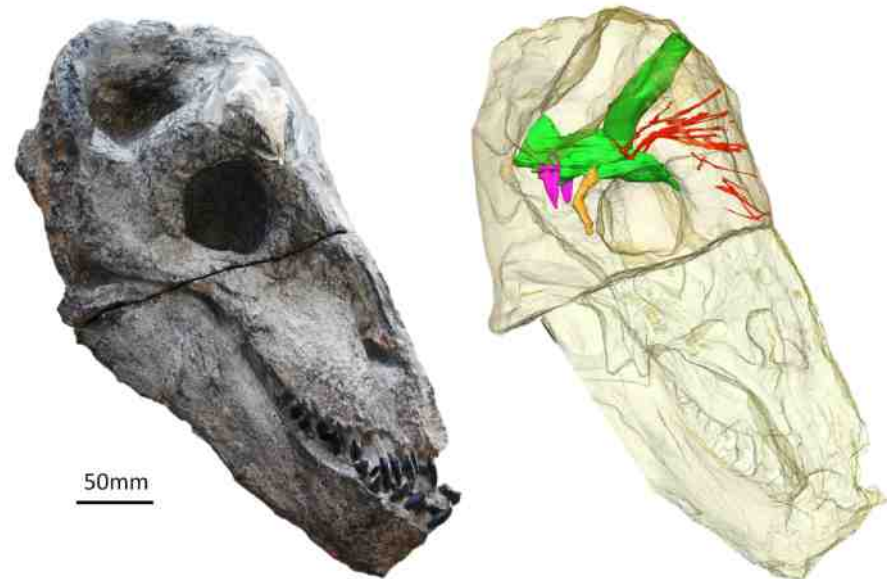
julien.benoit@wits.ac.za



Above: Two male *Moschops* are fighting using their ornamented head as a weapon. Image credit: Alex Bernardini.

For a palaeontologist, there is nothing more exiting than using X-ray imaging to study a monstrous and emblematic extinct creature. *Moschops* is certainly among the most fascinating monsters of the South African prehistoric bestiary. It was discovered in 1911 and belongs to an animal family called Dinocephalia, which translate as “terrible head” or more accurately “terribly large head”, a name that they indeed deserve. The South African Karoo around Beaufort West is literally stuffed with large remains of dinocephalians’ thickened cranial elements forming chunks and galets of bones episodically eroded away by torrential rains. Before becoming fossils,

these bones were part of the impressively thick and horned skull of these massive creatures. Imagine a rhinoceros-like beast with a more sprawling, lizard-like gait, and you will get a good idea what *Moschops* looked like. Based on Synchrotron radiation X-ray imaging, our new study of a complete *Moschops* skull revealed that this thickened and dense braincase was housing a remarkably small and over-protected brain. The whole central nervous system is mostly surrounded by an armour of bones, including the brain itself, the inner ear and the trigeminal nerve (the nerve responsible for the sensitivity of the face). This natural helmet, which can reach up to 15 centimeters of massive bone, was possibly protecting the brain and sense organs against brutal shocks of fierce head to head combats between males to find mates and defend territories.



The skull of *Moschops* in its natural position and the digital reconstruction of its brain.

In support of this hypothesis, we also found that the position of the inner ear inside the braincase indicates that the head was not habitually held horizontal as one would expect, but nearly vertical. This places the thicker part of the skull and horns forward, a ideal posture for head butting fights.

To conclude, the paleo-neurology of *Moschops* has shed new light on the biology of these emblematic creatures of South Africa's 270 million year old fauna and demonstrates that new X-ray imaging techniques can still unravel the secrets of species that have been discovered more than a century ago.



Above: A *Moschops* fight by Cedric Hunter done for the Iziko South African Museum *Stone Bones* exhibit.

Wits Dino Lab News

By Kimberley Chapelle

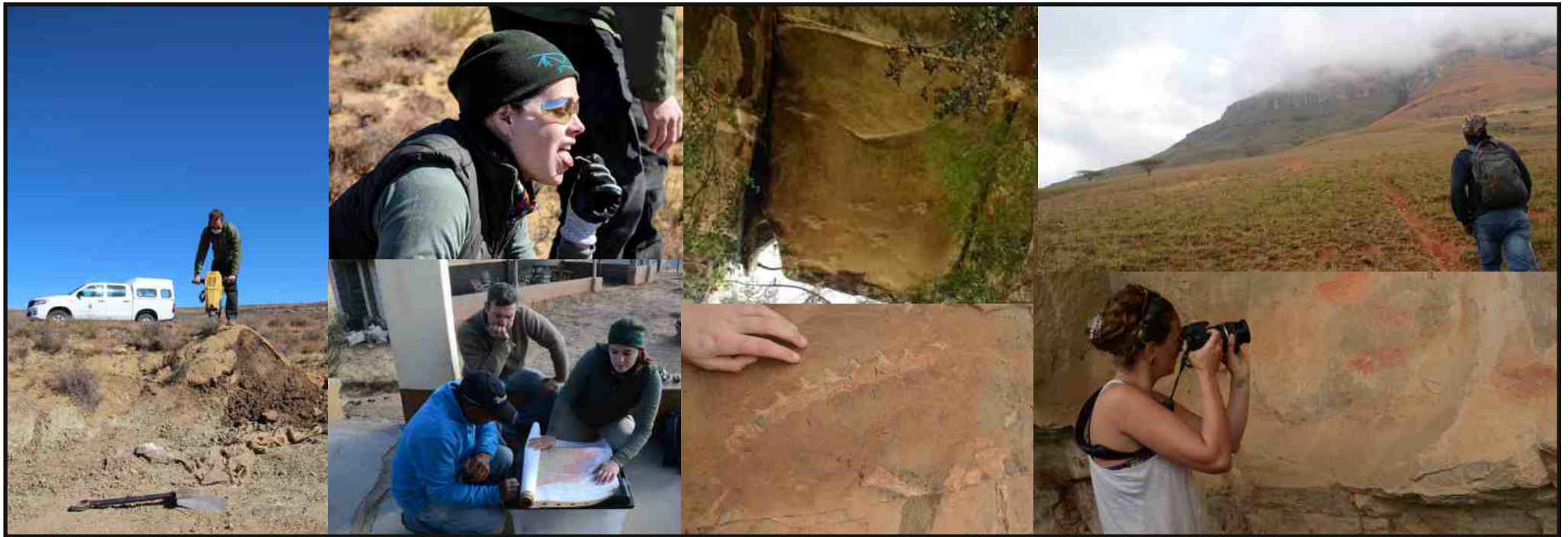
Evolutionary Studies Institute, Wits University

kimi.chapelle@gmail.com



The Choiniere Bone Lab: keeping class their number one priority. Image credit: Dominic Stratford.

In late August 2017, the Choiniere Bone Lab (aka Jonah Choiniere, Pia Viglietti, Kimi Chapelle, Kathleen Dollman, Cory Dinter) was joined by two mighty men from afar: Stephan Spiekman from Switzerland and Blair McPhee from Brazil. Together, this team of dino rangers set off on a mission with one goal in mind: to prospect historically underexplored Elliot Formation regions of the country...and have the best SPRING BREAK possible! The trip started with a 9 hour journey down to the Eastern Cape, near Dordrecht, where an excavation was started in 2016 at a site affectionately known as the Dam Dino. Half of the team finished the quarry up and was faced with several obstacles including giant termite mounds that



From left to right: Termite mound demolition. Some people can't resist how delicious termites look. Puseletso, Jonah and Pia trying to wrap their heads around the stratigraphy in the Matatiele area. Evidence of the spider theropod! Partial articulated *Massospondylus* specimen in the Clarens sandstone. Siya leading the way up the hill to the fossil *Massospondylus*. Turns out *Massospondylus* had great tastes in art. Image credit: Kimberley Chapelle and Cory Dinter.

needed to be jackhammered (and termites tasted), icy cold 27km/h gusts of wind as well as the occasional sleet fall. The other half of the team scouted the mountains and hilltops for rumored plant fossils and more 200 million year old beasts. As any good spring break should, this leg of the journey also involved some spring haas chasing and aardwolf spotting! The rangers then moved on to a hillier part of the country near Matatiele. Here they were met by Puseletso, a new avid fossil finder. Together, they all searched and searched and searched for those dinosaur fossils...and found them! These included Stephan's first *Massospondylus* find as well as other basal sauropodomorphs and some unidentified cranial bits.

The next part of the journey involved greener pastures...and more hills as the team set off to Cathedral Peak for some surveying. Here, they met Siyabonga the mountain pirate from heritage KZN and Sonya the park's ecologist. The lab was taken up to view a semi articulated *Massospondylus* specimen at the base of the Clarens sandstone, next to some stunning rock art. This was followed by a 3 and a half hour hike up the mountain to view evidence of the rare and mysterious creature, known as the spider theropod! Ok...not really, but there were theropod tracks on a sandstone ceiling about 10 m above our explorers' heads. Quite a site to see! Prospecting the area (after a few wrong turns) also yielded many fossils

including basal sauropodomorphs and possible therapsids.

