



PalNews

Biannual newsletter for the Palaeontological Society of Southern Africa

REMEMBERING



Sue Dykes

1959 - 2019

A Tribute to Sue Dykes

Francis Thackeray, ESI



It was a great pleasure and privilege to serve as one of Sue's supervisors for her MSc (*cum laude*), and her excellent PhD, both of which were in the field of palaeo-anthropology. Sue's co-supervisors were Varsha Pilbrow (Australia) and Kris Carlson (who came from California to Krugersdorp to attend the Memorial event on 17 August 2019, reflecting a mark of respect which Sue commanded). She undertook detailed studies of teeth of fossils from the Cradle of Humankind, including *Australopithecus*, *Paranthropus* and early *Homo*, from sites such as Sterkfontein, Swartkrans, Kromdraai, Drimolen, Gondolin, Rising Star and Malapa. She also studied hominins from sites in Kenya and Tanzania. Sue and I traveled together to East Africa for research at museums where she applied her new method. I got to know Sue as a friend as well as a supervisor for her academic degrees. I described her as my "Star Student". In fact,

she was a "supernova", a brilliant star. Supernovae are bright and brilliant stars. Sue was one of them. Bright and Brilliant! Some of the words which would describe her talents include perfectionism, precision and meticulous attention to detail. Despite Trials and Tribulations with which she was confronted, she Triumphed. She herself had a sense of pride when she graduated twice in the Wits Great Hall. We shared her absolute happiness. The ESI is extremely proud of her. Her family and friends can be proud of her. Indeed, the global fraternity of palaeo-anthropologists is proud of her. Her passing is an enormous loss. She was cut short just at a time when she was making her mark as a dedicated scientist in the field of human evolution. Her thesis and her dissertation and her publications serve as a lasting legacy.



**SUE
DYKES**

**STAR
STUDENT**

In loving memory of Sue

Jonah Choiniere & Kimi Chapelle on behalf of ESI



Dear Colleagues,

The Evolutionary Studies Institute mourns the passing of Dr Sue Dykes, a former student, lecturer, and a dear friend to all who knew her. After a previous career, Sue joined the ESI in 2013, completing an MSc with distinction and then continuing on to a PhD, which she completed in only two years of study. Sue's research focused on using statistical methods to identify the teeth of fossil hominoids, and in 2019 she published a promising new method in this area. She was also a volunteer lecturer in Statistics for the ESI's honours course.

Sue was a wonderful friend to students and staff alike at the ESI. Generous with her time, and empathetic to the utmost, Sue helped many of us through personal and professional difficulties. It was a pleasure to see her develop her research career, and a testament to her skill and determination that she was able to make the switch from a private career to an academic one. During the course of her studies, Sue's family became integrated into the ESI, both by conducting research with her and by attending social events. It is clear that she instilled them with that same generosity. We offer them our deepest condolences.

Sincerely, and with great sadness,

The Evolutionary Studies Institute



Sue with her PhD supervisor & mentor, Prof. Francis Thackeray



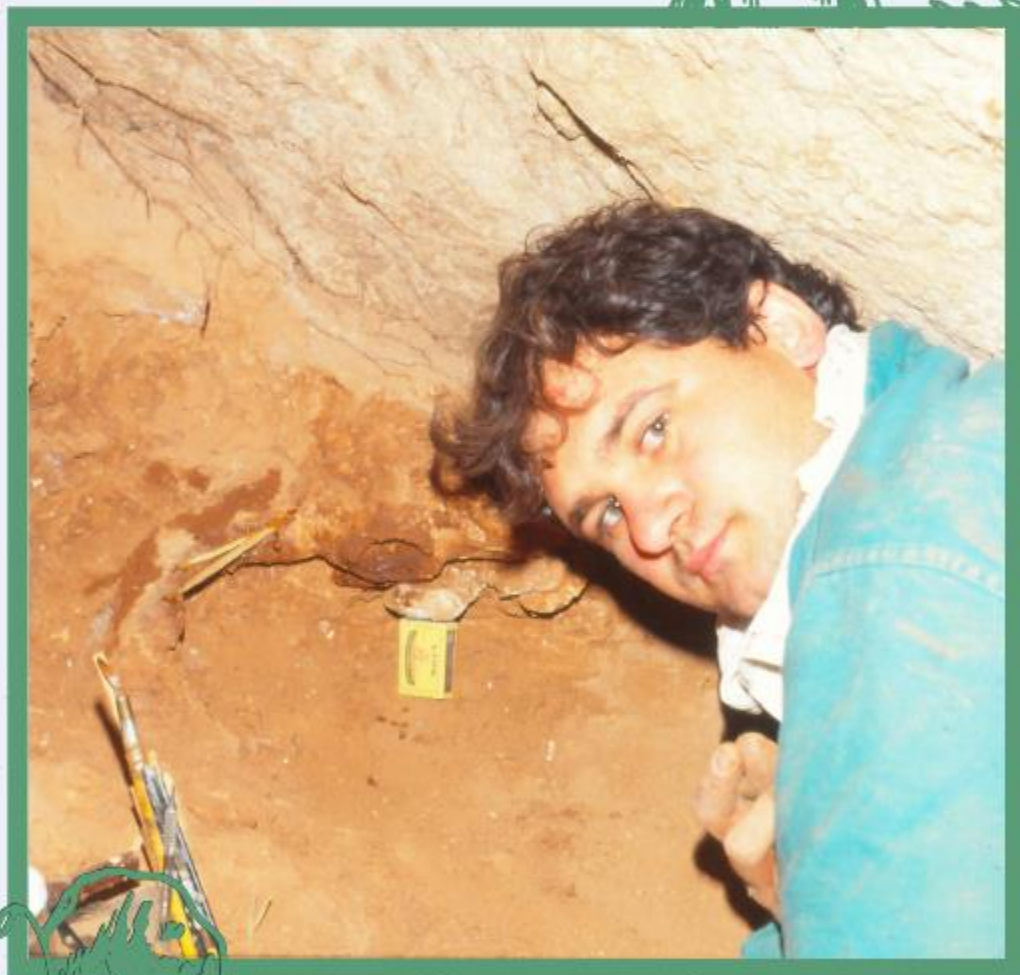
Sue with her husband, Dennis, at her PhD graduation.



Sue Dykes at the forefront of some ESI fun!

James Brink

1957 - 2019



Remembering James Brink

Lloyd Rossouw, FQRS

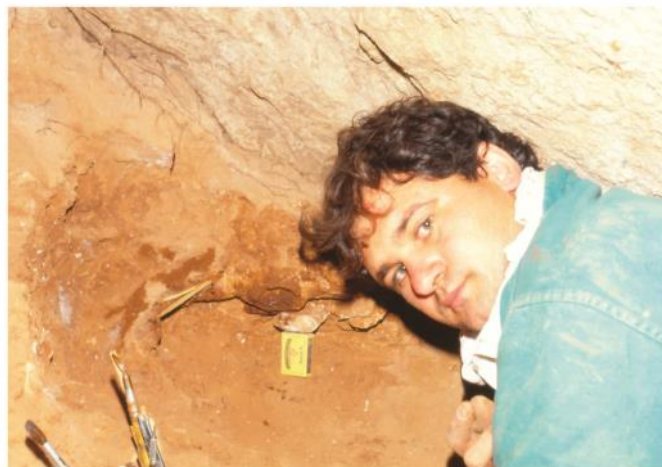


James Simpson Brink was appointed as a junior researcher in archaeozoology at the National Museum Bloemfontein in 1983 where he took over from Dr Ron Clarke in 1984 to lead an interdisciplinary palaeo-environmental research unit at the museum's Quaternary Research Station at Florisbad.

With missionary zeal, James not only began an in-depth study of the archaeozoology of the Florisbad Spring and Living Floor Assemblages, which represents the type site of the Florisian Land Mammal Age, but he also initiated the expansion of an extensive vertebrate osteological reference collection. This would eventually grow into a world-class research collection for students and scientists alike. With an extensive discussion on the taphonomy and re-evaluation of the fossil collections from Florisbad, James received an MA degree in Archaeozoology in 1987 from the University of Stellenbosch.

During 1987 and 1988 he completed a course at the Institut für Palaeoanatomie, Faculty of Veterinary Science, University of Munich, which included, among others, the comparative osteology of mammals in the Old World, the history of animal domestication in the Old World, the comparative osteology of fish and an introductory course in Latin and Greek as used in scientific nomenclature. In 1992, he received his BA Honors degree in Latin from the University of the Free State, while working on a comparative osteological study on the evolution of the black wildebeest (*Connochaetes gnou*), for a future PhD study.

In 1994, James, together with Rainer Grün from the University of Canberra in Australia, launched an extensive radiometric dating project to determine the age of the Florisbad deposits. In the process, a groundbreaking technique for non-destructive dating termed 'Electron spin resonance' (ESR) was developed to date a single tooth of the famous Florisbad human skull. This work,



James in 1996 at the Nooitgedacht Cave excavation of the caprine skull



JSB (R) & Britt Bousman (L) in the field - Modder River 2013

published in *Nature* in 1996, provided James with the palaeontological time frame to continue his work, in what would become an influential study on the evolution of the endemic black wildebeest as a model for the effects of changing environments on mammal evolution during the Quaternary. For this he earned a DPhil degree from the

Remembering James Brink

Lloyd Rossouw, FQRS



University of Stellenbosch in 2005. Since then he has worked extensively on the evolution of Plio-Pleistocene ecosystems and the processes that drove changes in environments and ungulate communities in the central interior of southern Africa and eastern Africa. These studies would eventually culminate in the first description of an extinct caprine from the Cape Fold Mountains, as well as a re-evaluation of age of the faunal assemblages from the Cornelian Land Mammal Age type site.

With over 100 peer-reviewed publications produced during his career, James would also foster local as well as international collaboration with colleagues in the USA, Australia, France, Germany, Kenya, Israel and Sicily. James found the appeal of functional anatomy and mammal evolution irresistible and he would freely give instruction on some finer points of comparative osteology to anyone, even to a casual passerby. His expertise in

bone identification and post-cranial elements, in particular, was simply outstanding. He was an exceptional teacher who, in his unique way, introduced many students (including myself) to the practical side of Quaternary palaeontology and archaeozoology. I was fortunate to be one of his earliest students and, like others after me, was captivated by his wisdom, sense of humor and modest nature. He was a philosopher, expert on classical cultures and languages, as well as a connoisseur of good wine. It is hard to imagine a world without James, and to think of Florisbad without his singular presence. None of those who knew him will forget his generosity towards every person he encountered.

James is survived by his wife Marianne, their children, Mari, Willem-Carel, and Lilian.



James hard at work in the field at Erfkroon, Modder River, in 2003

Remembering James Brink

Louis Scott, University of the Free State



South Africa lost a highly esteemed Quaternary palaeontologist when James Brink passed away on the 23rd of September 2019, after illness. Following his training in archaeology under Professor Hillary Deacon in Stellenbosch, James was, for more than 35 years, attached to the National Museum in Bloemfontein, where he played an instrumental and leading role developing the infrastructure and research programme of the Florisbad Quaternary Research Station. Since his passing, colleagues and friends globally have sent numerous messages of appreciation of Brink's discoveries, wisdom, collaboration and vast insights into past environments and prehistory of Africa. Last year, we edited a special issue of *Quaternary International* (volume 459) entitled *Sub-Saharan Archaeology, Zooarchaeology and Palaeoenvironments - Papers in Honour of James Simpson Brink* on his 60th Birthday to bring tribute to his remarkable contribution in palaeontology and palaeo-environmental science in Southern Africa. The following is an extract from the editorial article (Scott et al. 2018):

"James is known for his contributions to osteology, Quaternary palaeontology, and archaeozoology, enlightening us about the patterns and processes that drove the evolution of environments and mammal communities of southern Africa. His contributions range from detailed descriptions of the taphonomy of the Florisbad Spring assemblage – the type site of the Florisian Land Mammal Age, to discussions about the evolution of a biogeographically unique mammalian fauna in southern Africa.

James' studies of the evolution of the black wildebeest (*Connochaetes gnou*), a species endemic to the South African central interior, presented arguably the most definitive example of how vicariant processes have shaped mammal evolution in

the sub-region, providing an empirical basis for the mechanistic link between landscape and morphological change. His unparalleled understanding of functional anatomy has allowed him to expand related theories to their mammalian lineages and, ultimately, to reveal the ecological processes that governed changes in community structure.

Throughout his career, James applied this approach to studies of faunal assemblages at multiple sites in the central interior of South Africa, including excavating and describing the collections from Cornelia-Uitzoek, the type site of the Cornelian Land Mammal Age, numerous sites representing the Florisian Land Mammal age, the more arid Holocene, and several Late Pleistocene Cape Coastal sites. In combination, these works have revealed a picture of landscapes shifting from savanna mosaics to treeless open grasslands through the mid-to-Late Pleistocene, and of perennial water sources acting as piospheres governing mammal communities and ecosystem processes during the Late Pleistocene, that is now central to palaeoenvironmental reconstructions in the sub-region. Indeed, it is now difficult to argue against the central interior of South Africa being the evolutionary source from where many savanna, desert, and fynbos mammal populations and communities are derived.

Among all this, James also drove research in the 1990s that culminated in the application of Electron Spin Resonance to date the Florisbad human skull at 259.5 ka, over 200 ka older than what had previously been believed. However, James has made contributions that extend beyond purely academic ones. For almost three decades he has single-handedly built and curated the modern mammal and fossil faunal collections of the Florisbad Quater-

Remembering James Brink

Louis Scott, University of the Free State

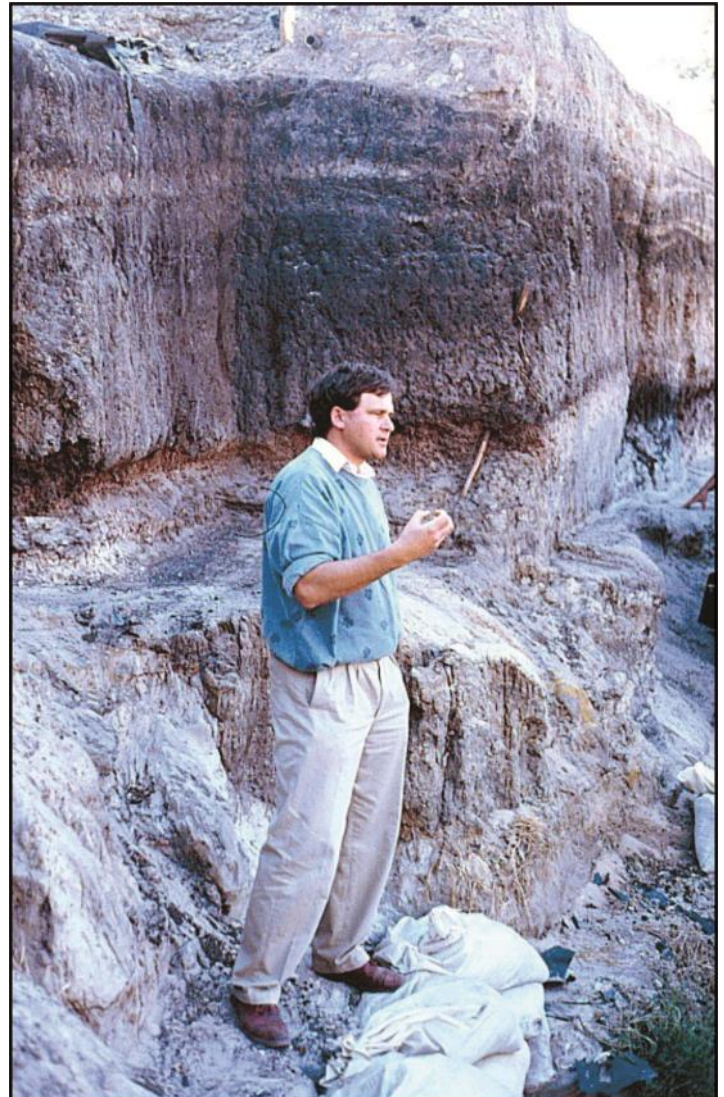


nary Research Station. This has made it possible for research that focuses explicitly on both spatial and temporal palaeoenvironmental trends. His foresight in amassing an unrivalled modern mammalian collection has enabled important studies not only on mammalian species and functional diversity, but on morphological and behavioural variations across populations and communities (at scales rare for studies based on skeletal material).

James is a natural historian as well as a scientist. His knowledge and understanding of functional anatomy or archaeozoology is shared by few. To witness his expression of this knowledge first-hand is, quite simply, an awesome experience."

Reference

Scott, L. Codron, D. and Horwitz, L. 2018. Sub-Saharan Archaeology, Zooarchaeology and Paleoenvironments - Papers in Honour of James Simpson Brink on his 60th Birthday. *Quaternary International* 495, 1-3. <https://doi.org/10.1016/j.quaint.2018.10.034>.



James Brink at Florisbas in 1996.
Photo taken by J. S. Carrión, University of Murcia, Spain.



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Sue Dykes



James Brink

A word from the Eds



Hello again, dear palaeontology community,

The year is beginning to, finally, slow down and rightfully so – we received many contributions for this edition and it absolutely fantastic to see how busy you have all been. South African palaeontology's flag is consistently hoisted higher and continues to wave with much gusto because of your collective efforts. The number of research labs, departments, and staff and students, fuelled by people from increasingly diverse backgrounds, is encouraging and gives us great hope and optimism for South Africa's trajectory and its continued ability to compete at an international level. Our capacity for exemplary work is, of course, afforded by various grant agencies like the Centre of Excellence in Palaeosciences (CoE-Pal), the Palaeontological Scientific Trust (PAST), the National Research Foundation (NRF), and various more localised streams of bursaries at the university level. Access to these generous grants has allowed us to continue to fire on all pistons and our collective scientific output reflects this. As the editorial team, we are incredibly grateful for this support in our academic pursuits.

While this year has had many highlights, it has also brought tremendous sadness in the passing of Dr Sue Dykes and Dr James Brink. From our time with them, and from what we have gleaned from communicating with friends and colleagues closest to them, we can safely attest to the far-reaching, positive impact they had on both the Palaeosciences and the lives of those around them. Both Sue and James were irreplaceable people and our discipline and personal lives are all the poorer for their loss. It is a modest gesture, but we dedicate this issue of PalNews to their memory.

Those hawk-eyed readers might notice a few changes: The most obvious is the portrait orientation of the page. We did this because most of the digital documents read are in this orientation, but also to make the reading experience better suited for mobile devices. A chat with Prof Francis Thackeray also had us resurrect the “Palaeo-Palaver” section – a section for outreach endeavours and palaeo-related “think pieces”. And as a bonus, Dr Christian Kammerer supplied us with a better gorgonopsian image to use for our Permian section header. We say better because (1) LOOK AT THOSE CANINES! it is such a cool looking beast, and (2) because it is sentimental: it is now the gorgonopsian *Smilesaurus* which means “knife lizard” but is really a secret pun as Sydney Rubidge would refer to specimen RC 62 as ‘Old Smiler’ for its toothy grin. Christian's paper discussing *Smilesaurus* and many other gorgons can be found here: <https://doi.org/10.7717/peerj.1608>

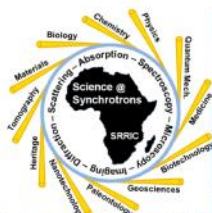
South African palaeontology is growing from strength to strength and continues to be a world leader in many regards - we hope that by the end of this issue you see why!

Kind regards,

Viktor Radermacher and Lara Sciscio
Editors of PalNews

CENTRE OF  XCELLENCE
PALAEOSCIENCES





The European Synchrotron Radiation Facility (ESRF), of which South Africa is an associate member, is currently undergoing a dramatic upgrade to an “Extremely Brilliant Source” (EBS). Completion is planned for August 2020.

This workshop aims to:

- inform the South African light source community of the novel functionalities and scientific opportunities of the ESRF-EBS.
- prepare SA scientists and engineers to efficiently utilize the ESRF-EBS immediately after its relaunch.
- function as a user meeting for the South African light source science community.

Topics include:

- Life and Medical Sciences
- Heritage Sciences and Paleontology
- Geo- and Mineral Sciences
- Energy, Nano and Materials Sciences
- Environmental Sciences
- Competitive Industry
- Capacity Building
- Strategy and policy

JBS, University of Johannesburg

ORGANISING COMMITTEE

Tshepo Ntsoane (NECSA)
Wolf-Dieter Schubert (UP)
Simon Connell (UJ)
Brian Masara (SAIP)
Trevor Sewell (UCT)
Giovanni Hearne (UJ)
Bjorn von Heyden (SUN)
Wilson Mogodi (UCT)
Kudakwashe Jakata (WITS)

For more information visit:

<http://events.saip.org.za/event/SA-ESRF2019>

or contact:

Tshepo Ntsoane

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Announcements



Do you want to test your honey for its origin? Is it really honey anyway?

Are you suffering from hay fever or are you just curious about the fascinating world of modern and fossil pollen?

We at the Evolutionary Studies Institute-University of the Witwatersrand here in Joburg might have all the answers!

We monitor the pollen in Johannesburg & Pretoria and are a member of the South African Pollen Monitoring program:

www.pollencount.co.za

Contact: Dr Frank H. Neumann, NRF C1 rated senior researcher

frank.neumann@wits.ac.za

Cell 0637569125



Collections build connections for Iziko SPNCH 2019

Zaituna Skosan, Sibiu Mtungata, Iziko Museums



Towards the end of May/beginning of June, my colleague Sibusiso Mtungata and I were fortunate to spend two weeks in Chicago. The trip was made possible with the help of various funders including The Iziko Museums of South Africa, The Friends of Iziko South African Museum, Centre of Excellence Palaeosciences (CoE), Palaeontological Society of Southern Africa (PSSA) and the Palaeontological Scientific Trust (PAST). Our mentors on this project, Ms. Claire Browning and Dr. Wendy Taylor played a major role in assisting us with the write-up of the funding proposal and continuously supported us throughout this process.

During our two week stay in the US, we attended a week-long conference organised by the Society for the Preservation of Natural History Collections (SPNHC). We participated in hands-on workshops and attended presentations on collections management, education, public programmes and data management to mention but a few. Apart from these events, we also attended the five-minute specimen presentation, which is a new addition to the conference that I think was the most enjoyed. Hopefully one day we can submit and present on one of our most recent discoveries as part of this segment of

the conference.

We were fortunate to give our very first presentation to an international audience on how 'Collections make Connections' at Iziko and judging from the feedback we received afterward we think it went well. Attending our very first international conference was an awesome experience. We met many people that work in the museum sector and managed to form networks with collections managers and preparators from different continents. In our discussions with our international colleagues, we were able to evaluate how we at Iziko compare to other institutions and are happy to say that we are on par with most practices and procedures. Throughout the conference, we were stopped by delegates that expressed their hopes of attending a conference in South Africa. This is one project that we would like to be a part of if it is possible.

The second week of the trip was spent behind the scenes in the collections at The Field Museum and Dr Paul Sereno's Dinosaur Lab at the University of Chicago. Chief preparator in the McDonald's Fossil Preparation Lab at The Field Museum, Ms. Akiko Shinya, stunned us with her exceptional fossil preparation and casting skills.



The Hilton was a beautiful setting for the SPNCH collections conference



We gave our first presentation at an international conference. After the nerves settled down we had a great time and made many valuable connections through sharing our experiences as collection manager and fossil preparator at Iziko South African Museum.

Collections build connections for Iziko SPNCH 2019

Zaituna Skosan, Sibu Mtungata, Iziko Museums



Her knowledge of fossil preparation techniques and the tools used were invaluable to us - in many ways, she reminded us of “MacGyver” as she can do just about everything. We enjoyed every behind the scenes tour of the collections facilities and there were many. The Field Museum is an amazing place and as visitors, we could not get enough. We are extremely grateful to the staff at these institutions who willingly shared their skills, insight, and knowledge with us.

Despite a busy schedule, we managed to do some sight-seeing that included numerous visits to the Field Museum (as there was just too much to see), The Art Institute, The Driehaus Museum and a boat trip circling Navy Pier. This was an experience that we will never forget. Being able to see Chicago at night from the lake was magical. We attribute the experience and success of our trip to the generosity of Dr Wendy Taylor who was with us eve-

ry step of the way during our time in Chicago and managed to provide us with much-needed equipment for our workshops such as new tablets as well as cameras; and of course to our employer, The Iziko Museums of South Africa, for giving us time-off. Our heartfelt thanks go out to everyone involved in this great professional development opportunity.

This trip forms the basis of an ongoing knowledge sharing project in professional organizations like SPNHC; the experiences and knowledge gained will be used to develop online eLearning museum training modules. We hope that these courses will enhance collections and fossil preparation knowledge in institutions across South Africa.



Thanks to Akiko Shinya and Peter Makovicky at the Field Museum for the hands-on tour of the preparatory lab and for freely sharing their expertise and knowledge.

We were happy to make connections both old and new at the conference. What an amazing opportunity for professional development and to showcase South African Palaeontology!

At the Field and in the field.

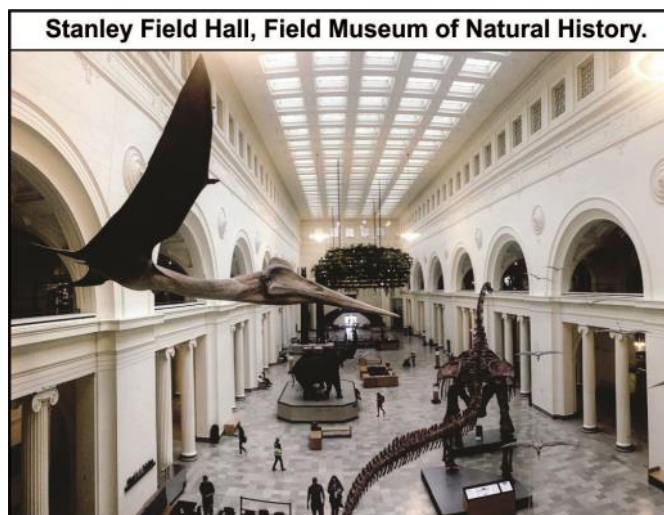
Pia Viglietti, Field Museum of Natural History



It was a frosty, zero degree (Fahrenheit!) afternoon when I landed at O'Hare International airport over six months ago, but it did not take long to warm up to the city of Chicago, and the people who have made me feel right at home in the Field Museum's Integrative Research Centre.

Ken Angielczyk (Associate Curator of Paleomammology) and Brandon Peacock (now at Idaho Museum of Natural History) got me right to work as a scientific consultant on exhibitions development. Evolving Planet is a very popular exhibit with the public, which now leads visitors to Sue the T-rex's new exhibit hall on the second floor. However, it requires some updates to its Permian and Triassic sections relating to the end-Permian extinction and the rise of dinosaurs, which should be completed by the end of October. Ken and I have also begun work on our quantitative investigation of the Karoo Basin's Permo-Triassic extinction event and assemblage zones. In collaboration with Roger Benson and Peter Roopnarine, we are using stratigraphic and collections data that I revised during my PhD to test diversity and origination trends; and food web structure leading up to and immediately after this major biotic crisis. We are also working with an intern, Brady Davis, to statistically recover the Karoo assemblage zone framework.

In May, I was invited as a guest to the Field Museum's Women in Science Board (FMWIS) annual luncheon. Founded in 2013, the FMWIS has become a flourishing and inclusive organisation that provides many opportuni-



ties for women to engage in science and support women at every step of their STEM careers. Recently, they acquired funds for one postdoctoral fellowship that I am the first recipient of. It was a great opportunity to meet the FMWIS members, and those who made my postdoctoral fellowship possible.

In the final week of May, the annual Society for the Preservation of Natural History Collections (SPNHC) was held in Chicago, and Iziko Museum employees Zaituna Skosan (Karoo collections manager), Sibusiso Mtungata (Iziko fossil preparator), and Wendy Taylor



At the Field and in the field.

Pia Viglietti, Field Museum of Natural History



(Honorary Research Associate at University of Cape Town) attended the conference thanks to funding from the Centre for Excellence in Palaeoscience. They also visited the Field Museum to learn and exchange fossil preparation and collections knowledge with Chief Preparator of Fossil Vertebrates – Akiko Shinya. During the same week Zaituna and Sibusiso gave a lunchtime talk about their 15 years of experience planning collecting trips, excavating fossils and preparing them for public display and scientific study. It was wonderful to have them around, and home felt a little closer that week.

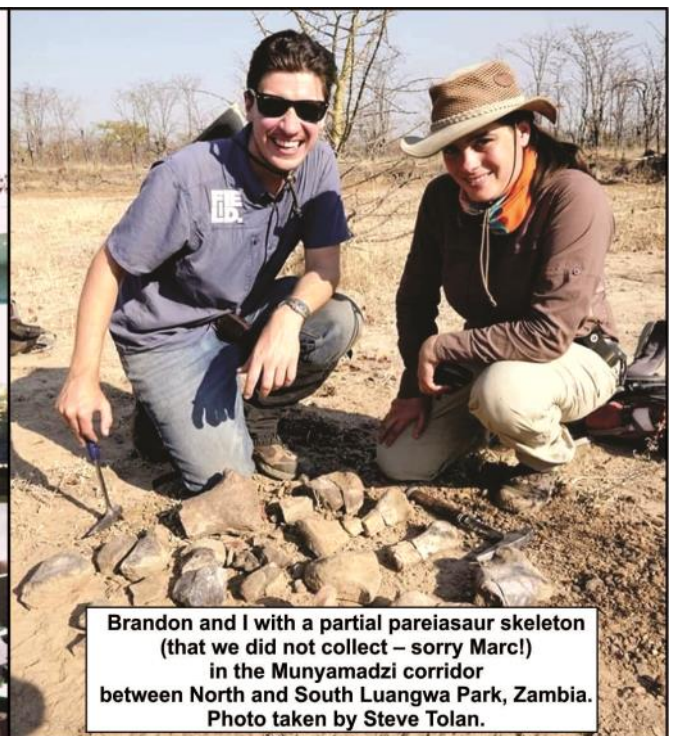
At the end of June and for most of July I was very excited to take part in fieldwork in Zambia's Luangwa Basin

(see Steve Tolan's story for more information). While it was unfortunate to not be able to get to South Africa this year and join my dearly missed colleagues on our fieldwork collaborations, I am planning some research trips for 2020, so watch this space...I'll be back!

I would finally like to end off my thanking Ken Angielczyk and the Women in Science Board for this amazing opportunity to work at the Field Museum and collaborate on some exciting research.



Zaituna and Sibusiso meeting Sue the T-rex in her new exhibit hall at the Field Museum.



Brandon and I with a partial pareiasaur skeleton (that we did not collect – sorry Marc!) in the Munyamadzi corridor between North and South Luangwa Park, Zambia. Photo taken by Steve Tolan.

The Sophumelela Youth Development Programme

Sandiso Mnguni, ESI



The Sophumelela Youth Development Programme (SYDP) is a non-profit organization that was constitutionally registered under the Department of Social Development: Non-Profit Organization sector on the 24/11/2017, with a certificate reference number: 199-362 NPO, with ESI PhD candidate Sandiso Mnguni serving as the programme's Deputy Chair.

The organisation, in a nutshell aims to: (a) uplift learners and students, (b) bridge the gap between academics (learners/students) and the society, and (c) eradicate socio-economic issues through motivating, mentoring, monitoring, equipping with life skills and providing career guidance to the needy learners and students who come from disadvantaged backgrounds.

The organization is currently working with Khutliso Daniels Secondary School, Extension 4 Grahamstown's township. We chose to focus on uplifting this school because it was listed as one of the underperforming

schools in Grahamstown and the Eastern Cape District in 2016.

In 2018, SYDP committed in working with the school in fulfilling all the above-mentioned aims. This involves frequent visits to the school and recruiting members of the community to partake in the initiative. The monthly contributions of the founding members have ensured that work gets done.

Motivating, monitoring and equipping the learners with life skills and guidance is continuously done by founding members of the SYDP; largely by the chairperson who is responsible for much of SYDP's existence, and occasionally by a member of the community - just to bring a new and fresh dimension.

In tackling socio-economic issues, SYDP committed to supply matric learners with sanitary essentials on Valentine's Day on an annual basis. Learners exchange these



Learners from Khutliso Daniels High School, Grahamstown, after Love Day, with SYDP members.