The final part of the quest took our rangers to Clarens. After 12 days of missioning, the team quenched their thirst at the Clarens Brewery and the happening local watering hole known as the Friends Pub. The following day, the dino rangers revisited the renowned Highland Giant site in the hopes of finding some more puzzle pieces of the animal. But in vain. They then attempted to make their last day count by finding more buried treasures, but their luck seemed to have dried up.

None the less, the Choiniere Bone Lab returned home with pride, having built the legend. The expedition was a success as they found many new promising sites and had the best SPRING BREAK possible!



Lesotho 2017

By Pia Viglietti

Evolutionary Studies Institute, Wits University

pia.viglietti@gmail.com

In May dino rangers Jonah Choiniere, Kimberley Chapelle and myself collaborated in a Nat Geo funded field trip to Lesotho. Our collaborators were Jim Clarke from George Washington University and his lab (Joey Steigler, Drew Moore, Shawn Denarie, Brittany Malinowski, and Alex Rubenstahl). Also on the trip were Emese Bordy and Lara Sciscio from the Department of Geological Sciences (University of Cape Town). The aim of the trip was to find new sites and prospect in the Upper Elliot Formation (UEF), while Emese, Lara and their students were on the hunt for dinosaur footprints. Upon our arrival at Fuleng Guesthouse in the bustling town of Quthing, we were welcomed by the locals with a series of planned celebrations - all coordinated by Mr. Muji. First we were put on ponies and given a tour of the town. We then returned to our accommodation for local sorghum beer and a "talent show". The following morning we were joined by school children and their teachers in a parade where we sang and danced all the way to the Moyeni track site just on the edge of town. All involved were very impressed by well preserved tridactyl prints of theropod dinosaurs. Once the festivities were completed, we got down to the business of the trip, and first up was visiting a track site near Maphutseng. Preserved here are beautiful prints of a large sauropodomorph and other smaller tridactyl prints. The dino rangers left Emese and her students to work at the track site, while we searched for good outcrop, which we did find but unfortunately yielded few scrappy remains. A couple days of searching near

Mohaleshoek yielded a partial skeleton found by Joey, and lots of isolated material near Dili Dili. By this point in the trip, I was left by Jonah and Kimi to hold the fort on the Wits front as they needed to return early to Johannesburg. As luck would have it, soon after their departure some great finds were located in the UEF on the hill overlooking the Moyeni track site. A clutch of eggs found by Joey, and a crocylomorph skull and *Massospondylus* skeleton found by Jim meant our efforts were concentrated at this site for a good few days as it was clearly rich in good fossils.

The rock at the site was incredibly hard, which much to our initial excitement, we got to use the rock saw and jackhammer. It was tiring work, but rewarding as the *Massospondylus* skeleton had a beautifully preserved skull. The eggs also have embryos preserved, so hopefully CT scanning will yield their secrets soon. But our good luck came with a few curses as it was really tough going trying to get the skeleton out. And I got Bronchitis which meant to my great frustration I was too sick to search for fossils, but it also meant we were one person down at the quarry and days of jackhammering were taking their toll on the crew. After a third sick day at Fuleng, I hear one of the cars returning early from the site. It was Joey with Shawn who had dropped the jackhammer on his foot. So on a Sunday afternoon we arrived at Quthing hospital looking for a doctor. We must have looked like quite the motley crew with Joey covered in dust from the jackhammer, Shawn and his profusely bleeding foot, and myself who was a complete mute at this point thanks to the Bronchitis. Luckily Shawn only needed two stitches that he received....without anesthetic. Needless to say Shawn became a legend after that experience, and we can truly say blood, sweat, and tears were spilled on this trip but all in the name of science!



Top to bottom: Joey and Drew enjoying beers and pony rides. Mr. Muji with homebrew sorghum beer. Kimi and Drew dancing in the parade. Joey, myself, Kimi, Shawn, Alex, and Brittany the Moyeni track site. The enthusiastic parade crew. The Maphutseng track site. Image credit: Jonah Choiniere and Pia Viglietti.

Limb loading of *Thrinaxodon*

By Safiyyah Iqbal

Evolutionary Studies Institute, Wits University

safiyyahiqbal@gmail.com



Top to bottom: Joey shows Mr. Muji the fossilised clutch of eggs. Joey all geared up to use the rock saw. The well preserved *Massospondylus* skull we uncovered after hours of battling power tools against hard rock. Emese Bordy discussing the sedimentology of the egg clutch, which were laid by dinosaurs within pedogenically altered sand before they were fossilised. The weary quarry crew taking a break. Shawn building the legend and being a total trooper as he receives stitches without any anesthetic.

During my honours thesis, external morphology of the *Thrinaxodon* forelimb was broadly compared to those of extant species characterised by parasagittal and sprawling limb postures. Ultimately, this study lead to more unanswered questions: what features of the forelimbs are adaptations to posture? Which features are adapted to a fossorial lifestyle? My master's dissertation was then to compare *Thrinaxodon* to reptiles with different locomotor behaviours, specifically those characterised by sprawling limb postures. This work also included the assessment of the internal and external structure of the forelimb. These two projects were the first time that geometric morphometric analyses were used to inspect the morphology of limbs in nonmammalianform cynodonts.

The proposed PhD research project is a multidisciplinary approach combining Palaeontology (supervised by Jonah Choiniere, Fernando Abdala, and Kristian Carlson) and Mechanical Engineering (Frank Keinhofer). The next steps include understanding how well-optimised *Thrinaxodon* limbs are for sprawling and/or semi-sprawled posture. Mechanical loads that are applied to bones of the limb over time influence the morphology of the bones, and thus are reflected in functional adaptations. Mechanical loading of *Thrinaxodon* limbs, in order to assess their functional adaptations, has not been documented yet with quantitative methods. This precludes establishing a full appreciation of its adaptive strategy. I am exploring theoretical loading conditions of its major

My Trip to the North

By Silindokuhle Mavuso

Evolutionary Studies Institute, Wits University
461219@students.wits.ac.za



limb skeletal elements during quadrupedalism characterized by three different postural modes: parasagittal, sprawling and semi-sprawling limb configurations. This will permit quantification and comparison of stresses that occur on humerus and femoral diaphyses during each posture, which will shed light on the comparative capabilities of documented limb morphologies to withstand externally induced loads associated with each posture. Understanding capabilities to resist these stresses will provide new evidence for interpreting particular traits (i.e. functional adaptations to the habitat, or ecomorphology) that help define (or refine) niche space of *Thrinaxodon*. Demonstrating successful use of this method (i.e. developing expertise) will facilitate its application in similar future studies of the evolution of limb postures.

2017 began very busily. With a looming Masters dissertation, I found myself planning for what would be the most exciting trip of my academic career. Fast forward to March 20, I handed in my dissertation to the faculty and was on my way to the airport for travels. With a trip funded by my amazing supervisor, Dr. Dominic Stratford (School of Geography, Archaeology and Environmental Studies) and Dr. John Yellen (The Paleoanthropological Society), I got the chance to travel to North America for three weeks.

My trip started with a visit to the Centre for the Advanced Study of Human Paleobiology (CASHP) (George Washington University) in Washington, DC where I was working on micromorphological investigations with my fellow archaeology colleagues, Kathryn Ranhorn and Dr David Braun. Our work focused on sediments from the world-famous Turkana basin as we investigated sites in Illeret, Karare and Base camp. I then gave a talk to CASHP about the karst geology in South Africa with a specific interest on my own work in Sterkfontein caves. This was well received with glowing compliment from the director, Prof. Bernard Wood. After this, I also got the chance to meet and spend the afternoon with a very busy Dr. Kay Behrensmeyer who took me around the Smithsonian collection and gave me some much-needed academic advice. I got to go sight-seeing and reconnect with friends from the past. A week later, I was off to Vancouver, Canada to what would be a week filled with

talks and poster presentations. The first stop was the prestigious Paleoanthropological Society Conference where I spoke on my Master's work, about the sedimentology of the Jacovec Cavern, Sterkfontein. Later on that day, I co-authored another talk with Dr. Stephen Merritt who found what seem to be Mid-Pleistocene cut-mark bone in Illeret.

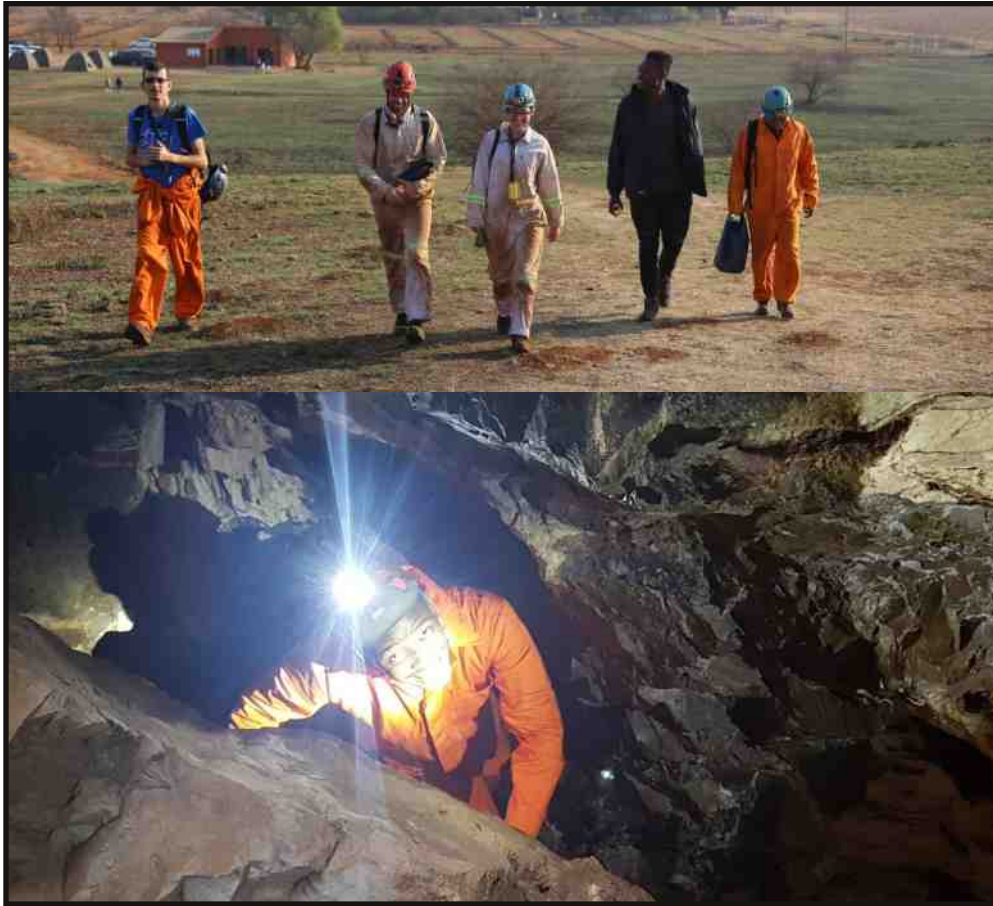
The next day I was in a poster session with Kathryn Ranhorn, Tamara Dogandžić where I contributed some sedimentological work on MSA tool site in aeolian deposits at Base Camp. It was rather intimidating as I was the youngest presenter there but my talks peaked interest as seen through the many engagements I got from other researcher as well as compliments from the organisers. A day later was the first day of the 82nd Annual Society for American Archaeology Conference at the Vancouver Convention Centre. I was in two poster presentations with my mentees from the Koobi Fora Fieldschool, both on stratigraphic and sedimentological discoveries and investigations that we have done in the MSA of the Turkana Basin. I spent the remainder of the conference running between session and I was blown away by the scale of work conducted around the world on the paleosciences. It really was an enriching time.

Conferences aside, I had an incredible experience. I got to reconnect with some colleagues and dear friends from all over the world as well as make new ones and get inspired by the very small Plio-pleistocene geology community that is out there. I got to see and meet the lovely people of DC and their obsession with brunch as well as witness all that Vancouver city life had to offer. I am very grateful for this experience as it really was eye-opening and revitalizing as I pursue what I love.



Top to bottom: My Koobi Fora mentee Shannon Warren (right) and I presenting some of our work on stratigraphy in the Turkana Basin. (Image credit: Michael Ziegler). My friend Collin Philips showing me around the George Washington University Campus. Presenting on my Master's research at the Paleoanthropology Society in Vancouver. (Image credit: Kathryn Ranhorn). Post-presentation selfie with my colleagues at the Society of American Archaeologists Conference. From left; myself, Shannon Warren (University of Kansas), Ella Beaudoin (American University) and Umazi Munga (George Washington University).

Rising with the star - Homo Naledi



Top: Early morning going from camp into the caves. From left; Rick Hunter, Steven Tyler, Dr Elen Feuerriegel (University of Washington, Seattle), myself and Mathubela Tsikoane. (Image credit: John Hawks).
Bottom: A picture of myself emerging safely above ground after being distracted by breccias. (Image credit: Prof. Lee Berger).

While most people decided to spend their spring day in the big city, I packed up to go on fieldwork at the Rising Star

Cave system which hosts the world's largest assemblage of hominid remains (now known as *Homo naledi*). As an enthusiastic cave geologist, this cave network was at the top of my exploration list. Unlike most excavations, this one is run very differently. It takes about 15 to 20 minutes to get into the cave and getting there is quite the obstacle course. You have to navigate between very wet slippery walls, crawl on your chest at Superman's crawl, then go up a very complicated Dragon's back; certainly for a specific body type. Because of the location of these fossils, there needs to be many safety procedures put in place - all run from the command centre, located at the entrance of the cave. As a frequent operator of this command centre, this task got quite monotonous but, it was so exciting to watch these excavations and see these remarkable fossils being exposed. I also got a chance to navigate the cave for myself and it was such a fun experience. It was also enriching to meet scientists from different parts of the world doing interesting exciting things beyond this project. Because not a lot of people would get the chance to see this for themselves and share in the common human heritage that these caves host, National Geographic has collaborated with the Rising star team to schedule Google hangouts with classroom kids where they can ask scientists questions about the scientific process. These classrooms were from South Africa, Canada, Germany and the US to name a few. It was a great outreach project and it really set the ground to relaying the sciences to the public where they too can be part of this amazing discipline. I would like to thank Dr. Bonita De Klerk and Prof. Lee Berger for letting me be involved in this work as well as Dr. Marina Elliot (lead excavator) who made my stay at Rising star so comfortable.

Species Concepts, Sigma Taxonomy, and a Singapore Conference

By Francis Thackeray
ESI, Wits University
francis.thackeray@wits.ac.za

In June this year (2017), I was invited to Singapore to deliver a lecture in the prestigious “Sydney Brenner Lecture Series”, initiated by Sydney (a Wits graduate and Nobel Prize Laureate) to reflect on evolution from the time of the Big Bang (14 billion years ago) through to the origin of Pioneering Protozoa, and on to Flagrant Fishes, Resilient Reptiles as well as Thoroughly Therapsids, and even further on to Magnificent Mammals including the short-lived but high-impact species which we classify as *Homo sapiens*. Through Dr Balázs Gulyas, I was kindly invited to give a serious lecture on hominins within the timeframe of 10 to the power of 6, in other words, on hominins in the order of a million years ago. I did so with reference to my concept of a probabilistic definition of a species, including early *Homo* (proudly African), *Australopithecus* (amazing ancestors) and *Paranthropus* (phenomenal friends).

The lecture was well received. To my mind, there has been an over-emphasis on what is known as “Alpha Taxonomy” earnestly championed by Ernst Mayr, whereby fossils and extant fauna can be pigeon-holed into discrete categories (boxes), such as species A, species B, and species C. But hey! Wait! As we discover more specimens, leading to the erotic erection of more species, the boundaries between species collapse! Can we really say this is species A, distinct from species B, itself distinct from species C, when sample sizes for each

“species” increase? Very politely, in Victorian English, Darwin (1851, 1854) recognised the lack of clear boundaries for his barnacle taxa. It was a case of “*Blithering Barnacles*” (to quote Captain Haddock in the chronicles of *Tintin*). And in 1859 (in the concluding chapter of the *Origin of Species*), Darwin appealed for the assessment of the “amount” of a variation within a “species”. Shortly thereafter, his courageous colleague Thomas Henry Huxley (1870) referred to the “fuzzy boundaries” between species. By complete contrast, almost 100 years later, Ernst Mayr referred to “Alpha Taxonomy”. But then about 50 years after that, Francis Thackeray appeals for the concept of “Sigma Taxonomy” whereby it is recognised that boundaries between species are not necessarily clear in a dynamic process through evolutionary time and ecological space. In the distance I hear “HEAR HEAR!”. But there are still critics (alpha taxonomists) who cry out “outrageous!” in an audible outcry.

I greatly respect pioneering scientists who discover new specimens (extinct or extant) representing new species, with a sample of one. That applies to the “Taung Child” (the type specimen of *Australopithecus africanus*), described by Raymond Dart whom I met in 1971, and whom I remember as an old person who had sparkling eyes, willing to talk to me as a young man about the excitement of finding something that could be considered as a distant relative of all humankind, dating back to the Pleistocene, from Africa, consistent with the view of Darwin who argued for Africa as the Cradle of Humankind.

I wish Charles Darwin could have met Raymond Dart.

I was thrilled to meet Dart, and regret not having been able to meet Darwin. I envy the young Thackerays (my recent relatives) who (as children) met Darwin who described to them his adventures on *The Beagle*.

I digress. There I was in Singapore, in June 2017, talking about human evolution, species concepts, and my probabilistic definition of a species, based on morphometric analyses of skulls, whereby one may assess the probability that two specimens may or may not belong to the same species. I am arguing strongly that boundaries between species just do not exist, whether one is dealing with fossils or modern fauna. This may be uncomfortable for alpha taxonomists who champion the “pigeon-holing” of taxa. Certain critics of my probabilistic approach have stated that my definition of a species ($T = -1.61 \pm 0.2$) is a “*mathematical and biological red herring*”. I have responded by saying “*give me ten years and think again*”. Maybe some people will have to eat their words. If so, let them eat red herrings with hot curry. Just give me time.