Learners from Khutliso Daniels High School after a Motivation session, with SYDP members

The Sophumelela Youth Development Programme

Sandiso Mnguni, ESI



as gifts, to show love to one another.

The other commitment in our programme of action is the Mini Career Expo Exhibition that usually takes place around March or April on an annual basis. This usually requires a lot of financial support!

Other forms of engagement include exam prayers and assisting with online applications.

In 2019, the Community Engagement from Rhodes University has greatly assisted the SYDP in providing tutors that volunteered to assist learners from Khutliso Daniels on a regular basis.

The SYDP's efforts have already yielded fantastic results as in its first year, the overall matric pass rate effectively more than doubled from 25% in 2017 to 58% in 2018 at Khutliso Daniels Secondary School. Needless to say, SYDP aims to build on this going forward and look to

improve the matric pass rate even further. Once that has been achieved, the challenge will be to then maintain those high standards.

The SYDP welcomes any contribution, suggestions and advice given by any member of the community! To do more, the SYDP would also greatly appreciate any financial support from any funding source! Remember, it takes a village to raise a child, and social insects paved the way for this characteristic!

Yours sincerely, Sandiso Mnguni

SYDP Deputy Chairperson.

msandiso@gmail.com.



Learners from Khutliso Daniels High School during Motivation, with SYDP members, SLA and L.O teacher



Learners from Khutliso Daniels High School after Mini Career Expo, with SYDP members and invited speakers

Joburg Palaeo-Outreach

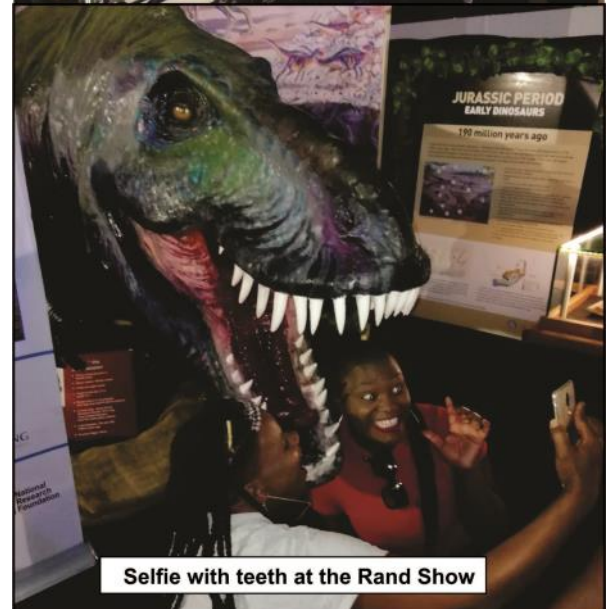
Ian McKay, ESI



2019 has been fantastically busy for ESI outreach, and through working with enthusiastic partners like the Albany Museum, Origins Centre and Centre of Excellence in Palaeosciences we have reached hundreds of thousands of people. Our main activities have been exhibitions like Sci-Fest Africa, The Rand Show, Wits' Yebo-Gogga, National Science Week and Comic Con Africa at Gallagher Estate. Comic Con turned out to be a lot of fun as we discussed the intricacies of the Palaeosciences with people in brightly coloured costumes ranging from Harry Potter through to the Hulk. We will soon be exhibiting at the video gaming exhibition rAge at the Ticketpro Dome in Northgate. We also have hands-on school curriculum-related workshops devoted to South African Palaeontology and Human Evolution! We are working hard, but we are sure that we can improve our programme and would welcome suggestions from the palaeosciences community on how we can better represent you and your research in better and more innovative ways. Also, you will be most welcome if there is anyone out there who would like to design an exhibit or join us at any activity.



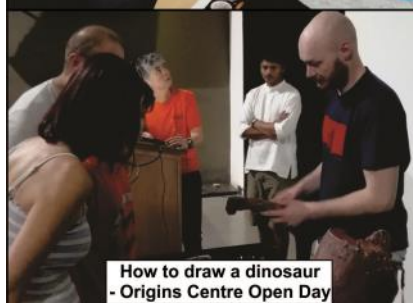
The story of technology at the Rand Show



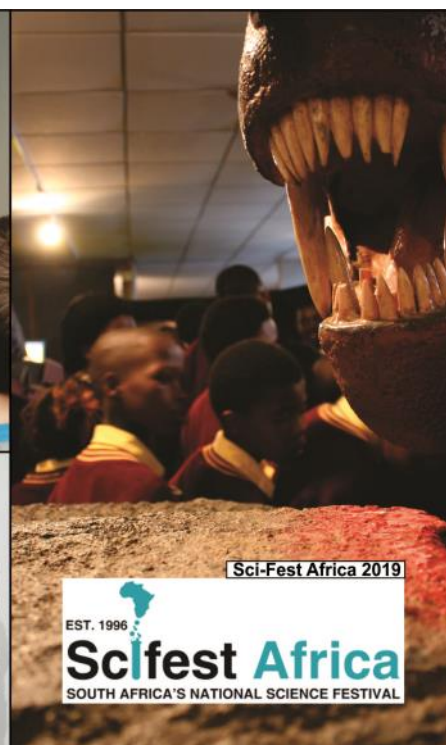
Selfie with teeth at the Rand Show



Palynomorphs are really cool
- Origins Centre Open Day



How to draw a dinosaur
- Origins Centre Open Day



Sci-Fest Africa 2019

EST. 1996
Scifest Africa
SOUTH AFRICA'S NATIONAL SCIENCE FESTIVAL

Joburg Palaeo-Outreach

Ian McKay, ESI



“Earth Day” 22 April 2019

John Anderson



‘Earth Day’, 22 April 2019

Our Earth as seen from the Moon, 21 July 1969

‘That’s one small step for man, one giant leap for mankind’,

—Neil Armstrong on taking his first steps on the moon.

2019 is the 50th anniversary of that seminal event and those iconic words. It’s now time to take another *‘giant leap’* forward—for humankind and for all other species of life that share our world!

‘The Earth was small, light blue, and so touchingly alone, our home that must be defended like a holy relic.’

—Alekssei Leonov (USSR), in *‘The Home Planet’* (1988), reflecting on the occasion of the first space walk.

Yes, Earth is surely the most prodigiously beautiful and biodiverse of all possible worlds! We’re certainly not

aware of another. Consider those photos taken of the *‘Earthrise as seen from the moon’* from Apollo II while in lunar orbit the day before that first landing and moon-walk. Witness our exquisite fragile Earth with its light-blue expanse of oceans, and the ever-shifting cloud-scape texturing its encircling atmospheric skin.

Find your way down through that atmosphere and venture into the biosphere: teaming with life of the most startling diversity and clothed in colour touching every nuance of the spectrum—think of the insects (from beetles to butterflies) or the birds (from toucans to parrots) or the flowering plants. Then there’s the endless range of spectacular landscapes, from the polar icecaps to the folded mountain belts and the tree-clad Pacific islands to the tropical jungles! You can fill libraries of books brimming with photos of the most breathtaking corners of the Earth—its life and landscape!

‘Earth Day’, 22 April 2020

Next year, 2020, is the 50th anniversary of Earth Day!

“Earth Day” 22 April 2019

John Anderson



Earth Day offers us the ideal symbolic moment to make a global commitment to the most profound change, to a seemingly inconceivable shift. Literally towards *‘achieving the impossible’*! Talking from within the scientific fraternity, and having been born into that fraternity, we are on the brink of no return, the very edge of the precipice.

Let us, for instance, call urgently on the school-kids of the world to expand on their climate-change brief of 2019. We adults have failed them inexcusably! Let them, accessing the rapidly expanding network of science and knowledge, call for a total revamp of how we humans, their elders, currently ‘mis-govern’ the world. Let us call, too, on the school-kids of 50 years hence to express, by proxy, their wishes.

And let us bring the rest of life into the ‘democracy’—how would the chimps and gorillas, elephants, big cats and whales vote were they given a voice? How would the birds and the beetles vote? How would the trees and the grasses vote? Why do we stand so arrogantly alone?

Nationalism, Capitalism, Democracy, the military, The Rule of Law, are recent inventions. Mostly of the past few hundred years. If they worked better in today’s world, we’d not be teetering on the edge. They’re driving us and the rest of life on Earth over into the abyss of extinction. These un-tuned pillars of governance—think of the Parthenon with its eroded tottering pillars—are clearly impotent in the face of our unprecedented global challenges!

‘Earth Day’, 22 April 2019

This year, 2019, is the 50th anniversary of the UNESCO conference in San Francisco when the proposal was made to set aside a particular day, annually, to honour the Earth and the concept of peace—22 April.

‘20-20 vision’

In a specific sense, the term refers to perfect vision, sharpness of vision as in seeing numbers of different sizes in testing for one’s driving license. In a more inclusive sense, it takes in contrast, tracking moving objects, depth perception, speed of focus, colour vision. Towards Earth Day 2020, let us expand on the metaphor. Let us picture ourselves on the moon looking down at the Earth—with 20-20 vision, in the most holistic objective sense. We can see both across space and time—back to around 300,000 years ago when our species, *Homo sapiens*, arose, as if it were yesterday; back to around

10,000 years ago and the Agricultural Revolution; back to 1769 and the Industrial Revolution.

With our super 20-20 vision, how do we perceive it all? We see an exponential explosion in the human population reaching over 7,2 billion today, and we see our uncomprehending ‘footprint’ spreading to every corner of the planet, land and sea. We see the rest of life dwindling rapidly in abundance and diversity, in the grip of extinction. We see the Sixth Global Extinction in startling clarity!

Global census of Biodiversity

‘And how many species of organisms are there on earth? We don’t know, not even to the nearest order of magnitude. The number could be close to 10 million or as high as 100 million.’

—Edward O. Wilson, *‘The diversity of life’* (1992)

‘... in 2015 the number of species known to science passed two million. ... It is entirely possible that specialists have discovered only 20 percent, or fewer, of Earth’s biodiversity ...’

—Edward O. Wilson, *‘Half Earth’* (2016)

The 2015 census of the most familiar organisms includes around 5,500 species of mammals, 10,000 of birds, 32,000 of fishes and 270,000 of flowering plants. Even amongst these so richly colourful, best-loved groups, there remains much beyond our knowledge: some 2-3 new species of bird are discovered annually, and estimates put the number of fishes and flowering plants still unknown, for instance, at as many as 10,000 and 80,000 species respectively (Wilson 2016). The tally of insect species, the most diverse group of organisms known, amounted to 751,000 in 1992, with estimates ranging from 10-30 million still undiscovered. Our Earth’s biosphere is indeed profoundly biodiverse; and we are but one species amongst that mostly still-unknown richness. We are not alone!

The 6th Extinction

The dinosaurs, and over 90% of all other life, died out when an asteroid the size of downtown New York slammed into the Earth some 66 million years ago. We know that cataclysmic event as the **5th Extinction**. Imagine a similar-sized asteroid slamming into the Earth today. *‘We humans are that asteroid. Humankind is rapidly bringing about the extinction of life worldwide, irreversibly destroying the natural beauty and diversity of our*

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Earth, impotently converting our planet into a sad, sullen slum. We are forging the Sixth Global Extinction.’—John M. Anderson, *‘Towards Gondwana Alive’* (1999). That was written 20 years ago—and things have got a whole lot worse since.

How fast are we driving species to extinction?—asks Edward Wilson in *‘Half Earth’*. Current science suggests an astonishing figure: close to a *‘thousand times higher than that before the spread of humanity.’* And all this due to human activity: deforestation and other habitat destruction, the spread of invasive species, hunting, poaching, climate change. It’s not only the larger mammals (elephants, rhinos) or birds (everyone knows of the Dodo) at risk, it’s all groups of organism down through the pecking order. We humans are the most invasive species ever.

‘In Half-Earth I propose that only by committing half the planet’s surface to nature can we hope to save the immensity of life forms that compose it. ... I am convinced that only by setting half the planet in reserve , or more, can we save the liv-

ing part of the environment and achieve the stabilization required for our own survival.’

We’d better heed Wilson’s words. He is surely the Charles Darwin of this past century. E.O., as he likes to be called, is the world’s ant expert, and a field naturalist par excellence. In his vast repertoire of research papers and books (all literary masterpieces), he gave us the words biodiversity, biophilia, island-biogeography and many besides. We ignore the very best of science at our peril. There is still time.



Journey into the heart of my Discipline

Chris Harris, ESI



I was in Belgium recently on what you might call a working holiday. I had the benefit of visiting palaeontology labs in Brussels and Liege, and went on a field trip to the southern part of the country. I was soon impressed by many aspects of what I saw, and feel that it is worth sharing a few of them.

The natural history museum of Brussels is a real attraction in the city. I visited a number of times. On the first Wednesday of every month the museum is free to enter. Hundreds of people descended on the museum, with queues stretching out into the street. Inside, it was clear to me why the museum was so popular among residents of the city and tourists alike. Dozens of mounted *Iguanodon* skeletons greet one on entry into the fossil gallery, leading the way into a vibrant and interactive display. And one can't forget the large mounted theropod (*Allosaurus*) skeleton, nicknamed 'Arkane', that was brought in recently. The library is open to the public for an annual membership fee of 2€, with free access to scanners and their impressive collection of periodicals. I had emailed their 'Bibteam' the day before and a pile of ten journals awaited my arrival at 9am.

I had a tour of the labs behind the museum from Dr. Bernard Mottequin, a brachiopod expert. He impressed on me the effectiveness of old techniques such as camera lucida drawings and the coating of fossils with a vapour of aluminium oxide to enhance photographic contrast. He introduced me to Aldo, the fossil display manager, who was responsible for the difficulty I'd had in distinguishing the casts from the real fossils on display. This man has an unbelievable skill in bringing ancient bones to life.

I was brought into the field by Dr. Julien Denayer and Dr. Cyrille Prestianni, both from the palaeontology lab at Liège University (the latter is a co-supervisor on my mas-

ter's project). We went to the southern part of the country to look at some sections of the Famennian (Upper Devonian), the Belgian age equivalent of the South Africa Witpoort Formation in the Cape Fold Belt. We visited old quarries, including the famous tetrapod bearing locality of Strud, looked at a number of fascinating lithological sections, and went down into some old abandoned iron workings, escaping for a few minutes the heatwaves of the Belgian summer. Wherever we see these artisanal iron mines, Julien told me, we know that we are in the lower Famennian. The thin iron rich strata are facies controlled and restricted to a few laterally extensive horizons of that age. Mapping out these mines can give one a good idea of the regional stratigraphy.

The Famennian strata of Belgium have been divided up into several Formations, which preserve a record of an evolving shoreline, much like the Witpoort Formation back home. The ages of each unit are well constrained by biostratigraphy. Conodonts and spores provide detailed correlations and give precise ages to outcrops. Ostracodal micrites, brachiopod obrution beds, tempestites, evaporitic dolomites, and sandy channels with plants indicate the changing environments. The rock record follows a repetitive cyclicity throughout the 10–15 million-year Famennian Stage. These cycles, Julien tells me, are controlled by global sea level shifts.