Currently there is a flurry of articles, in *Nature*, *Science* and elsewhere, presenting evidence for hybridisation, “introgression”, interbreeding and “incomplete lineage sorting”. In Singapore, I spoke on the same day as the geneticist Svante Paabo from the Max Planck Institute. As a specialist on ancient DNA, he talked about the interbreeding between *Homo sapiens*, Neanderthals and Denisovans, recognising the lack of clear boundaries between species. Svante and I bonded! We shared the view that there is a need to look again at the definition of a species in the context of gene-flow within and between

“species”. My interest is shared by my good friend and colleague, Caitlin Schrein who is based in Washington DC, and with whom I recently published a short (but allegedly potent) article on “*A Probabilistic Definition of a Species, Fuzzy Boundaries, and Sigma Taxonomy*”, where “Sigma” is the Greek letter for S which stands for a spectrum of diversity in evolutionary time and ecological space.

Hooray! Maybe we are entering a new paradigm shift. Let us open our beating hearts and our conscious minds to the fact that as sample sizes increase, boundaries break down, perhaps in the case of “species” of *Lythronotus* from the Permo-Triassic (*L. murrayi*/*L. declivis* for example), and perhaps in the case of amazingly diverse australopithecines (A for *A. africanus*, B for *A. bahrelghazali* and M for a mosaic of *A. sediba*), and as in the case of hopeful habilines (perhaps a chronospecies applies to the transition from *A. africanus* to *H. habilis*? See Thackeray, 2016 in *Paleoecology of Africa*); and probably in the case of *Homo sapiens* and naughty Neandertals who most definitely interbred.

One day after my lecture, I went to the famous Singapore Zoo, where I turned myself from being a palaeo-anthropologist into a peering primatologist. For two hours I observed the behaviour of orangutans, including individuals attributed to two species: *Pongo pygmaeus* (from Borneo) and *Pongo abelli* (from Sumatra). But I wondered inquisitively – were they really different species in evolutionary time? We know that at episodes of “Glacial Maxima”, sea levels retreated (about 20,000 years ago, and also at about 160,000 years ago, and earlier, about ten times in the last million years). And we also know that

eustatic events contributed to changes in sea level.

So, very simply, if there were episodic land-bridges, it would seem entirely possible that past populations of orangutans could have interbred (hybridised, associated with “introgression”), such that boundaries between two species may have broken down. I was a primatologist in the Singapore Zoo for two wonderful hours. But then I took off my primatologist’s hat, and morphed into an anthropologist (after all, I have a PhD in Anthropology from Yale). As an anthropologist, I interviewed two subjects in the tropics of Singapore. First question: Do the two species of orangutans interbreed? The response from the young zoo-keeper was this: “*Yes indeed, out of 24 births, six were hybrids*”. The response from the senior zoo-keeper was this: “*Certainly not. We keep the two species separate. It is not allowed for them to interbreed!*”

So the responses from the two zoo-keepers could be related to perceptions associated with sigma taxonomy (interbreeding between closely related species possible), and alpha taxonomy (we keep the two species separate, in boxes). What applies to orangutans can be applied to two “species” of chimpanzees, *Pan troglodytes* to the north of the Congo River, and *P. paniscus* (bonobos) to the south of that river. The river levels would have risen and fallen within the Pleistocene, ten times in the last 1 million years. During dry episodes, *P. paniscus* from the south could have crossed the river-bed to the north. Are you surprised? Naughty *Pan paniscus* is promiscuous! From genetic analyses (De Manuel et al, Science, 2016), we now know that there is no clear boundary between the “common chimp” and bouncing bonobos. Case closed.

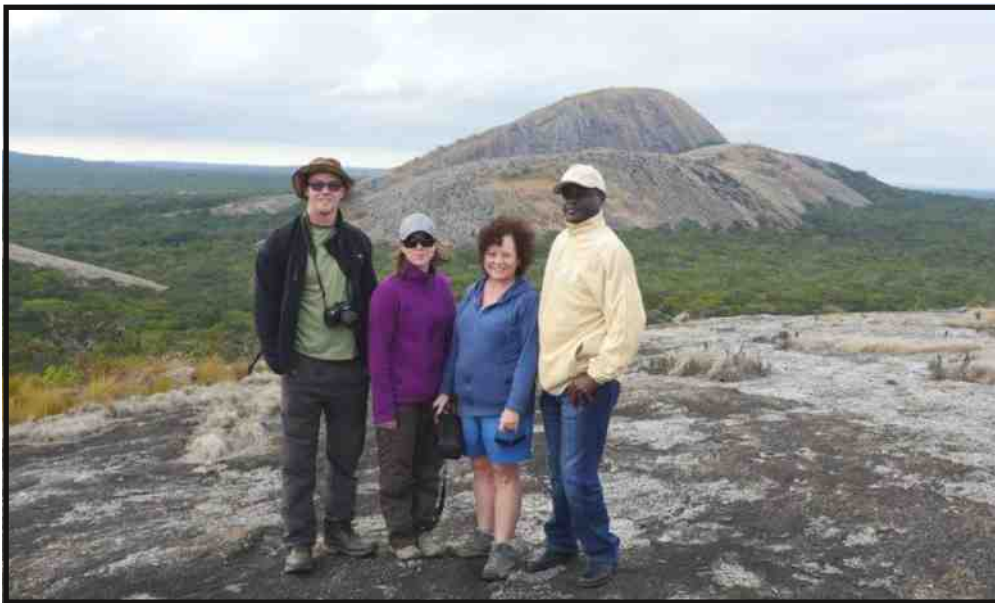
It might be claimed that Sigma Taxonomy rules supreme. See Thackeray’s “log sem” statistics ($T = -1.61 \pm 0.2$) based on morphometric analyses of chimp crania, associated with a probabilistic definition of a species (Thackeray and Dykes, Homo, 2016).

Even the French newspaper Le Monde had a headline “*Two species of chimpanzees made love, at least twice in a million years*”. (You can believe everything in Le Monde).

It was a great honour and pleasure to go to Singapore. Many thanks to Sydney Brenner and his colleagues for the invitation. I was deeply impressed by Sydney who, at the age of 90 years, confined to a wheel chair and linked 24-hours a day to an oxygen tank, was effusively enthusiastic about his interactions with Raymond Dart (synonymous with *A. africanus*), with Phillip Tobias (synonymous with *H. habilis*), and also with Francis Thackeray who has dared to challenge the concept of Alpha Taxonomy, and who was bold enough to argue that there is no boundary between *Australopithecus* and *Homo*. Thanks, Sydney. I appreciate your willingness to listen to a Sigma Taxonomist.

ESI palaeobotany expedition to the Luangwa Valley, Zambia

By Steve Tolan
Chipembele Wildlife Trust, Mfuwe, Zambia
luangwa@hotmail.com



Following on from the success of the ESI palaeobotany expedition to southern Zambia in 2015, Marion Bamford returned in June 2017 to look at fossil tree sites at various locations in the Luangwa Valley, Zambia. The team flew into Lusaka early on the morning of the 5th June, and consisted of Marion Bamford and 2 ESI students, Simone Kock and David Groenewald (above). The plan was to collect samples for identification and growth ring analysis. We hired a Nissan Hardbody 4x4 double-cab for the duration of the trip. I was the guide on the expedition, having visited fossil sites in Zambia since 2004. We managed to do all our shopping for food and stores on the first day. By mid morning the next day, we had collected

Joseph Museba, a National Heritage official (a regular on our fossil expeditions and a very good fossil finder) and were driving up the Great North Road out of Lusaka. We arrived at Mutinondo Wilderness Lodge after a drive of 585 km, where we camped for the night. The next day we collected an armed Scout to allow us to work in North Luangwa National Park. Unfortunately, due to late rains, the main access track we hoped to use was not driveable, but we managed to collect some very good fossil wood samples from elsewhere in the park.

As Marion needed to fly back to Joburg on the 13th, we headed for Mfuwe, where we collected an armed Scout and spent 3 full days in South Luangwa National Park, visiting many fossil tree sites and camping in the park at night. We had to negotiate some waterlogged sections of the track, getting stuck on occasions, as well as having to cut down trees pushed over by elephants that were blocking the tracks, and digging out blocked stream crossings that hadn't been used for 6 months or more. One day our way was blocked by a raging river that was too deep and fast to cross in the vehicle, so we were forced to wade across, risking our cameras and other equipment, to get to a good fossil tree site the other side. Several of the team were nearly swept away by the current, but all made it across safely by forming a human chain, and we collected some good samples, before crossing back again.

Early the next day, having left Marion behind to catch her plane, Simone, David, Joseph and I drove 500 km from Mfuwe to the remote upper Luangwa Valley. We left our vehicle behind early the following morning in the safe

hands of the village headman, and, together with 3 heavily-laden porters, we walked 15 km into the bush and set up base-camp on the banks of a clear stream, our 'home' for the next 4 days. In the immediate area are literally tens of thousands of fossil trees.

Since 2004, the largest fossil tree trunk I had ever found in the Luangwa Valley was 1.46m diameter, but on the first morning of fieldwork, we managed to beat that...3 times! Firstly, with a trunk of 1.63 m, then one of 2.06 m, and lastly with a monster of at least 2.26 m (probably bigger, but most of it is buried, and needs a lot of work to expose it more). The latter tree must be among the biggest ever found in Africa! We also visited a Triassic site nearby and we found fossils of silesaurs, cynodonts and temnospondyls. As the bones were only just being exposed by erosion on the edge of a deep exposure, they were left there to be collected on the next palaeontology expedition to the area.

We walked back to the vehicle along a track regularly used by poachers, and then drove back to Mfuwe, camping one night in the bush, as we took a more scenic route following the Luangwa River. We camped in Mfuwe one night before driving to Lusaka next day, having driven 2,000+km on the expedition, much of it off-road.



Magnetostratigraphy of the Karoo's Elliot Formation

By Lara Sciscio

Dept. of Geological Sciences, University of Cape Town
l.sciscio@gmail.com

Magnetostratigraphy has the raw magnetism (literally and metaphorically) to captivate! Here is a quick summary of my research journey so far – with a focus palaeomagnetism and the relative age of the Triassic-Jurassic continental red beds of the Elliot Formation (Stormberg Group, main Karoo Basin).

Firstly, the importance of providing a concise time range for the Elliot Formation rests on the fact that it contains an abundance and diversity of trace and body fossils that are seldom seen in continental deposits of this age. In addition, the Elliot Formation also spans the Triassic-Jurassic boundary and is therefore likely to record the biotic changes associated with the end-Triassic mass extinction event (ETE) and post-extinction recovery period. In fact, the Elliot Formation is one of the few continental deposits globally to support such a diversity of fauna over such a critical time in the Earth's history.

In order to study the amplitude of a biotic crisis, a rock package must have two important components. The first is an abundant and diverse range of fossils to observe biodiversity changes. The second is a means of dating these fossils to provide a timeline. Because, up until recently, neither diagnostic palynomorphs nor radiometric ages (from zircons in volcanic ash beds) have been

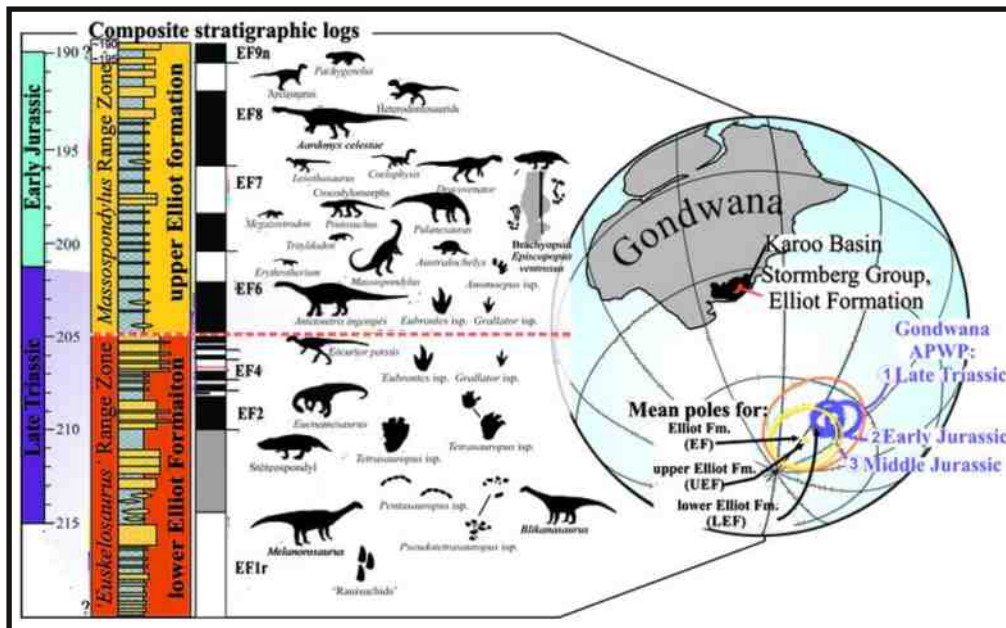
reported for the Elliot Formation, we have used a relative dating method known as magnetostratigraphy to provide a timeline. This method uses rock magnetism (termed palaeomagnetism) and is, essentially, the study of variations in the Earth's magnetic field in deep time. Since the direction of the Earth's magnetic field has changed (it has 'reversed' – the formal way to say it flipped-flopped periodically and irregularly) several times in the geological record, studying the rates and number of these changes recorded in rocks, allows one to get a more accurate idea of the age of the rocks. When you combine the pattern of polarity reversals with the principles of stratigraphy = you have magnetostratigraphy.

Importantly, for this method to work the rocks must contain magnetic minerals that have faithfully recorded the Earth's ancient magnetic field. Thankfully, as the Elliot Formation is a 'red bed' it contains iron oxide minerals (e.g. hematite, maghemite) which retain a magnetic signature. And indeed, primary magnetizations are preserved in rocks of the Elliot Formation indicating that they have not undergone overprinting by later Lower Jurassic dolerite intrusions associated with the Karoo Large Igneous Province. This means that these rocks record the Earth's magnetic field as it was approximately 200 million years ago.

In conjunction with sedimentology, the magnetic signatures recorded in the Elliot Formation build a unique magnetic polarity timeline which acts as a 'finger print' or 'barcode' for this particular rock package. This can be utilised to constrain the relative age of the Elliot Formation by comparing it to other polarity time scales, biostratigraphic data and (when lucky) with radiometric ages. The new magnetic chronology suggests that the

*****Sciscio, L.**, de Kock, M., Bordy, E.M. and Knoll, F. 2017.
Magnetostratigraphy across the Triassic-Jurassic boundary in the main Karoo
Basin. *Gondwana Research*. 51: 177- 192. doi:10.1016/j.gr.2017.07.009!

Magnetostratigraphy across the Triassic-Jurassic boundary in the main Karoo Basin. *Gondwana Research*, 51: 177- 192. doi:10.1016/j.gr.2017.07.009!



By Christian Kammerer
North Carolina Museum of Natural Sciences
jonkeria@gmail.com

It has been a dicynodont-heavy year thus far as go my publications (although stay tuned, gorgonopsian fans): at the beginning of the year, Roger Smith and I published on a new taxon of geikiid dicynodont, *Bulbasaurus phylloxyron*, from the *Tropidostoma* AZ. Geikiids (taxa like *Aulacephalodon* and *Pelanomodon*) are better known from the later *Cistecephalus* and *Daptocephalus* AZs, and *Bulbasaurus* appears to be the earliest member of the

group. The known specimens of *Bulbasaurus* were all originally identified as *Tropidostoma* –I first suspected that they were something different several years ago while going through the dicynodont holdings at the Council for Geoscience, but they were never a top priority. Then, while looking through Roger's latest batch of Trop. AZ dicynodonts last year, I saw that he had found new, better-preserved specimens of the 'not *Tropidostoma*' morphotype, one of which became the holotype of *B. phylloxyron*.

Given how many dicynodont species I have synonymized over the years (>100), I think I can be forgiven for this particular instance of splitting – we are now at the point in dicynodont alpha taxonomy where the worst excesses of the past have been resolved, and we can start to look at lower-level variation and even bring back some previously-sunk species. On that note, Ken Angielczyk and I just 'resurrected' the emydopoid dicynodont *Compsodon helmoedi* via a thorough redescription (well, it never really went anywhere, it just has been ignored for the past 50 years). *Compsodon* was initially described by E.C.N. van Hoepen (1934) on the basis of a single skull collected near Bloemfontein, which remained the only known specimen of the taxon for the next 75 years. In 2009, however, several extremely well-preserved dicynodont skulls were collected in Zambia (discovered via the serendipitous escape of a rhinoceros from the national park, which necessitated rapid creation of a trail wide and well-graded enough to fit a truck that could bring back the rhino, but which also then allowed vehicles to reach the *Compsodon*-bearing locality, according to Steve Tolan), which after prep bore a remarkable resemblance to the holotype of *Compsodon*. Based on the Zambian specimens, *Compsodon helmoedi* has been



Above: The early geikiid dicynodont *Bulbasaurus phylloxyron*, restored by Matt Celleskey.

confirmed as a valid dicynodont species, which in South Africa seems to be restricted to the *Daptocephalus* AZ. Two additional South African specimens (from the Rubidge Collection) of *Compsodon* have now been identified, and we suspect more are out there. Unfortunately this taxon is (superficially) a very *Diictodon*-sized and shaped animal, so it is easy to overlook in collections, but please keep an eye out if you find smallish dicynodonts from the latest Permian. Finally, after five and a half fruitful years at the Museum für Naturkunde, Berlin, I have moved back to the United

States to take the position of Curator of Paleontology at the North Carolina Museum of Natural Sciences in Raleigh. Raleigh is built on Triassic rock, and exposures yielding a rich assemblage of cynodonts, dicynodonts, and archosaurs can be found only a few kilometers away from the museum, so I think I will be keeping very busy with local fossils (although I still hope to make it back to Gondwana whenever possible).

*****Kammerer, C.F.** & Smith, R.M.H. 2017. An early geikiid dicynodont from the *Tropidostoma* Assemblage Zone (late Permian) of South Africa. *PeerJ* 5:e2913.

***Angielczyk, K.D. & **Kammerer, C.F.** 2017. The cranial morphology, phylogenetic position and biogeography of the upper Permian dicynodont *Compsodon helmoedi* van Hoepen (Therapsida, Anomodontia). *Papers in Palaeontology* 1-33.