Global eustacy, or sea level shifts, are influenced by a number of factors, the most important of which is climate. When Earth goes through a cold period, a lot of water is stored on continents in the form of ice causing the sea level to drop. During hot periods that ice melts, causing sea level to rise. As the sea retreats and advances, continental shorelines can migrate back and forth by hundreds of kilometers. Speaking with Julien and Cyrille over a glass of cold Belgian beer (some of

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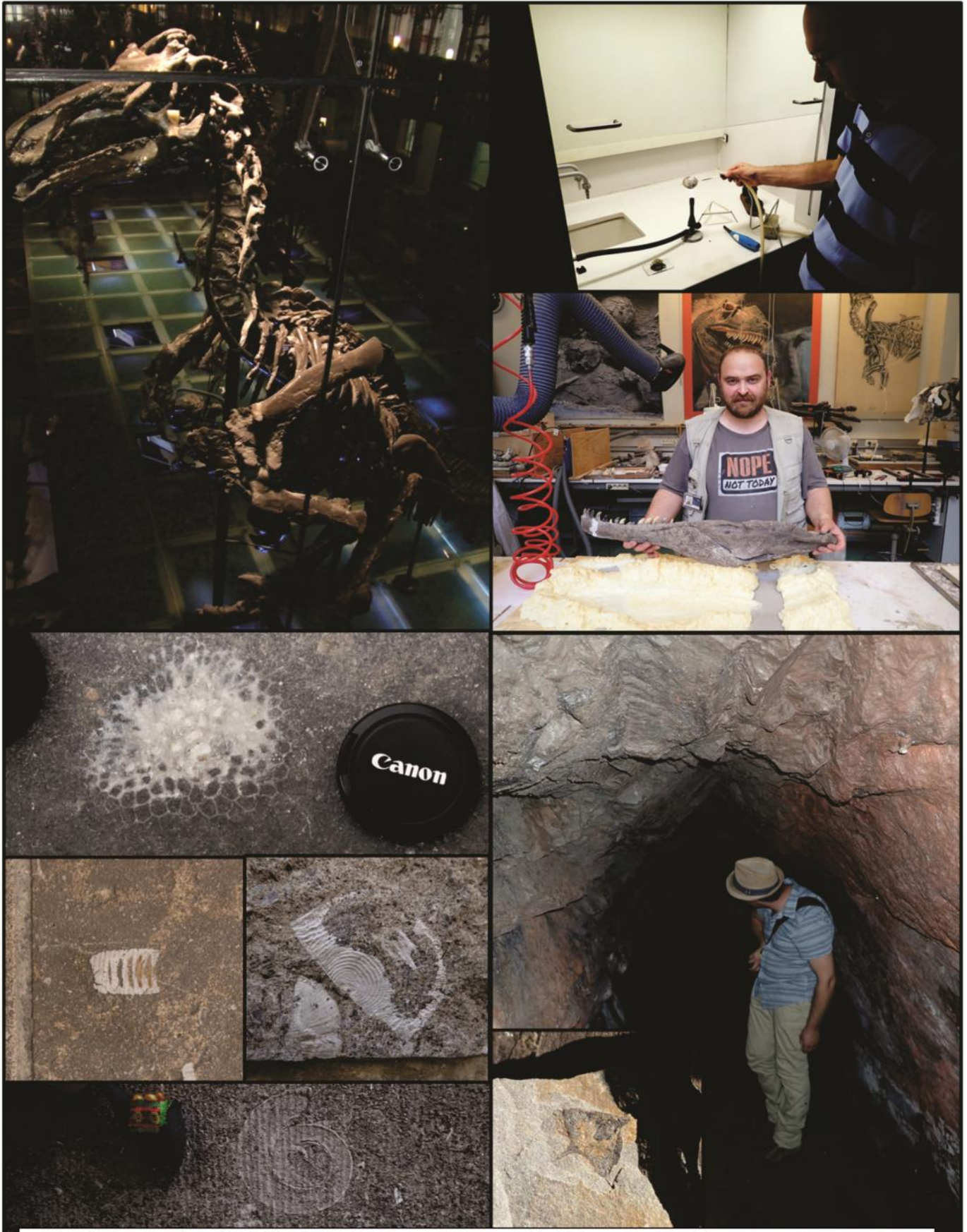
the best in the world), I wondered whether the detailed sea-level shifts that have been recognized in Belgium, have been recorded and correlated in other places. Indeed they have, and since they are global in nature, these events should also be observable in the Witpoort Formation if one had the right eyes.

When I visited the lab in Liege, I remarked to Julien that I had seen a wonderful array of marine fossils in the pavements and walls of Brussels. He told me that the buildings of Brussels were made of Upper Tournasian (Carboniferous) limestones from Tournai, near the French/Belgian border. Most people are not aware of them, he said, and the fossils are usually regarded as imperfections in the building stone. In Liege there is a similar style of architecture; Julien is busy developing an 'App' which will identify well preserved fossils around the city and provide facts and stories about them, giving the public an insight into the ancient world that they stroll over in their day-to-day lives.

I came away from Belgium with a new perspective on why we do palaeontology. I have seen how on so many levels this science contributes to the well-being of society. What I experienced there in Belgium was the heart of my discipline, where the necessary skills have been practiced for generations. Having the benefit of insights from the 'old world', and of working on completely new material in South Africa puts me and my colleagues in a unique position, and I hope that we make the most of it.

Journey into the heart of my Discipline

Chris Harris, ESI



(clockwise from top left): The Iguanodon welcoming party at the natural history museum in Brussels;
Dr. Bernard Mottequin demonstrates techniques for scientific photography;
The talented display manager, Aldo; Dr. Julien Denayer leads the way into an abandoned iron works;
A late Devonian fossil seed about 1cm in diameter;
The fossils of the Brussels pavement (Upper Tournasian gastropod, coral, crinoid and brachiopod).

Continental Ichnologists Unite!

Lara Sciscio, University of Johannesburg



In 2017, the 2nd ICCI (International Conference of Continental Ichnology) was held in South Africa (Cape Town) and hosted by Dr Emese Bordy (UCT). Two years later, the continental ichnology community met up again for our 3rd conference in Halle (Saale), Germany. Through the generous support of Palaeontological Scientific Trust (PAST) and Society for Sedimentary Geology (SEPM) I made a hat-trick of ICCI attendance, and got to network with old and new friends once more.

The ICCI was hosted at the Martin-Luther-University Halle-Wittenberg which is one of the oldest universities in Germany and the largest university in Saxony-Anhalt. The conference saw a multitude of excellent presentations and discussions relating to several aspects of continental ichnology. A global representation of speakers attended the 3rd ICCI from Japan, S. Korea, India, U.S.A., Canada to Argentina. The keynotes by Peter Falkingham, discussing track formation mechanisms through experimental study on guineafowl and computer simulation; and that of John A. Nyakatura, whose team reconstructed locomotor behaviour of a fossil and created a fossil-inspired walking machine (OroBOT), were incredibly interesting.

The conference also visited the Natural Sciences Collec-

tions (ZNS) of the Martin Luther University Halle-Wittenberg which displays a unique and large natural history collection going back some 230 years, as well as exhibiting the Eocene Geiseltal-Collection with its soft tissue preservation. Finally, the 3rd ICCI ended with a visit to the State Museum of Prehistory which exhibits the famous Himmelsscheibe/ Sky Disc. Field trips to several Early Permian - Late Triassic localities in northern Bavaria followed but, unfortunately, rainy weather meant outdoor trekking and viewing was not ideal.

Many thanks to the 3rd ICCI organising team, headed by Dr O. Wings, for another successful continental ichnology conference.

1. Sciscio, L., Bordy, E.M., & Head, H. (2019). Swimming and related traces of a Late Triassic freshwater community from the lower Elliot Formation, South Africa. *Hallesches Jahrbuch fur Geowissenschaften, Beiheft 46. Proceedings of the 3rd International Conference of Continental Ichnology (ICCI), Halle, Germany*, pp. 88. E-ISSN:2196-3622.
2. Sciscio, L., Bordy, E.M., Abrahams, M., & Reid, M. (2019). Re-evaluating the wealth of the Late Triassic Phuthiatsana ichnosite, Maseru District, Lesotho. *Hallesches Jahrbuch fur Geowissenschaften, Beiheft 46. Proceedings of the 3rd International Conference of Continental Ichnology (ICCI), Halle, Germany*, pp. 89. E-ISSN:2196-3622.





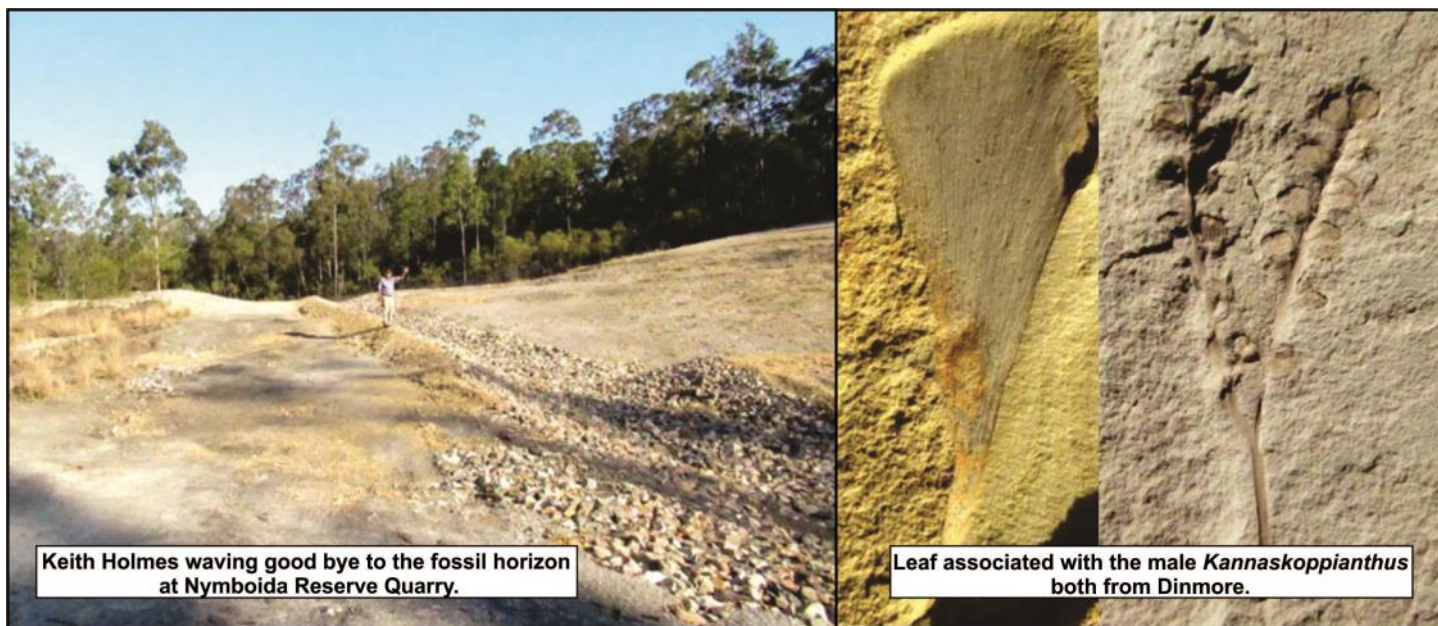
John Anderson and I are busy with our next volume on the mega project of completing the description of the Molteno Flora. Little did I think in 1968 that 50 years on I would still be so involved in fossils and trying to beat the clock to the finish line (why does it always seem to recede further into the distance?).

Kannaskoppia is a female fruit, known so far only from the Molteno and unique in Gondwana as the only fruit attached to a stem with leaves attached. The male *Kannaskoppianthus* is also known attached to a stem with leaves. We described these in 2003 and now embark on a description of the numerous species of leaves associated with these fertile structures. These raise interesting questions on speciation and our palaeodeme approach to solving them.

Such leaves are known from elsewhere in Gondwana.

In New Zealand, Retallack called them *Ginkgophytopsis* and Herbst gave the leaves a new name (*Rochipteris*) in South America. Holmes collected numerous species from Nymboida, Australia and these have been published (bar one very dissected leaf found later). I have identified the first male in Australia from a locality at Ipswich and Wivenhoe collected by the Three Fossil Musketeers (Rob, Alan and Lance). Recently Bomfleur alerted us to a fertile specimen described by Solms Laubach in 1899 from Chile (sadly Herbst is no longer alive to chase that up).

On another sad note we report the end of an era at the Nymboida quarries which have been rehabilitated and the fossil horizons now hidden. Keith Holmes and his family have collected Triassic plants from there since the early 1960's.



Keeping up with the Palaeobotanists!

Compiled by Moteng Moseri



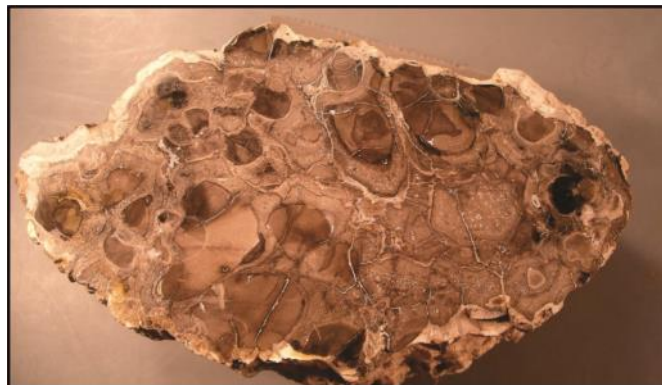
Marion Bamford

In August Marion took two technicians from the ESI to Mozambique to help set up a fossil preparation facility in Chitengo Camp, Gorongosa National Park for the Palaeo-Primate-Project-Gorongosa, led by Professors Susana Carvalho and Rene Bobe (Oxford University). Gerry Germishuizen and Pepson “Pepsi” Mukanela spent one and three weeks there respectively and set up the compressor to prepare fossils. Pepsi did an amazing job of reconstructing some Miocene teeth and preparing most of the fossils that the team has collected to date. The baboons in the camp were very inquisitive and tried to steal the jacketed fossils that had been put in the sun to dry, so Pepsi borrowed a baboon trap to house the fossils and keep the baboons out – rather than in.

Over the last few years Heidi Holmes-Anderson, Barbara Barbacka, Keith Holmes, John Anderson and Marion Bamford have been collating and revising the taxonomy of *Dicroidium* from the Molteno of South Africa and other Triassic Gondwana deposits, and three papers have now been published in *Alcheringa*:

Anderson, H.M., Barbacka, M., Bamford, M.K., Holmes, W.B.K., Anderson, J.M., 2019. *Dicroidium* (foliage) and affiliated wood Part 3 of a reassessment of Gondwana Triassic plant genera and a reclassification of some previously attributed, *Alcheringa: An Australasian Journal of Palaeontology*, DOI: 10.1080/03115518.2019.1622779

Anderson, H.M., Barbacka, M., Bamford, M.K., Holmes, W.B.K., Anderson, J.M., 2019. *Pteruchus* (microsporophyll): part 2 of a reassessment of Gondwana Triassic plant genera and a reclassification of some previously attributed, *Alcheringa: An Australasian Journal of Palaeontology*, DOI: 10.1080/03115518.2019.1617348



Polished cross section of *Rhexoxylon* sp.
The wood that is associated with *Dicroidium* spp.



Excavation near Mhenger Hill, Gorongosa National Park.



Pepsi preparing fossils in the background with jacketed drying inside a baboon-proof animal trap.

Keeping up with the Palaeobotanists!

Compiled by Moteng Moseri



Irene Esteban

Hello palaeos! During these past three months some exciting stuff has taken place on my side, and this is what has been happening:

In May, the principal investigators (Erich Fisher, Hayley Cawthra, Justin Pargeter and myself) of the P5 Project at Pondoland (Eastern Cape, South Africa) restarted the excavations at the Waterfall Bluff rockshelter. Ten students from South Africa, Lesotho and Zimbabwe joined us this year on what was a very productive and fun field season. Over the five weeks we spent in the field, we documented new deposits with well-preserved shellfish, bone, macroleaves and charcoal; and we collected several samples to continue our micromorphological and OSL and 14 Carbon dating study.

The first two publications of this new phase of the P5 project are currently under review in Quaternary Research. In Fisher *et al*, “*Coastal occupation and foraging during the Last Glacial Maximum and Early Holocene at Waterfall Bluff, eastern Pondoland, South Africa*” we report the stratigraphy, chronology and archaeological material recovered in the 2015 and 2016 excavations at Waterfall Bluff. I am the leading author of the palaeoenvironmental paper “*Palaeoenvironments of hunter-gatherers from MIS 3 to the Holocene in coastal Pondoland (South Africa): a biochemical and palaeobotanical approach*”, in which we present the first multiproxy study from South Africa that combines pollen, phytoliths, charcoal, macro-plant remains and leaf wax isotopes from the same archaeological deposits.



Sampling at Witberg 1, Tswalu Kalahari Reserve (Northern Cape)

Keeping up with the Palaeobotanists!