An Interview with Paleobotanist Dr. John Anderson

By Ellen Palestrant
Author, Arizona
ep@ellenpalestrant.com

In my recent *Monthly Creative Thinking* Newsletter I interviewed wpalaeobotanist Prof. John Anderson. John and I were in the same 'Class of 1955', our final year of junior school, Fairmount, Johannesburg. I now work and live as an artist, writer, poet and creative thinker in Phoenix, Arizona. The first portion of the interview is shown here, but please follow the link to see the rest.



British born Professor John M. Anderson did his BSc in exploration geology and a doctorate in palaeobotany. He was awarded a Professorship at Nelson Mandela Metropolitan University (NMMU), Port Elizabeth. His research and interests have diversified into a far-reaching range of interlinking topics but the on-going research at the center of it all, has been on the fossil flora of the Late Triassic Molteno Formation – deposited around the time of origin of the dinosaurs and mammals in the Karoo Basin of South Africa.

Ellen: When you think about the time of the earliest dinosaurs and mammals, what kind of visual images do you conjure up in your mind or are the images more in line with diagrammatic representations you have studied? I presume that visually, you take an imaginative leap back into a very distant past and move in. If so, how real and imprinted has your visualizations of that period become in your mind?

John: As if walking about in the wilderness today – that's certainly the best way of visualizing the Karoo landscape some 220 million years ago at the time of the Molteno flora, home to those earliest of dinosaur and mammal populations. So very different was the Karoo back then with its braided and meandering rivers crisscrossing a vast,

temperate, wooded inland floodplain. The Karoo in those distant days was at the heart of the Gondwanaland Supercontinent before it split up and drifted apart. This photograph below taken of Hadedas in 2017 at The Amphitheatre, is a reminder of the dinosaurs.

Ellen: Any particular difference you would like to discuss?

John: One wonderful difference between one's image of those distant pristine days and now: then there were no streaming lines of trucks and cars, no high-powered lines, no fences holding back herds of sheep and cattle. There was none of the paraphernalia of modern Homo sapiens. No hint of the most contradictory species ever to tread this earthly planet as it journeys about the sun!

Ellen: Contradictory – why?

John: We are the most extraordinary of all possible species! We are capable of everything from the most insane trench warfare to the most sublime concert music; from blinding greed to the most selfless charity; from mindless littering to the art of Rubens and Picasso; from fouling our atmosphere and causing climate change to the science of Madame Curie and Einstein. We are capable of understanding continental drift, yet building cities on the grinding edges of continental plates.

Ellen: You are a pretty extraordinary member of the human species yourself, John. Your contribution to science is truly impressive. Sir Peter Crane, when he was director of Kew Gardens, London, wrote: "I am not aware of any set of fossil assemblages that have been collected with such intensity, such uniformity of approach and such care..." He was referring then to yours and Heidi

Anderson Holmes's work in collecting from one hundred Molteno Formation sites, mostly new, within the extensive Karoo Basin of South Africa.

John: Good old Peter Crane. He too is a palaeobotanist, but one specializing on the flowering plants (the angiosperms) and their origins.

When Heidi (who was to become my first wife) and I first headed out to Little Switzerland in 1967, exactly 50 years ago, we had absolutely no idea of the significance of the Molteno Formation on the global stage. It was the first Molteno site that she and I collected from. And what a beautiful site nestled at the foot of a sandstone cliff along a scarp-slope of untouched wet forest, with the Natal Drakensberg stretching out magnificently before one! No better place to start!

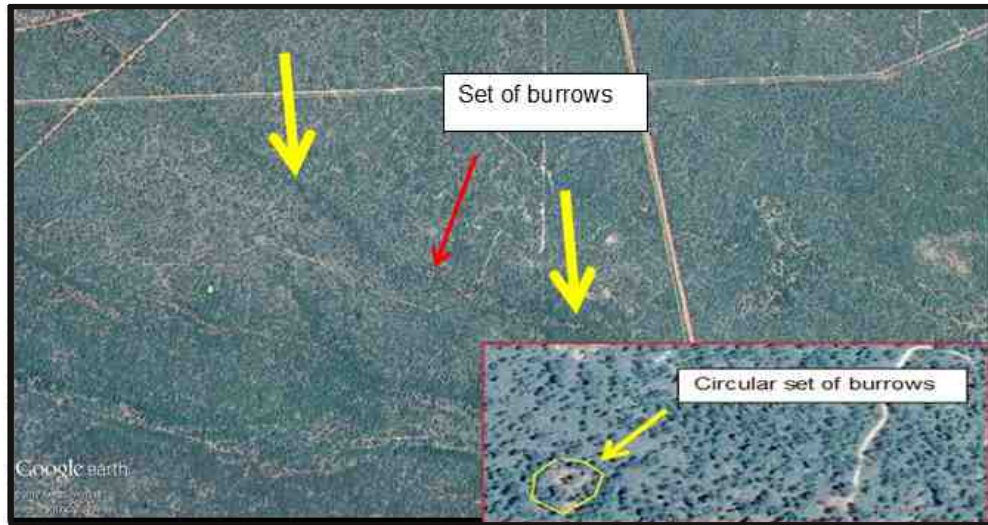
Ellen: Amazing that fifty years later, the Molteno Formation is still part of your life's work.

John: We had no reason then to think we'd spend the next few decades taking numerous trips out into the Karoo, finding endless new fossil-plant localities, and amassing a huge collection from them. The thing was that a sizable proportion of what we dug up was new, and that every locality added something further to the growing picture. By the time we got to 100 sites, it was time to put aside the pick and shovel—to be sure we could finish describing the whole flora. It's for the next generation to head out and find another 100 sites...

***a link to the rest of the interview is here:
<http://ellenpalestrant.com/imaginative-leaps-back-to-the-past-and-into-the-future/>.

Burrows, Trails and other Goggas from the Free-State

By Gideon Groenewald
PO Box 2, Clarens
gideonhgroenewald@gmail.com



Above: Site of the burrow cluster in association with the linear growth of trees on Thiane Wildlife Sanctuary (image modified from Google Maps).

Following up on our story of burrowing creatures we discovered to our dismay that the Herpetologists decided to change the name of our famous friend the “*Cordylus giganteus*” to “*Smaug giganteus*”, so my sincere apologies to all the Palaeontologists who thought the Sungazer lizard I mentioned in our previous discussion was a different animal to the burrowing creature we all adore in the Free State. Many of the Free State creatures of South Africa like basking in the sun, but none as regularly as our friend *Smaug giganteus*, also known as “*die Oувolk*” in Afrikaans. On a recent search for water

we came across a most peculiar set of very large burrows, constructed in a very nice circle. The burrows are nearly 1.5 m in diameter and all point towards the center of the circle. As we drilled for water we did detailed geomagnetic surveys across the burrow clusters and discovered that they belong to a colony of Aardvark (*Orycteropus afer*). They cleverly excavated into a very large termitarium that extends about 39 m underground. At that point we hit the water table and the termites then attacked the pumping systems, leading to thousands of termites being pumped to the surface. During a nocturnal visit to our colony of Aardvark friends, we were pleasantly surprised to find the burrows used as hiding places of our good friends from the Bushveld, the common old “*Vlakvark*” or properly known to most of you as the Warthog (*Phacochoerus africanus*). It seems as if these mammals were living in symbiosis in an area where there was no surface water within at least 30 km radius from this colony. The borehole drilled to 60 m filled with groundwater to 39 m where the water table stabilizes during the winter months. Finding extensive and complicated networks of casts of burrows from the Permian and Triassic is most probably a reflection of ancient behaviour - that is still in use by the “*boemelaars*” we find borrowing burrows – an ancient survival trick.



Fossil theft - here is what to do

By Ragna Redelstorff
South African Heritage Resource Agency
rredelstorff@sahra.org.za

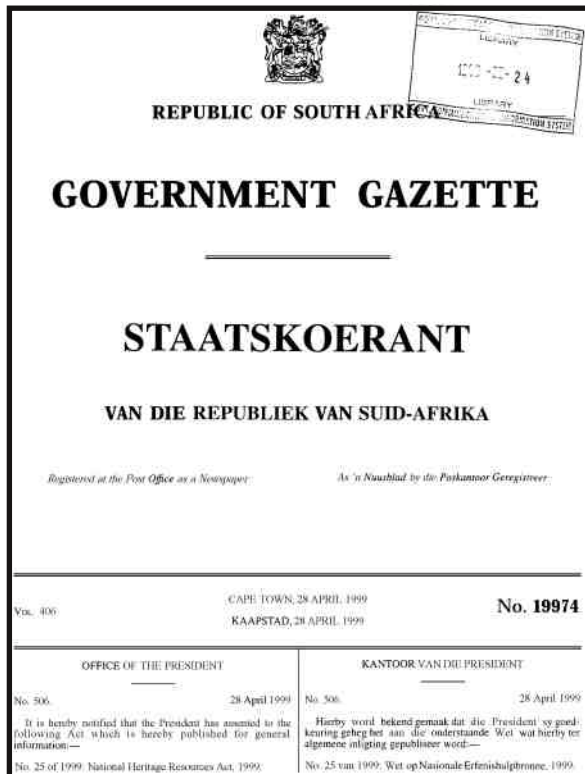


Figure 1: Title page of the National Heritage Resources Act (NHRA, No 25 of 1999).

Lately I have received emails from the palaeo community reporting fossil theft and asking for advice on the correct process to follow to report theft. So I have put together a what-to-do list in case of fossil theft or any crime related to heritage, be it that fossils are stolen from an excavation site, a museum or collection, or if you find fossils or archaeological items on sale in markets or online.

1). Report it to the local SAPS station

This must be the local one, for example if you excavate within Municipality xyz you must report it to the SAPS station nearest to the excavation site within Municipality xyz, preferably immediately. If possible, take the National Heritage Resources Act (NHRA, No 25 of 1999; see Figure 1) with you or at least copies of sections 35(4)(a), (b) and (c) and 51(1)(b) (see Figure 2). Section 35(4)(a) speaks to archaeological and palaeontological sites and as such is best be used when fossils were illegally (i.e. without a permit) removed from an excavation. Section 35(4)(b) refers to archaeological and palaeontological objects, in this context the damage, destruction or removal of fossils. Section 35(4)(c) states that trade, sale and export without a permit is illegal; you may use this section when you are aware of any fossil sale etc. Section 51(1)(b) is about the penalties that apply for the above offences (section 35(4); see Figure 3).

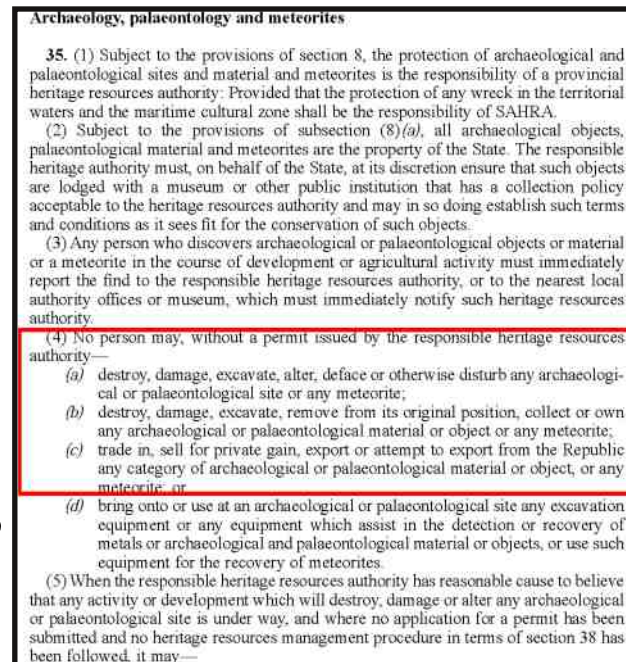


Figure 2: Exempt highlighting section 35(4)(a)-(c) of the NHRA, No 25 of 1999).

Write down the name of the SAPS Officer who handles the case and the SAPS case reference number.

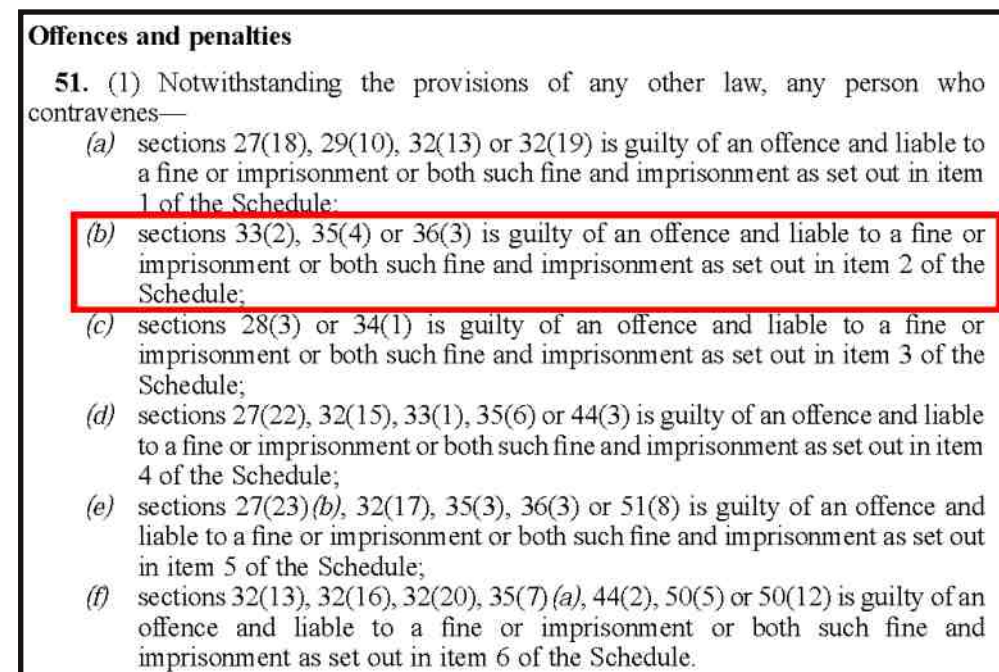


Figure 3: Exempt highlighting section 51(1)(b) of the NHRA, No 25 of 1999.

2). Report the theft to SAHRA (rredelstorff@sahra.org.za) and open a heritage crime case on SAHRIS.

- Go to SAHRIS (www.sahra.org.za/sahris).
- From the drop down menu under “Create” choose “Case/Application”.
- Under “Case Type” select “Heritage Crime”.

d. Just below it, enter or create the respective site and/or object.

e. In Step 4, upload under “Additional Documents” a document with the description of the crime, add your name and affiliation, name of SAPS case officer and SAPS case reference number.

3). Report it to the palaeo community (e.g. PSSA members) and ask them to be vigilant and keep their eyes open for the stolen fossil.

***Please note that it is important to report to the SAPS because we need these types of heritage crimes in their crime statistics. The more cases are reported the more seriously they will take them.

Recipe Corner: Mike's Navajo Tacos!

By Cory Dinter
ESI, Wits University
cm.dinter@gmail.com



Prep Time: 15 minutes
Cook Time: 1 hour
Yield: 6 servings

A bit about the meal:

To kick off the first PalNews recipe corner, I've got a dish coming to you all the way from the sandy deserts of western North America. Paleontology guru, Mike Getty, taught me this dish out on my first excavation back in 2009 and it remains my all time favorite. What are Navajo tacos, you ask? Only the most delicious, golden hunks of fried perfection topped with southwestern chili and all the fixings! Traditionally this meal is served by and for indigenous gatherings but has been warmly embraced as a staple amongst all walks of life where I'm from. It may seem a little daunting at first, but it's a snap to make in the field if you've already got a good chili recipe and it's always a huge hit.

Fry Bread Ingredients:

- 6 cups all-purpose flour
- 1 teaspoon salt
- 1 tablespoon baking powder
- 1 ½ cups warm water
- Sunflower, vegetable, or canola oil (lots)

Chili Ingredients:

- 1 pound group beef
- 1 cup diced onions
- 1 cans of diced tomatoes
- 2 cans of black beans
- 2 cans of kidney beans

As much garlic as you'd like
2 tablespoons tomato paste
3 tablespoons oil (whatever you've got)
¼ cup chili or to taste
1 ½ tablespoon Worcestershire sauce
4 tablespoons apple cider vinegar
1 teaspoon cumin
1 teaspoon paprika
½ teaspoon oregano
Salt and pepper to taste
Jalapeno (minced) to taste
Whatever else you like in your chili

Suggested Toppings List:

Grated cheddar
Chopped lettuce
Hot sauce
Chopped red onions
Chopped jalapenos
Diced avocado
Minced cilantro
Black olives
Tomatoes
Sour cream

Directions:

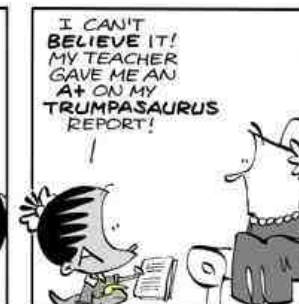
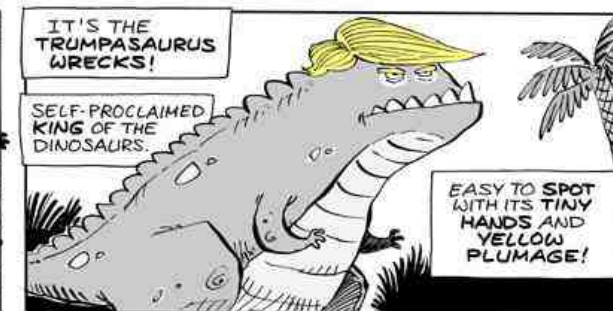
Before you get going on the chili go ahead and prep the dough for the fry bread. For this mix the flour, baking powder, and salt in a large bowl. Gradually stir in water and start to knead. Add more water if it's too dry. Let the dough stand (covered) somewhere warm for the next 30 minutes.