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Sandra Lennox

Sandra J Lennox (PhD 2016, University of the Witwatersrand) <http://orcid.org/0000-0003-0078-3685> is an early career researcher who specializes in anthracology. During her post-doctoral fellowship woody taxa were identified from charcoal previously excavated at three Middle Stone Age sites in KwaZulu-Natal and Free State. This enables a comparison of plants from sea level, low altitude/inland and from higher altitude/further inland on the eastern side in the summer rainfall region of South Africa. During 2019, two papers were published, "*The identification of Cryptocarya spp., Lauraceae in archaeological charcoal*" and "*A charcoal study from the Middle Stone Age, 77,000 to 65,000 years ago, at Sibudu, KwaZulu-Natal*" and research was presented at INQUA (International Quaternary Association) in Dublin and Anthracology 2019, at the University of Liverpool. Having relocated to Belfast, Northern Ireland a home-base in Pretoria enables follow up research.



Frank H. Neumann

Aeropalynology at ESI

ESI now contributes to the National Pollen Monitoring Program, initiated by Prof. Jonny Peter and Dr Dilys Berman/UCT. This project is meant to help pollen allergy sufferers, medical doctors and pharmaceutical companies in South Africa in light of increasing pollen allergies. There is a strong link between increasing temperatures and shifts in the flowering season and the total amount of pollen produced. Seven major cities now have spore traps, two spore traps were installed on the roof of Richard Ward building on Wits Campus and on the roof of the CSIR building in Pretoria. The scientific aeropalynology team at the ESI consists of Marion Bamford, Frank H. Neumann, Kevwe Eweto, Moteng Moseri, Angela Effiom, and Nikiwe Ndlovu. Postdoc Linus Ajikah, funded by the

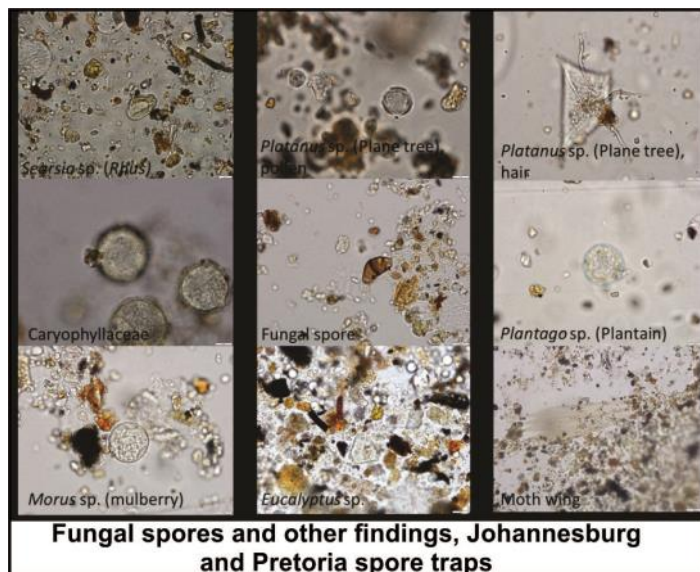


Spore trap on the roof of Richard Ward building, next to ESI, Wits campus.

Wits School of Governance, will join us in 2020. For more information, please visit the website: www.pollencount.co.za.

Keeping up with the Palaeobotanists!

Compiled by Moteng Moseri



Frank H. Neumann

Since May 2018, I am employed as Senior researcher at the Evolutionary Studies Institute, currently working on several Quaternary and Neogene profiles from southern Africa, Israel and Central Europe. In January 2019, I received a NRF C1 rating. Here are some of my projects in the Quaternary:

In the Negev desert (Israel), I am currently involved in a project investigating the Late Middle Paleolithic site of Farah II (cooperation partners: Liora Kolska Horwitz, Hebrew University of Jerusalem; Mae Goder-Goldberger, Ben Gurion University of the Negev; Elisabetta Boaretto, Weizmann Institute of Science; and Louis Scott, University of the Free State (UFS)). Here, the focus is on environmental and cultural contexts at the transition to the Upper Paleolithic in the southern Levant. The pollen content reflects the steppe/desert environment with tamarisks, chenopods, Asteraceae but also some influence by Mediterranean trees (far distance transported pollen of oaks, pines and olives). A paper elaborating on these details will be submitted soon.

Another study in the Negev, at the mountaintop site of Nahal Roded 110 near Eilat, revealed a Late Pre-Pottery

Neolithic B (late 8th millennium BC) ritual site (Birkenfeld et al. 2019). Palaeoenvironmental data indicate that similar arid conditions prevailed as today (cooperation partners: Michal Birkenfeld, Israel Antiquities Authority; Uzi Avner, Dead Sea-Arava Science Center; Louis Scott, UFS). A new paper on this project will be submitted soon.

The RAIN 2 project, principal investigators Enno Schefuss & Matthias Zabel from MARUM, University of Bremen in Germany, deals with interdisciplinary investigations of climate evolution and its dynamics in southern Africa during the Late Quaternary. A marine core (GeoB 20615) from Maputo Bay, offshore of Mozambique, which was studied palynologically by myself, reveals vegetation fluctuations during the last c. 16,000 years. Cooperation partners are, next to Enno Schefuss and Matthias Zabel; Charlotte Miller; Lydie Dupont and Annette Hahn from MARUM; Hayley Cawthra, Council for Geosciences in Cape Town; Jemma Finch and Andrew Green/UKZN, and Louis Scott, UFS.

Waterfall Bluff, located on South Africa's Pondoland coastline, is a recently excavated archaeological site with deposits spanning the Marine Oxygen Isotope Stage 3, the Last Glacial Maximum and the last glacial/interglacial transition. This multi-proxy study in the frame of the P5 project combines pollen (investigated by me), phytoliths, charcoal, macro botanical remains, and plant wax isotopes. Cooperation partners include Erich Fisher, Arizona State University; Irene Esteban and Marion Bamford, ESI; Justin Pargeter, Emory University USA; Enno Schefuss, Matthias Zabel, Charlotte Miller, MARUM; Hayley Cawthra, Council for Geosciences in Cape Town. Two papers are currently under review.

In 2018 a collaboration started with climate modeller Francois Engelbrecht, then CSIR/Pretoria, who has

Keeping up with the Palaeobotanists!

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since January 2019 moved to the Global Change Institute at Wits University. He conducted the first dynamic downscaling of Last Glacial Maximum (LGM) climate over southern Africa using a regional climate model and, collaborating with Curtis W. Marean, Arizona State University; Richard Cowling, Nelson Mandela University PE; Louis Scott, UFS, and myself and a few others, tested it against palaeo-proxy data. Currently a paper focusing on that topic is in press.

Van der Merwe, J., Dedekind, Z., Difford, M., Neumann, F.H., Scott, L., O'Neal, D., Marean, C., Shook, E. in press. Downscaling Last Glacial Maximum climate over southern Africa. *Quaternary Science Reviews*.

The following peer-reviewed articles and book chapters were published or accepted in 2019:

Book chapter

Neumann F.H. in press. Kapitel 2.5 Die holozäne Vegetations und Klimageschichte Palästinas auf Grundlage palynologischer Studien.

Peer-reviewed articles

Birkenfeld, M., Kolska Horwitz, L., Bar-Yosef Mayer, D.E., Cummings, L.S., Goldgeier, H., Krakovsky, M., Natalio, F., Nebenhaus, K., Neumann, F., Porat, N., Scott, L., Simmons, T., Yashuv, T., Avner, U. 2019. Investigations at Naḥal Roded 110 - a Late Neolithic Ritual Site in the Southern Negev. *Antiquity* 93(367), DOI 10.15184/aqy.2019.6

Grímsson, F., Graham, S.A., Coiro, M., Jacobs, B.F., Xafis, A., Neumann, F.H., Scott, L., Sakala, J., Currano, E.D., Zetter, R. 2019. Origin and divergence of Afro-Indian Picrodendraceae: linking pollen morphology, dispersal modes, fossil records, molecular dating and paleogeography, *Grana*, 58:4, 227-275

Engelbrecht, F., Thatcher, M., Engelbrecht, C., Cowling, R., Nkoana, R., McGregor, J., Fisher, E., Franklin, J.,

Keeping up with the Palaeobotanists!

Compiled by Moteng Moseri



Angela Effiom, PhD student

Hi, I'm Angela Effiom, a botanist with some experience in palynology. My Master's thesis was on a palynological study across grassland savanna - rainforest biomes in the montane area of Taraba state Nigeria.



I arrived at ESI in March 2019 for my PhD and I'm presently working on the pollen analysis of Holocene sediments from two cores close to Lake St. Lucia, Kwa-Zulu Natal. My project is partly funded by TRACES, another project which is run by Enno Schefuss and Matthias Zabel from MARUM, Bremen, Germany. TRACES specifically deals with interdisciplinary investigations, involving sediment analyses, palynology and geochemistry of the combined effects of climate change and anthropogenic impacts on aquatic and terrestrial ecosystems in eastern South Africa over the last

250 years. However, since the above-mentioned cores cover up to 7000 years, a focus will also be on climatic fluctuations.

During the Holocene and the possible impact of the Iron Age farmers on vegetation since the last 1500 years. I am also involved in the aeropalynological studies carried out in the major cities of South Africa. Myself and other colleagues carry out a weekly count of palynomorphs in the atmosphere of Pretoria and Johannesburg in order to study the seasonal fluctuation in the aeroallergens.

In July, 2019 I was involved in the Wits National Science Slam where I gave presentation on the relevance of Palynology in the present age. My presentation was titled "Wanted, Dead or Alive: Pollen grains, the key to the past, present and future" it was fun educating the grade 9-12 learners that despite its diminutive size, pollen is of great importance to the study of climate change, past environments, allergies, forensics, and even in the study of honey (mellisopalynology).

Keeping up with the Palaeobotanists!

Compiled by Moteng Moseri



Moteng Moseri, Masters student:

My Master's thesis is based on the palynology of Core BH2 from Langebaanweg, north of Cape Town in order to provide a chronologically constrained timing of the evolution of the *fynbos* flora.

Counting pollen for my MSc is keeping me on my toes, but it hasn't prevented me from participating in other amazing projects. I attended the TRAIN-ME summer school in Richard's Bay from the 5th-12th September 2019, courtesy of the University of Greifswald, to learn about coring techniques to extract sediment sequences and sampling of soil, plankton and benthos.

The Evolutionary Studies Institute Palynology team, which I am a member of, has collaborated with Prof. Jonny Peter and Dr Dilys Berman from the University of Cape Town to collect allergenic pollen data for the National Pollen Monitoring Program. This project will assist pharmaceutical companies and medical doctors to treat pollen allergy sufferers and create awareness of pollen allergies. I hope to publish my MSc thesis to contribute to the field of palynology in South Africa, and continue being actively involved in the National Pollen Monitoring Program.



Getting sun-soaked and ready to collect a water sample at Richard's Bay harbour during the TRAIN-ME summer school

Keeping up with the Palaeobotanists!

Compiled by Moteng Moseri



Elysandre Puech, PhD student

I am a French PhD student, pursuing my degree through both the University of Côte d'Azur (Nice, France) and the University of the Witwatersrand (Johannesburg, South Africa). Since my Master's dissertation was a study of the pollen from a peat sample at the Middle Stone Age site, Wonderkrater, I have decided to expand this research by investigating the palaeobotany from Stone Age sites in the Limpopo province. I am currently working on macro-charcoals under the supervision of Professor Marion Bamford (ESI, Witswatersrand) and senior researcher Isabelle Théry-Parisot (CEPAM, CNRS, France).

My PhD focuses on the first charcoal analysis recovered from the Later Stone Age (LSA) sequence of Bushman Rock Shelter (BRS), Limpopo, South Africa. The site preserves one of the rare archives of the Late Pleistocene/Holocene transition in the southern African region, a critical and still poorly understood period, especially in the summer rainfall region of Limpopo. Moreover, the LSA sequence shows a progressive transition from a microlithic industry related to the Robberg to a macrolithic one identified as the Oakhurst industry. The nature and the tempo of this change as well as the definition of the Oakhurst industry within the southern African Holocene Prehistory are still debated. Therefore, the LSA period in this area remains poorly documented regarding human behaviours and adaptations to the climatic change associated with this critical period. The abundant and well-preserved charcoal remains of the BRS site offer a unique opportunity to document the past vegetation and climate in the vicinity of the site as well as fuel-wood management strategies by human groups occupying the shelter during the LSA. Charcoal remains, de-

rived from incomplete wood combustion, largely contribute to the deposit accumulation at the site and are considered to stem mostly if not exclusively from anthropogenic activity. Indeed, the use of fire was an inextricable part of the daily life of past hunter-gatherer groups e.g. for cooking, heating, lithic raw material processing, plant-based medicine or personal ornament processing/making. On the one hand, (1) the study of charcoals scattered in the well stratified and well dated LSA layers will allow me to reconstruct the past woody vegetation and past environment of the surroundings of the site. On the other hand, (2) particular attention will be paid to the charcoal remains recovered from the LSA combustion structures and their organisation in relationship with the other archaeological remains to understand the functions of the different hearths recognized at the site. Both lines of study, combined together with results of other botanical proxies from the ongoing multidisciplinary project of BRS, (3) will allow me to interpret the nature of plant-human interactions, as well as the implications on resource exploitation and subsistence strategies during the LSA at the site. Finally, in order to carry out this PhD project, (4) new modern wood will be sampled and then charred to complement the reference charcoal collection currently available for the region.

Sandiso's Exploits!

Sandiso Mnguni, ESI



This last year has been an incredibly busy but fulfilling one. I am a PhD candidate in Palaeontology, based at the Evolutionary Studies Institute (ESI) at the University of the Witwatersrand. My research mainly focuses on using fossil Coleoptera to reconstruct the Cretaceous paleoecology and palaeoenvironment of the Orapa Diamond Mine in Botswana.

So far, I've had to go through 20 shelving units, each containing 356 trays. In total, this amounts to 6800 fossiliferous mudstone blocks that I've been sorting according to colour. We hypothesise that these colours - which can be red, brown, yellow, pink, or green - are indicative of different depositional environments. The next step is to then identify fossil-rich mudstone blocks, and then find well-preserved beetle specimens to identify to the lowest taxonomic level.

In May, I expanded my engagement by teaming up with Dr Rose Prevec and her team from the Albany Museum, Grahamstown and joining their field trip to Sutherland in the Northern Cape. Here we found many exquisitely preserved fossil and plant remains. Soon after, in June, I continued my travels by going to Orapa Diamond Mine in Botswana with advisor, Dr Ian McKay to further sharpen my exploration skills, whilst also deciding if palaeontology is something I want to pursue as a career – luckily, I have more than enough material in the ESI's herbarium to persuade me.

Recent, non-field work activities include Dr McKay and I presenting our research at the 21st Entomological Society of Southern Africa (ESSA) Congress. My talk was titled "Fossil beetles and their contribution to palaeoenvironment, biodiversity and biogeography", and Dr McKay's was "Resurrecting the dead: Reconstructing the 90 million-year-old Crater lake at Orapa, Botswana using fossil insects". Dr McKay and I were the only ones flying the Palaeontology flag very high at a conference other-

wise full of researchers working on extant taxa.



I also participated in Wits' National Science Week "Science Slam" competition where I presented a fun talk titled "PalaeoEnto: The Living And The Dead" that showcased my PhD work but also the extant entomological work I did prior to joining the ESI. I got to show the vast diversity of insects out there – from predators, scavengers, parasitoids, pollinators, biological control agents and ecosystem indicators. I soon followed up by presenting a poster at Wits' 10th Cross Faculty Symposium.

It has been a great year with no signs it slowing down!

Sandiso's Exploits!

Sandiso Mnguni, ESI



Orapa Diamond Mine fossil treasures.

Sandiso Mnguni, Ian J. McKay and Marion K. Bamford.

Evolutionary Studies Institute (ESI), School of Geosciences (GEOS).

University of Witwatersrand, Johannesburg, Gauteng Province, 2050, South Africa.



Introduction

Understanding how past ecosystem and environments have changed over time is essential in understanding evolution of life on Earth, climate change and extinctions.

Insect and plant ecologies, species richness and abundance and their distribution patterns are used to reconstruct past ecosystems preserved in lacustrine sediments.

The Orapa Diamond Mine (ODM) is one of 60 kimberlitic pipes and dykes in the area.

Insects and plants are preserved in shales and mudstones in the centre of the crater.

This study reviews all the publications from the ODM, from the 1980's until today.

Methods

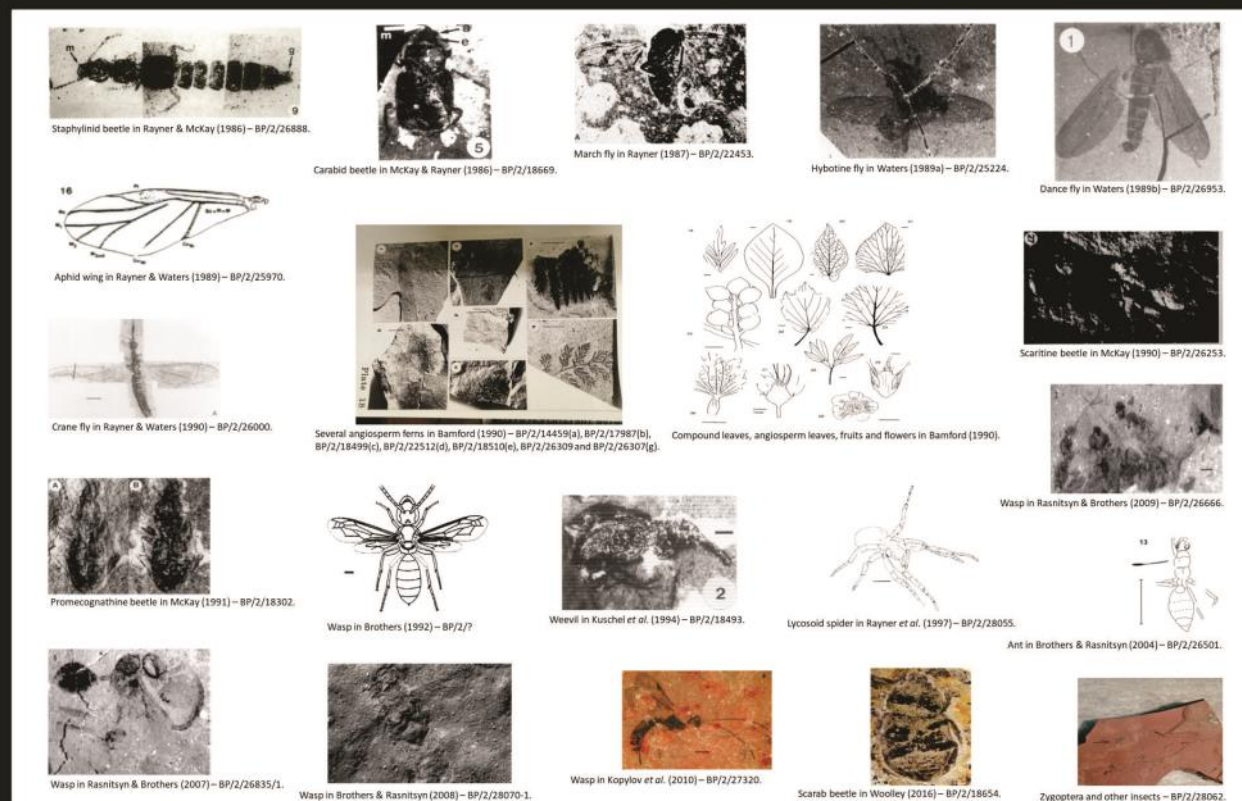
A bilobate kimberlite pipe in Botswana erupted 93 million years ago.

Scientists from then Bernard Price Institute (BPI) of Palaeontology were invited to collect fossil material.

Total collection of 6191 (ESI) and 220 (NMB) blocks.

Comprises: 55% insects, 40% plants & 5% unknowns.

Collection has so far yielded several publications.



Discussion

The collection has well preserved fossil insects and plants housed at the National Museum of Botswana (NMB) and the Evolutionary Studies Institute (ESI) Herbarium at the University of the Witwatersrand. However, the collection lacks bees and termites. It also lacks fish, frogs, immature stages of aquatic insects and other aquatic animals. There are no vertebrate skeletons. Spiders and other arachnids occur in low numbers. There are no myriapods. Fossil insects from ODM are diverse and consists of Zygotera, aphid, cockroach, flies, ants, wasps, weevils and beetles. Fossil plants from ODM are less diverse and includes *Pteridophytes* as well as angiosperm flowers, leaves, stems and seeds.

Acknowledgements

We would like to acknowledge The Office of the President of Botswana, the National Museum of Botswana and De Beers Botswana Mining Company for the invitation to collect the material. We would also like to acknowledge the staff of the National Museum of Gaborone. One of us (S.M.) has received funding from the NRF, PAST and DST-NRF Centre of Excellence in Palaeosciences.



Mr Sandiso Mnguni poster presentation in the 10th Cross Faculty Symposium.

Kammerer's cross-country Karoo collections

Christian Kammerer, North Carolina Museum of Natural Sciences



Thanks to a taxonomic improvement grant from SANBI, I was able to spend a month visiting Karoo fossil collections in July and August. This trip was centered on refining Permo-Triassic synapsid fossil identifications and highlighting prep priorities at Iziko, but I was also able to spend substantial amounts of time revising specimen IDs at the ESI and the KwaZulu-Natal Museum in Pietermaritzburg. A number of clearly novel therapsid taxa are present among recent finds at both Iziko and the ESI, illustrating the importance of both ongoing fieldwork at well-known localities (continuing to fill out the collection curve even after 175 years of worker effort) and prospecting in new parts of the basin (in some cases finding entirely new faunas).

The KZNM collections, by contrast, are all historic (mostly collected between 1900 and 1930) and consist of well-known taxa, but proved deeply intriguing from a biostratigraphic standpoint. All of the tetrapod fossils from classic sites like Ennersdale, Estcourt, and the Little Tugela River turn out to represent a very stereotyped assemblage (*Daptocephalus leoniceps*, *Lystrosaurus maccaigi*, and *Moschorhinus kitchingi*) characteristic of the Upper *Daptocephalus* AZ. Combined with similar records in other collections (Iziko, ESI, Council for Geosciences), it seems as though the majority of fossiliferous exposures in KwaZulu-Natal are latest Permian in age, and younger, Triassic sediments may be less widespread than currently mapped. With that said, the province as a whole is in desperate need of systematic paleontological surveys, and it is possible that more extensive fossil-bearing Triassic rock is exposed in the poorly-sampled southwestern portion of the province. New collection efforts from the KZNM would be extremely welcome in this regard, although this would probably require the addition of a full-time Karoo paleontologist to their

staff.



Complementing my work on collections from the Main Karoo Basin, I also recently spent some time with Namibian fossils from the Triassic Omingonde Formation collected by researchers from the South African Geological Survey in the 1970s and Harvard University in the 1990s.

The Omingonde fauna remains problematic: it seems to consist of at least two assemblages roughly equivalent to the South African *Cynognathus* AZ and Brazilian *Dinodontosaurus* AZ, but also features endemic taxa more closely related to animals from the Manda Beds of Tanzania. The ages of all the aforementioned assemblages are highly contentious, and at present anything from Olenekian to Carnian is possible for the Omingonde (although I personally favor Anisian–Ladinian).

A few years back I gave a presentation at the SVP meeting on a gigantic *Cynognathus* dentary symphysis from this formation, noting some unusual features relative to standard South African *C. crateronotus* but leaving its lower-level taxonomy uncertain given the incompleteness of the specimen. Study of additional dentary ele-

Kammerer's cross-country Karoo collections

Christian Kammerer, North Carolina Museum of Natural Sciences



ments during my recent trip provides further evidence that Omingonde *Cynognathus* may be distinct from that of the Main Karoo, although the newer specimens are also somewhat less than ideal. Omingonde *Kannemeyeria* material is already recognized as specifically distinct from that of the Burgersdorp Formation, so distinction among the cynodont genera as well would not be out of the question, but whether such distinction is geographic or temporal in origin remains to be determined.

All told, another very productive trip (as if time spent in South Africa could be anything but for the therapsid en-

thusiast). Sincere thanks to the welcoming and helpful curators and collections staff who facilitated my efforts: Zaituna Skosan and Claire Browning at Iziko, Sifelani Jirah at the ESI, Helke Mocke at the GSN, and Matabaro Ziganira at the KZNM. Thanks as well to Kelsey Glennon, Jonah Choiniere, Viktor Radermacher, and Kimi Chapelle for their kind hospitality.

Here's hoping I can make it back for 2020, as I suspect there will be no slowdown in therapsid fossil discoveries any time soon.



***Dicynodon angielczyki*, a new species of dicynodont from the Permian Usili Formation of Tanzania named after PSSA member Ken Angielczyk. It has been a busy 2019 for me Dicynodont-wise, as *D. angielczyki* joins *Thliptosaurus imperforatus* and *Ufudocyclops mukanelai* in the new taxon column.**

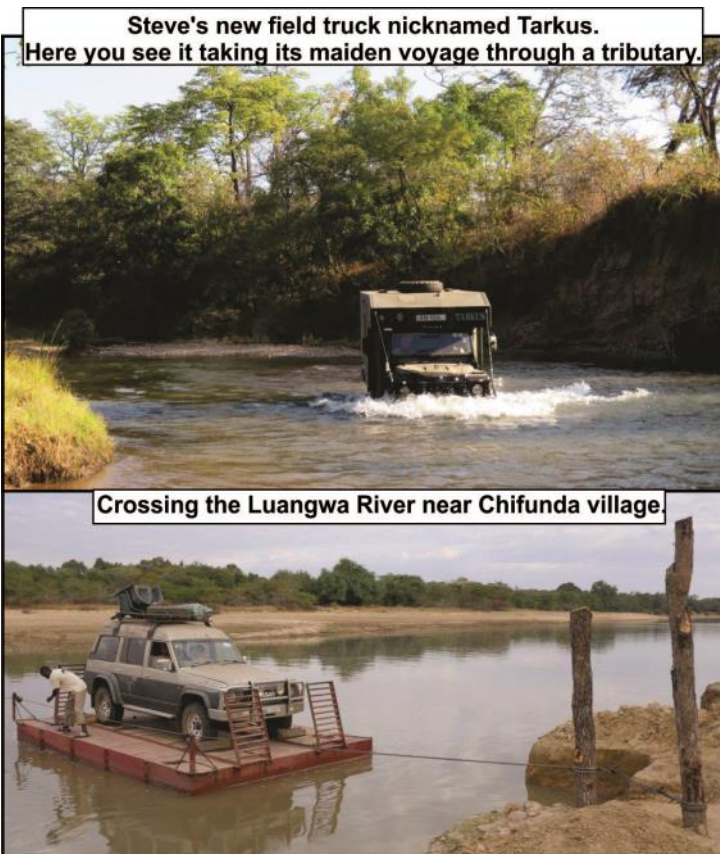
A novel test case for vertebrate patterns of diversity and recovery from the Permo-Triassic mass extinction: the Luangwa Basin, ZM

Brandon Peacock, Pia Viglietti, and Steve Tolan



Following on from last year's successful expedition to North Luangwa National Park, mid-Luangwa Valley, the team returned to the same general area for more fieldwork.

The team this year consisted of Brandon Peacock (Field Museum, Chicago, and expedition leader), Chris Sidor (University of Washington), Megan Whitney (University of Washington), Pia Viglietti (attached to the Field Museum, Chicago), Steve Tolan (Chipembele Wildlife Education Trust, Zambia) and Joseph Museba (National Heritage Conservation Commission, Zambia).



Having met in Lusaka, the team drove to North Luangwa National Park, a distance of over 1,000km. Our focus there was to look for Triassic fossil areas in the same general area as we had first collected in during last year's expedition, and also to allow Pia to study the geology in the area. In 3 days of fieldwork, we collected fos-

sils of various archosaurs (including a silesaurid), rhynchosaur, temnospondyls and cynodonts. Pia was also able to make some revisions to the stratigraphy, which will have implications for correlation to the *Cynognathus* Assemblage Zone in the main Karoo Basin, and the Mid-Zambezi Basin in exposed in Zimbabwe and southern Zambia.

We then left North Luangwa NP and drove south to the Munyamadzi Corridor, a wild and remote area between North and South Luangwa national parks. We entered a private, unfenced hunting area, reached by crossing the Luangwa River by a pontoon. Arriving at dusk, we set up camp in the bush, and heard lions and hyaenas most nights. One hyaena was particularly persistent and kept coming to within a few feet of Pia's tent.

We had to draw water almost every day from the nearby Munyamadzi River, filtering it to make it safe to drink. There followed 8 full days of fieldwork, focusing mostly on the extensive Permian exposures, but also discovering a remote Triassic area that has never been studied before, and which has the potential to be an important fossil area in the future. The Permian fossils found in this area are generally extremely well preserved, and we collected many excellent fossils, including dicynodonts, gorgonopsians, cynodonts, therocephalians and pareiasaurs.

Testing a hypothesis, the team walked from exposures starting in the east, which is an earlier assemblage zone, as indicated by *Diictodon* fossils, and as we walked westwards, we then found *Oudenodon* fossils and lastly *Daptocephalus*, *Therapsid* and pareiasaur fossils in the extreme west of the walk; 3 different assemblage zones in just 3-4 kilometres.

In addition to lots of fine fossils, we experienced great game-viewing too, seeing rhino, wild dog, buffalo, ele-

A novel test case for vertebrate patterns of diversity and recovery from the Permo-Triassic mass extinction: the Luangwa Basin, ZM

Brandon Peacock, Pia Viglietti, and Steve Tolan



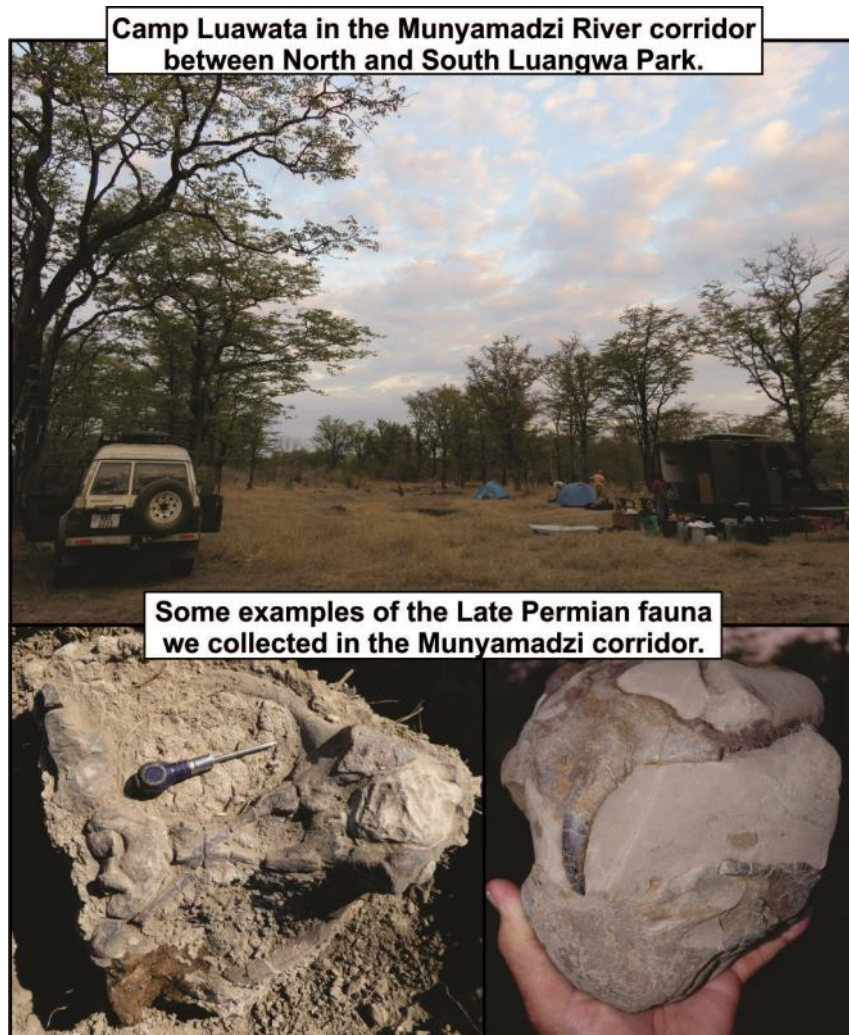
phant, zebra, giraffe, hippo, crocs, eland, hartebeest, wildebeest, roan, kudu, etc.

At the end of the fieldwork, we returned to Chipembele Wildlife Education Centre in Mfuwe to sort out the finds and store the equipment for the next expedition. Most of the team then drove to Lusaka, when they shipped the fossils to the States for preparation and study, before they are later returned to Zambia for curation at Livingstone Museum.