For the chili if you've already got a tried and true recipe go ahead and use that! If not, here's one I quite like: In a pot cook the garlic, onions, jalapenos, and peppers on low. Stir often for about 5 minutes. Add in all the spices and let that cook for two minutes more. The tomato paste goes in next, followed by the (pre-thawed) beef. Turn up the heat a bit and cook until the meat has been browned. From there you can add in the tomatoes and beans (and corn if you'd like), juice and all. Set to simmer for 30 minutes.

Now it's time to get back the star of the meal. Take out a large frying pan and fill that with an inch and a half of oil. Put on med-high. Shape the dough into roughly 1" balls and roll each as flat as you can get with a roller or empty bottle. When the oil is hot, delicately place one of your dough pancakes directly into the oil. Fry until the edges of the bread are light gold and then flip. Remove the finished product, set on a bed of paper towels to dry, and repeat until you're done.

When the bread and chili are done put it all together. Toppings on top, chili in the middle, and bread on the bottom! Enjoy!

Comic Corner



Email list

Email list of current PSSA members.

Abdala, Fernando

nestor.abdala@wits.ac.za

Almond, John

naturaviva@universe.co.za

Anderson, John

jmanderson.gondwana@googlemail.com

Angielczyk, Ken

kangielczyk@fieldmuseum.org

Araújo, Ricardo

paradoxides@gmail.com

Avery, Graham

gavery@iziko.org.za

Bamford, Marion

marion.bamford@wits.ac.za

Barbolini, Natasha

barbolini.natasha@gmail.com

Battail, Bernard

bbattail@mnhn.fr

Bender, Patrick

pkabender@yahoo.com

Benoit, Julien

julien.benoit@wits.ac.za

Berger, Lee

lee.berger@wits.ac.za

Bergh, Eugene

ebergh@iziko.org.za

Backwell, Lucinda

lucinda.backwell@wits.ac.za

Bordy, Emese

emese.bordy@uct.ac.za

Botha-Brink, Jennifer

jbotha@nasmus.co.za

Boyd, Glen

glen@karkloof.co.za

Braga, José

braga@cict.fr

Brand, Alexa

brandha@mweb.co.za

Brink, James

jbrink@nasmus.co.za

Browning, Claire

browning.claire@gmail.com

Brumfitt, Ian

ian_brumfitt@yahoo.co.uk

Butler, Elize

elize.butler@nasmus.co.za

Carlson, Kristian

kristian.carlson@usc.edu

Carrano, Matthew

carranom@si.edu

Cazenave, Marine

marine.cazenave4@gmail.com

Chapelle, Kimberley

kimi.chapelle@gmail.com

Chatterjee, Tapas

tchatterjee@uwc.ac.za

Chinsamy-Turan, Anusuya

anusuya.chinsamy-turan@uct.ac.za

Choiniere, Jonah

jonah.choiniere@wits.ac.za

Clark, Jim

jim.jclark301@gmail.com

Cisneros, Juan

juan.cisneros@ufpi.edu.br

Codron, Daryl

darylcodron@gmail.com

Cohen, Brigitte

jet-cohen@hotmail.com

Cowley, Ron

ronc@mineval.co.za

Curry-Rogers, Kristina

rogersk@macalester.edu

Damiani, Ross

rossano1973@googlemail.com

Day, Michael

michael.day@wits.ac.za

De Klerk, Billy

paranthodon@gmail.com

De Klerk, Bonita

bonita.deklerk@students.wits.ac.za

De Ruiter, Daryl

deruiter@tamu.edu

Doehne, Ludwig

doehne@global.co.za

Durand, Francois

fdurand@uj.ac.za

Dykes, Sue

dykes.susie@gmail.com

Faith, Tyler

j.faith@uq.edu.au

Fernandez, Vincent

vinfernand@gmail.com

Fielding, Christopher

christopherfielding@gmail.com

Forster, Cathy

forster@gwu.edu,

Fourie, Heidi

hfourie@mitsong.org.za

Gess, Rob

robg@imagnet.co.za

Gommery, Dominique

dominique.gommery@upmc.fr

Govender, Romala

rgovender@iziko.org.za

Grine, Frederick

frederick.grine@stonybrook.edu

Groenewald, David

1davidgroenewald@gmail.com

Groenewald, Gideon

gideonhgroenewald@gmail.com

Güven-Neumann Saniye

guven.saniye@gmail.com

Haarhoff, Pippah

pippah@iafrica.com

Hancox, John

jhancox@cciconline.com

Harley, Eric

eric.harley@uct.ac.za

Helm, Charles

helm.c.w@gmail.com

Hiller, Norton

norton.hiller@gmail.com

Holmes, Heidi

hmsholmes@googlemail.com

Holmes, W.B Keith

wbkholmes@hotmail.com

Hopson, Jim

Jimjhopsn@midway.uchicago.edu

Huttenlocker, Adam

ahuttenlocker@gmail.com

Long, John

john.long@flinders.edu.au

Jasinoski, Sandra

sandra_jas@hotmail.com

Jinnah, Zubair

zubair.jinnah@wits.ac.za

Johnson, Mike

mikedes.johnson@gmail.com

Kammerer, Christian

jonkeria@gmail.com

Kemp, Tom
tom.kemp@sjc.ox.ac.uk

King, Gillian
gillianmking@virginmedia.com

Klinger, Herbie
hkling@telkomsa.net

Labandeira, Conrad
labandec@si.edu

Leenen, Andrea
andrea@pastafrica.co.za

Lehmann, Thomas
thomas.lehmann@senckenberg.de

Linkerman, Sean
seanlinkermann@hotmail.com

Loots, Marius
mloots@medic.up.ac.za

Lyson, Tyler
tyler.lyson@gmail.com

MacRae, Colin
horsebackafrica@colin.co.za

Maguire, Judy
judymaguireza@gmail.com

Matthews, Thalassa
tmatthews@iziko.org.za

Mavuso, Silindokuhle
461219@students.wits.ac.za

McKay, Ian
ian.mckay@wits.ac.za

McKee, Jeff
mckee.95@osu.edu

McPhee, Blair
blair.mcphee@gmail.com

Millstead, Barry
bmgeoserv@gmail.com

Mocke, Helke
helke.mock@gmail.com

Modesto Sean
sean_modesto@cbru.ca

Mothupi, Tebogo
tebogomothupi@yahoo.co.uk

Muir, Rob
MRXROB009@myuct.ac.za

Neveling, Johann
jneveling@geoscience.org.za

Norton, Luke
lnorton.za@gmail.com

Nowak-Kemp, Malgosia
malgosia.nowak-kemp@oum.ox.ac.uk

Odes, Eddie
eddieodes@gmail.com

Ovechkina, Maria
saccamina@gmail.com

Parkinson, Alex
palaeoparky@gmail.com

Pereira, Lucille
lucille.pereira@students.wits.ac.za

Pether, John
jpether@iafrica.com

Pickford, Martin
pickford@mnhn.fr

Potze, Stephany
stephany.potze@gmail.com

Prat, Sandrine
sandrineprat@hotmail.com

Prevec, Rose
r.prevec@ru.ac.za

Raath, Mike
mickraath@gmail.com

Redelstorff, Ragna
rredelstorff@sahra.org.za

Roberts, Eric
eric.roberts@jcu.edu.au

Rogers, Raymond
rogers@macalester.edu

Ross, Callum
rossc@uchicago.edu

Rossouw, Gideon
potknob@telkomsa.net

Rossouw, Lloyd
lloyd@nasmus.co.za

Rubidge, Bruce
bruce.rubidge@wits.ac.za

Rust, Izak
icrust@iafrica.com

Sanson, Elfie
elfie.sanson@gmail.com

Schaafsma, Elizabeth
elizabeth@vodamail.co.za

Sciscio, Lara
l.sciscio@gmail.com

Senegas, Frank
frank.senegas@evolhum.cnrs.fr

Senut, Brigitte
bsenut@mnhn.fr

Sidor, Christian
casidor@u.washington.edu

Smith, Roger
rsmith@iziko.org.za

Steininger, Christine
christine.steiningering@wits.ac.za

Strong, Gail
gail@thestrongs.co.za

Strong, Mike
gail@thestrongs.co.za

Suddick, Sam
sam.mortimer1972@icloud.com

Tawane, Mirriam
tawanem@yahoo.com

Thackeray, Francis
francis.thackeray@wits.ac.za

Thomas, Guy
guyrm.thomas13@gmail.com

Tolan, Steve
luangwa@hotmail.com

Tucker, Ryan
tucker@sun.ac.za

Van den Brandt, Marc
marcvandenbrandt@gmail.com

Van den Heever, Jurie
javdh@sun.ac.za

Van der Walt, Merrill
merrillv@strate.co.za

Van Dijks, Eddie
eddie@vandijks.com

Van Gend, Jani
16455266@sun.ac.za

Van Sittert, Brand
sybrandvs@gmail.com

Vermaak, Marius
m.vermaak@ru.ac.za

Viglietti, Gina
gl.viglietti@gmail.com

Viglietti, Pia
pia.viglietti@gmail.com

Warren, Anne
a.warren@latrobe.edu.au

Welman, Johann
johann.welman@smu.ac.za

Wolfaardt, Derik
derik1@mweb.co.za

Yates, Adam
yatesam@gmail.com

Zipfel, Bernhard
bernhard.zipfel@wits.ac.za