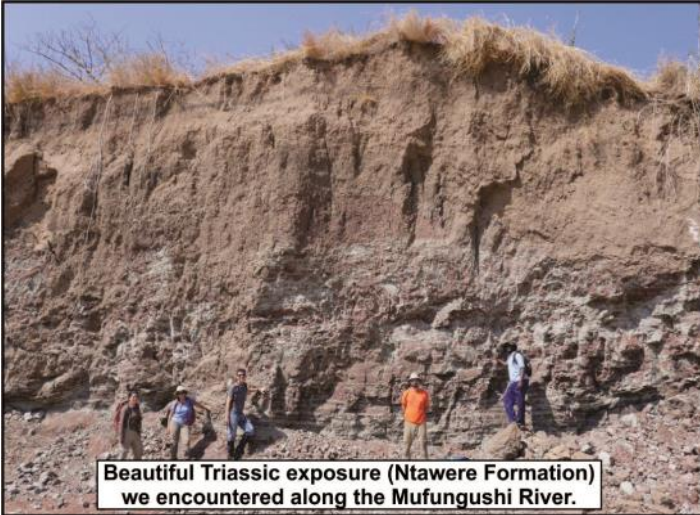
Acknowledgements: Many thanks to National Geographic Society for funding the expedition, to Ed and Claire Sayer of the North Luangwa Conservation Project for their help and support, as well as North Luangwa Area Warden Pumulo Nyambe and the Department of Na-

tional Parks and Wildlife, Chilanga, who assisted us with research permits to work in North Luangwa NP and the surrounding area. Thanks to our armed Scout, James Ng'uni, who protected us on our walks in North Luangwa NP, and to Joseph Museba, our National Heritage official and friend, who worked hard to help make things run smoothly.

Lastly, to our 2 excellent bush cooks, Matthews Kumwende and Isaac Sakala, who prepared such good food for us. Natwange Lodge in Lusaka was our home-from-home at the start and end of the expedition. Special thanks to Aadil Daya of Sitatunga Safaris, who allowed us access to a private hunting area in the Munyamadzi Corridor.



A novel test case for vertebrate patterns of diversity and recovery
from the Permo-Triassic mass extinction: the Luangwa Basin, ZM
Brandon Peecook, Pia Viglietti, and Steve Tolan



Beautiful Triassic exposure (Ntawere Formation) we encountered along the Mufungushi River.



Getting the fossils ready for their trip to Lusaka (and eventually the Field Museum!).



The whole crew (from left to right): Isaac Sakala, Steve Tolan, Megan Whitney, Brandon Peecook, Chris Sidor, Mathews Kumwende, Joseph Museba, and Pia Viglietti.



Sundowners at Chipembele



Things get official at NHCC headquarters in Lusaka.

Roger's been busy!

Roger Smith, Iziko Museums, ESI



PTB: PERMIAN

Karoo PTB project

In October/November 2018 I took Claire Browning and a team of Iziko preparators and volunteers to the PTB sections in the Graaff Reinet district on the final fieldtrip of my 3-year AOP funded project. The aim was to test the drought-induced 3-phased extinction theory at new, previously uncollected, PTB sections. A total of 54 newly discovered *in-situ* tetrapod specimens were logged of which 36 were collected for preparation. A new PTB exposure in the Nieu Bethesda area proved to be very informative, yielding specimens that could potentially be the last appearance datum fossils for 2 taxa. If so it would shorten the duration of the main phase of plant and animal extinctions in the Karoo. The Iziko prep lab has been diligently working through the latest PTB fossils with some superb results such as these 2 fully articulated temnospondyls (Broomistega- prepped by Tiffany) and a juvenile *Scaloposaurus* curled-up in a decline burrow cast with 2 millipedes (prepped by Sibusisu). *Karoo palaeo team near Nieu Bethesda November 2018.*

With travel grants from the Natural Science Collections Facility we were fortunate to be able to invite overseas experts to our Karoo palaeo lab to confirm the PTB fossil identifications. In April this year the therapsids and cynodonts were identified by Adam Huttenlocker (University Southern California) and in July/ August Christian Kammerer (Museum of North Carolina) worked over the dicynodonts and gorgonopsians. The revised identifications have now been entered into the Karoo PTB database for this project. This is now a significant internationally recognised research resource that contains accurate stratigraphic and geographic positions of 740 identifiable tetrapod specimens, found *in-situ* and recorded in the field, by Roger and Jennifer's teams over the past 20 years. It is possible that these specimens, and their associated stratigraphic logs, record the end-Permian tetrapod extinction in more detail than anywhere else in the world.

In March 2019, Jennifer Botha, Sibusisu Mtungata and I accompanied 2 Chinese geochemists to the PTB sections in the Graaff Reinet and Bethulie districts where they sampled the rocks looking for a mercury anomaly in



Karoo palaeo team near Nieu Bethesda November 2018

Roger's been busy!

Roger Smith, Iziko Museums, ESI



our tetrapod extinction interval. Mercury spikes have been discovered in several marine and terrestrial sections in China which they attribute to fallout from the Siberian Traps eruptions. Whilst Sibus helped the geochemists do detailed centimetre scale sampling, Jennifer and I checked our logs and consolidated our ideas on the positioning of the PTB. We eagerly await the Chinese results due early next year.



Juvenile *Scaloposaurus* with millepedes (arrowed)



Detail of new Triassic *Broomistega*



Close spaced sampling through PTB



Sibus helping the Chinese geochemists

A new detrital zircon sample collected by Adam Huttenlocker, from the Nooitgedacht PTB section near Bethulie, yielded a youngest detrital zircon date, which combined with a new set of stable carbon isotope analyses, and well-provenanced plant and tetrapod fossils, from the same section, have led us to the conclusion that the Karoo basin terrestrial extinction events are synchronous with those of the marine PTB sections in China. A manuscript reporting these results has been submitted to

Roger's been busy!

Roger Smith, Iziko Museums, ESI



3P's for publication.

Meanwhile a paper describing the ichnotaxonomy of a tetrapod trackway surface that I discovered way back in late 90's just above the PTB at the Bethulie study section has appeared in *Gondwana Research* (see below). This immediately generated some debate which has led to another mini-publication, as response to comment, which has just been accepted.

It is satisfying that some of the PTB fossils that Chris Sidor, Adam, Brandon and I collected on Graphite Peak Antarctica in 2010/11 are now fully-prepared and are being described. Recently 2 research papers by Brandon Peacock (on a new archosauromorph, see below) and Stephan Spiekman (on post cranial anatomy of the Antarctic *Prolacerta* specimens) have been published. More skeletons from Graphite Peak that we found on the 2017/18 expedition are currently undergoing preparation in Chicago and Seattle and yielding very interesting results. It is also good to hear that trackway specialist Marco Romano has managed to secure research funds to travel to Seattle to study the new early Triassic foot-print slabs that were figured in my last PAL news report.

Early Tetrapods in Gondwana

With the generous financial assistance from PAST, the Argentinians Claudia Marsicano, and Adriana Mancuso joined Iziko's Sibusiso Mtungata and me to spend 10 days in the hyperarid Huab Basin of western Namibia continuing our search for early Gondwanan tetrapods. Sibus and I drove up from Cape Town to return all the beautifully- prepared Gai-As Fm temnospondyl specimens that he has been working on for the past 2 years, the most spectacular of which is destined for display in the Geological Museum as soon as it is published. Helke

Mocke helped with the logistics in Windhoek but she could not accompany us to the field. Carrying only 200 litres of water we knew we would not be able to complete our 10 days without having to do a 4 hour round trip to Abu Huab camp for re-supply. Fortunately, Namibian geologists Roger Swart and Ansgar Wanke joined us at different times with extra supplies of water and meat. This year we concentrated our efforts on the Huab and Tsarabis formations that underlie the Gai-As Fm. From a single report of isolated temnospondyl remains, the Tsarabis now has a diversity of Early Permian temnospondyl, condrichthyan and actinopterygian fossils- some with taxonomic affinities to those we have collected in Brazil. These will be prepared in the Iziko labs as soon as the export permit is issued



Top:
The core research team before driving into the hills
in the background to pitch camp
Bottom:
Perfect preservation of an Early Permian temnospondyl
vertebra from Gai-As Fm.

On our way back to Windhoek we stopped for 2 days at Etjo Mountain to follow up on a most intriguing enigma-

Roger's been busy!

Roger Smith, Iziko Museums, ESI



the “Triassic gorgonopsian”. Helke, in her laudable efforts to repatriate the Triassic Omingonde fossils collected by a Harvard University team way back in the late 90’s, has retrieved a partial skull collected from Etjo Mountain which after prep was then identified as a gorgonopsian- a Permian carnivore clade that is generally regarded as a casualty of the End- Permian extinction. Prof Christian Kammerer - the current gorgonopsian expert recently confirmed this identification, which thus means that either the locality was wrongly documented, or if confirmed to be correct, as yet unknown Permian rocks outcrop at the base of Etjo Mountain. To solve this conundrum, I sampled the matrix of the gorgonopsian specimen (carefully excised by Jonah Choiniere - the rock saw champion) and carried the cut block with me to the GPS co-ordinates provided on the specimen label. There, Claudia, Adriana, Ansgar and I spent 2 days looking for more fossils to test their possible Permian affinity. I was quickly able to confirm that the matrix sample and certain beds in the outcrop were a perfect match thus confirming that the Harvard specimen did indeed come from this locality. Concentrating our search efforts on this outcrop we ended up with 2 complete (thanks to Claudia) and one partial (thanks to me) *in-situ* therapsid skulls. More news about the identification and temporal correlation of these specimens will have to wait until they are prepared, and Christian has re-confirmed and the gorgonopsian identification of the Harvard specimen with CT scans.

TANZAM project

I was not able to join the Zambian trip this year due to overlap with the Namibian work, however Pia was there as a worthy replacement. Nevertheless, it is satisfying that fossils from previous trips are now finding their way onto researcher’s desks. In 2017, during my “only

searching for tiny stuff” phase in the Usili Fm of Tanzania I was rewarded with a tiny articulated skeleton in a straight but twisted pose suggestive of a coprolite inclusion. This has now been scanned and Michelle Stocker (Virginia Tech) will be telling this year’s SVP delegates that it is a *Suminia*-like, possibly arboreal, Late Permian diapsid



Top:
Sebastien Steyer and Ken Angielczyk watching Chris Sidor photograph the unusual tiny diapsid (below) at the Permian Usili Formation locality in Tanzania.

Note Sebastien wearing a valuable 20 year-old “Fossil Stories” tee shirt, with my idealised temnospondyl skeleton, made for the launch of the exhibition at SA Museum.

Mio-Pliocene

WCFP dig site upgrade

The main fossil excavation at West Coast Fossil Park has been exposed for 20 years and although it has been kept relatively dust free by the park staff, there was urgent need to clean the exposed bones themselves to restore their visual impact, and to fix some water damaged patches. Last year the Fossil Park Trust eventually

Roger's been busy!

Roger Smith, Iziko Museums, ESI



opened its new lottery-funded visitor centre but the dig site still lies beneath its original horticultural tunnel cover that I commissioned way back in late 90's. As the leader of the team that uncovered the "Sivathere bonebed", it remains my professional (and financial) responsibility to ensure the integrity of the exposed fossil bones until a permanent structure is built over the excavation. With that in mind, I spent 2 weeks in March supervising the clean-up operation whereby all the exposed bones were

individually treated to remove accumulated grime then coated with (palaeontologically approved) Paraloid B72 consolidant thinned to 5% with industrial acetone. A second team were tasked with replacing all the sandbags surrounding the excavation and restringing and labelling the metre-square grid over the entire area.

View of the West Coast Fossil Park visitor centre from the Sivathere bonebed digsite



Tiffany van Zyl, an independent fossil preparator contracted to Roger Smith's AOP project, working on the Sivathere bonebed at West Coast Fossil Park.

Note the difference between before and after sections of the dig.

Permian

Palaeoecology of the Cistecephalus AZ project

This multidisciplinary AOP funded 3-year project aims to collect geological and palaeobiological data to investigate the biodiversity and palaeoenvironments of the *Cistecephalus* AZ in western Gondwana. We are fortunate that Bruce's radiometric dates have determined the CiAZ strata represents approximately one million years of the late Wuchiapingian epoch (256-255Mya). We aim to demonstrate that this zone represents an ecosystem that had fully recovered from the end-Guadalupian mass extinction and the early stages of the end-Permian mass

extinction had yet to set in. Thus it is possibly the first fully-developed seasonally-dry savanna-type terrestrial ecosystem to have ever evolved. It is also likely that the results of the proposed research will further strengthen biostratigraphic correlation and research collaborations with Zambia, Tanzania and Madagascar.

The Iziko Karoo palaeo team has just completed the first of three annual field trips scheduled for this project. This year we pitched our base camp in Fraserburg, N Cape, close to the targeted exposures of the CiAZ strata in Teekloof and Oukloof passes. Ten days of fieldwork yielded a total of 57 *in situ* tetrapod fossils of which 52 were collected. Two very large *Aulacephalodon* skulls

Roger's been busy!

Roger Smith, Iziko Museums, ESI



(one measuring 60cm wide and 40cm long!), sporting enormous nasal bosses along with disarticulated but closely associated skeletons were uncovered and logged. But, because of their size we had to leave them behind for a dedicated excavation team to work on, hopefully in November this year. One of these dicynodont skeletons has potential for the Stone Bones gallery in the SAM as it contains a shed gorgonopsian canine for extra interest. What became apparent while we were prospecting is that *Oudenodon* rather than *Diictodon* is the most abundant dicynodont in the CiAZ in this part of the basin.

Marthinus Kruger lives in Fraserburg and is the self-appointed tourism officer and guide for visitors to the Gansfontein mid-Permian trackway site on the outskirts of town. He was delighted to be able to tag along with us in the field to gain an appreciation of the effort required to find and excavate Karoo fossils and he even managed to get one of his finds logged.

Outreach activities

In May I gave the Wits ESI honours group a lecture course on Biostratigraphy and Taphonomy before David Groenewald and I took them on a weeklong trip through the Karoo to put some of what they had learnt into practice. We had long days logging Early Triassic sediments at Bethulie, and prospecting the T/J boundary at Barkly Pass, collecting taphonomic data on Late Permian embedded fossils at Gariep dam and making 2 dimensional maps of Pleistocene excavations at Florisbad. Evenings were dedicated to preparing food for the group of 12 from many different cuisines, resulting in some unusual but very tasty concoctions.

Other outreach activities include 2 lectures on my Antarctic Karoo research delivered to UCT's January Summer School, the annual 5-day Friends of Museum Karoo excursion to Beaufort West area in June led by Claire and I with valuable support from preparator Shandre Riddles, and a public lecture in Windhoek on the new early tetrapods from Namibia and Brazil project.



Left: Measuring a section through the Early Triassic Katberg Fm near Bethulie. Right: *Lystrosaurus* waiting for the honours group to do their taphonomic logging.

Roger's been busy!

Roger Smith, Iziko Museums, ESI



Left: AOP-funded preparator Shandre Riddles looking pleased with the undistorted *Pristerodon* skull she has just found.

Right: Iziko intern Devonne Kortje posing above the newly discovered *Aulacephalodon* skull. Note the large bony nasal bosses in the foreground.

Recent Publications

Tshibalanganda, M., du Plessis, A., Le Roux, S.G., Taylor, W.L., Smith, R.M. and Browning, C., Systematic experiments to quantitatively assess image quality for CT scans of a Karoo tetrapod fossil. *Palaeontologia africana*.

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Lemoenfontein Bonebed

Derik Wolvaardt & Mike Strong



In April this year, the Evolutionary Studies Institute and the Iziko Museum joined forces for the first formal field trip to Derik Wolvaardt's bonebed study location on the farm Lemoenfontein in the Xhariep (Rouxville) district, southern Free State. The team included Prof. John Hancox and Dr Eva Schneiderhan, Prof. Roger Smith, Iziko Museums' Karoo Palaeontology Curator Clair Browning and the ever-entertaining volunteers Dr Mike Strong and Dr Ian Woods. This was probably one of the most highly educated field teams assembled in recent memory.

First, some background. As early as 1963, James Kitching drew attention to the occurrence of bonebeds in the Middle Triassic exposures in the Joe Gqabi (Burgersdorp) district, located on the farms Cragievar and Winnaarsbaken. In 1976, James also pointed out a locality on the farm Lemoenfontein in the Xhariep (Rouxville) district, where he found what he interpreted to be cynodont burrow casts and a few *Trirachodon* and procolophonid skulls.

Our subsequent exploration of this locality revealed that it is most unusual and that its rocks record a very diverse faunal record. In an area of approximately one hectare, we found a variety of well-preserved fossils of several different taxa. This led to the identification of this locality as a potential bonebed. Before this field trip, the Lemoenfontein locality had already delivered over 70 identifiable skulls of at least six different taxa, many with articulated skeletons. The fossil taxa from

this bonebed have several features in common, such as herbivory, small size and a high degree of articulation. To date, the collection includes two holotypes and one potential paratype. Along with the body fossils at least three different types of interpreted burrow cast geometries have also been identified at this field site. The study of this site will hopefully make contributions to our understanding of the bone accumulation mechanisms and in doing so, generate information that will help to reconstruct the palaeoenvironments and palaeoecology of Middle Triassic tetrapod ecosystems more accurately in the Karoo Basin of South Africa.

The objective of the trip was to systematically search for additional vertebrate and invertebrate body fossils, coprolites, burrow casts, trackways and other traces and to log a vertical section through the Burgersdorp Formation rocks from exposures below the locality up to the Bamboesberg Member of the Molteno Formation.

With such a formidable field team searching the locality over 10 days, it delivered another 37 new specimens of cynodonts, procolophonids and possibly a small temnospondyl amphibian. Most specimens are articulated skulls with lower jaws or articulated skulls with curled up skeletons ranging from juveniles to adults.

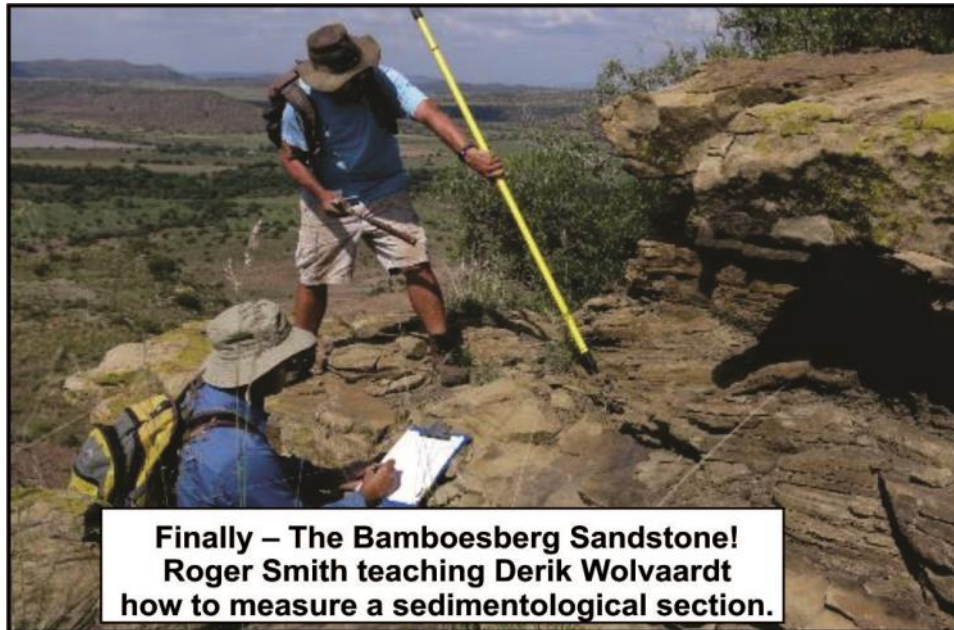
This successful field trip resulted in the collection of valuable data for the detailed investigation of the Lemoenfontein bonebed.



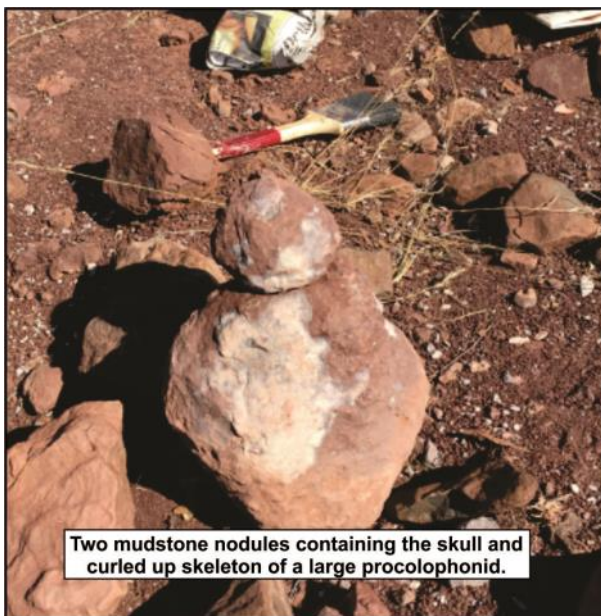
Panoramic view of the beautiful Lemoenfontein locality.

Lemoenfontein Bonebed

Derik Wolvaardt & Mike Strong



**Finally – The Bamboesberg Sandstone!
Roger Smith teaching Derik Wolvaardt
how to measure a sedimentological section.**



**Two mudstone nodules containing the skull and
curled up skeleton of a large procolophonid.**



**Sectioned nodule containing the skull and curled up
skeleton of a possible juvenile procolophonid.**



The last supper with the Wolvaardt family: Lamb, lamb & more lamb!

Lemoenfontein Bonebed

Derik Wolvaardt & Mike Strong



Claire Browning: "I am not sleeping; I am measuring that burrow cast angle!"



John Hancox: "To be or not to be, that is the question".

Roger Smith: "No, the real question is: 'Is that a procolophonid or a cynodont?'"

Triassic Times in the Former Transkei

Jonah Choiniere, ESI



It's the end of aloe season in the Eastern Cape, and that means it was time for our annual field trip back to the village of Qhemegha, Eastern Cape Province to continue our excavation of lower Elliot Formation dinosaur bonebeds.



You may recall that last year we left a brace of two-tonne jackets in the field, with a promise to fetch them in 2019. To make good on that promise, we brought a crack crew of seasoned field veterans, including Profs Roger Benson (Oxford), Paul Barrett (NHM, London), Jennifer Botha (NM, Bloemfontein; pronounced "both-ah"), and Michiel de Kock (UJ). We were joined by my new postdoc Dr David Ford, by Oxford University postdocs Drs Elsa Panciroli and James Neenan, by UJ postdoc Lara Sciscio, and by a host of students including PhD candidates Kimi Chapelle (Wits), Kathleen Dollman

(Wits), Gavin Dollman (UJ), Simon Wills (NHM), MSc candidate Mathew Robinson (Wits), and Honours candidates Bailey Weiss (NM, Bloemfontein), Marazaan de Wet (NM, Bloemfontein). Finally, it was our pleasure to have Joshua Davis from the NHM media team and retired Prof Marius Vermaak (Rhodes) as non-student participants.

We were welcomed back into the community with open arms, staying once again under the roof of the local tavern "Home Sweet Home" and being hosted by the proprietors Yoliswa and Victor. With all 17 of the crew, space was tight inside and our tent city expanded to fill the entire backyard! We made quite a few new friends, including Yoliswa's nephew Thando and the local gogo squad, headed by Ms Iris Eland.

Community pioneers Sginyane Ralane and Themba Jika-Jika had taken great care of the specimens we entrusted them with, and everything was more or less how we left it at the end of the field season last year, albeit with about 40cm of mud from last summer's rains coating our quarries.

Our first mission was to secure, flip, and ship the 2018 jackets, a task made more exacting by the schedules of visiting politicians and equipment breakdowns. Nonetheless, with the



Triassic Times in the Former Transkei

Jonah Choiniere, ESI



help of a backhoe provided at a discount rate by local firm Masakhane, we successfully extracted the massive jackets and put them on a flatbed bound for Johannesburg. They now await prep in the cavernous Wedge building adjacent to the Wits Origins Centre.

Giant jackets in the bag, so to speak, we focused our attention on preparing new quarries. Again, the backhoe was an

enormous help, removing tons of overburden in mere minutes and exposing what will likely become more huge specimens during our 2020 campaign. In fact, the big machine worked so quickly we were able to donate the rest of its time (3 days) to community improvement projects, including restoration of silted dams and the opening of a road to the commercial woodlot that Qhemegha maintains.

A backhoe helps us remove the giant two-tonne jackets we began making in 2018.



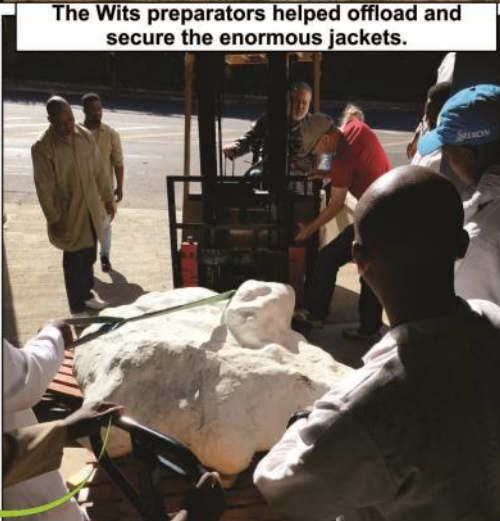
The jackets were loaded onto a flatbed crane truck for shipping to Wits.



The jackets are now ready for preparation



The Wits preparators helped offload and secure the enormous jackets.



While this was being done, Lara and Michiel measured section, collected detrital zircon samples, and drilled magnetostrat samples through more than 200 vertical meters of sediments. They even managed to scout a bit for fossils, finding an important new site with both fossil wood and abundant dinosaur bones a few hundred meters away from our main quarry!

In our waning days, Kathleen and Elsa discovered a new quarry that contains the remains of at least five different small animals, including what hopes to be the first lower Elliot Formation theropod! Watch this space in 2020 for more on this developing story.

Triassic Times in the Former Transkei

Jonah Choiniere, ESI



Not all of the happenings were good, however. After only a single libation, Paul took a misstep on the stairs of “Home Sweet Home” and twisted his ankle. He bravely soldiered on, but was out of action for prospecting.

While my crew were working furiously on these fossils, I put in some outreach time. On September 2nd, to kick off Heritage Month, I signed an MOU between Wits, ECPHRA, and the Qhemegha Tribal Council to ensure that the local community can use our scientific findings to leverage economic development in the area. The next day, I visited the local school, where the form 1 students had drawn pictures of dinosaurs for our crew, and I spoke to the principal about developing science kits for the area. Finally, on our last night in the field we sponsored a community braai, and Kimi Chapelle gave a talk and slideshow to more than 100 Qhemeghians about our work.

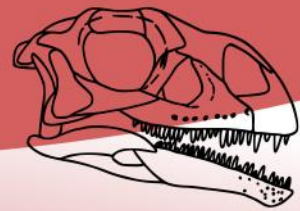
In summary, this year in Qhemegha was one the most exciting field season that I’ve ever had. We built relationships with the

vibrant local community, finished off two enormous quarries and started two more, and collected some of the smallest vertebrates, and first confirmed carnivores, known in lower Elliot ecosystems. Here’s looking forward to 2020!



Triassic Times in the Former Transkei

Jonah Choiniere, ESI



Teacher Elsa Eland and the Qhemegha junior school grade 1 students



PhD student Kimi Chapelle gives a short slide show to our hosts in Qhemegha



Hon MEC Fezeka Bayeni kicks off Heritage Month with a visit to our quarry in Qhemegha

5th International Symposium on Palaeohistology

Kimi Chapelle, ESI



A few months ago, I attended my first International Symposium on Palaeohistology in Cape Town with my PhD co-supervisor, Dr Jennifer Botha. This is a biennial meeting that has been going since 2011 (Sabadell, Spain). The venue was at the River Club in Observatory, a very scenic place that was complimented by the great weather that we had for the majority of that week. I only started working in this particular field a couple of years ago and this conference was a great eye-opener to the wonderful new world that is histology! There were approximately 50 talks that ranged from dinosaur histology all the way to human histology. There were speakers from all over the world including India, China, the USA, Belgium, Switzerland and France to name a few. I presented

on the “Inter-elemental osteohistological variation in *Massospondylus carinatus*: implications for locomotor ontogeny, developmental plasticity and environmental variation” and Jennifer presented on the “Osteohistology of *Lesothosaurus diagnosticus* from the upper Elliot Formation of South Africa”. On the opening registration night, we were treated to drinks and snacks at the Iziko South African Museum where we were able to visit the great palaeontology exhibits there including the “Stone Bones of the Ancient Karoo” and the “African Dinosaurs” sections. On the last day of the meeting, we were given the time to walk through the stunning Kirstenbosch Gardens where we all met at Moyo’s for the final dinner followed by the traditional ISPH “paper plane throwing”. The conference field trip took place at the West Coast Fossil Park (Langebaanweg). It was a great experience and I had the opportunity to meet many new fascinating researchers, and hopefully future collaborators. Thank you to Prof. Anusuya Chinsamy-Turan and her organizing committee for such a great conference. I look forward to my next ISPH!



News from the UCT Palaeobiology Research Group

Anusuya Chinsamy-Turan & students



Chinsamy Lab

Left to right: (Back) German Montoya, Megan Woolley, Iyra Maharaj, Caitlin Smith, Alberto Valenciano, Carla du Toit, Mohd Shafi Bhat, (Front) Emil Krupandan, Anusuya Chinsamy-Turan and Carmen Nacarino.

Prof. Anusuya Chinsamy-Turan (Head of UCT Palaeobiology Research Group, BioSci. Dept.)

This has been a great year of research, teaching and science engagement. It has been especially wonderful to have a lab full of enthusiastic postgrads and postdocs! Besides making strides in their own research endeavours (which each explain separately below), they have all actively contributed to organising the International Symposium on Palaeohistology (ISPH2019) in July-Aug in Cape Town. The meeting was a huge success and brought together people from over 35 countries worldwide. We are immensely grateful to the CoE Palaeosciences for funding support that enabled us to invite Dr. Sophie Sanchez as our keynote speaker.

At a more personal level, I was thrilled to deliver a Plenary at the International Comparative Vertebrate Morphology meeting in Prague in July where I presented an overview of my research. In October this year I will attend the Society of Vertebrate Palaeontology meeting where I will present some of my recent collaborative work on the dromornithids

(thunder birds) from Australia. While 'down under' I will also deliver the Wells Annual Lecture in Adelaide, and I will work with my colleagues on marsupials to better understand the evolution of mammalian growth dynamics and physiology. Other research news is that my colleagues and I have completed our investigation into the life history of the Mesozoic bird, *Confuciusornis sanctus* (currently in press in *Anatomical Record*), and my former postdoc, Delphine Angst and I (with other collaborators) now have a paper *in press* on the development of the bony crest in guinea fowls. The latter study has direct implications for the morphological assessment of crested extinct vertebrates! Additionally, the much-awaited revised taxonomy of the Aepyornithiformes (the elephant birds from Madagascar) has now spurred my collaborators and I to write up our research on their bone histology.

In terms of science communication, I am delighted to inform you that our free online course "Extinctions- Past and Present" has been recognised as a Top 100 MOOC for the past 3 years (out of over 8500 courses worldwide). Please do contin-



ue to spread the word about it since it runs every few months: <https://www.futurelearn.com/courses/extinctions-past-present>

Besides the MOOC, I have given several popular level talks, and I am especially pleased that several of my students have been actively involved in science communication. Notable amongst these has been our involvement in a week-long course at the UCT Summer School on “What bones tell”.

Alberto Valenciano (Postdoctoral Fellow)

Alberto is a Spanish Ph.D., specializing in faunas of carnivorans from the Neogene of Eurasia, North America, and Africa. Currently, he is a Postdoctoral Fellow with the Centre of Excellence in Palaeosciences (CoE-Pal) and member of the Iziko Museums of South Africa (Cape Town) and the University of Cape Town. His research focuses on taxonomy, systematics, phylogeny, and paleobiology; concentrating on the evolution of mustelids, mephitids, ailurids, canids, amphicyonids, and ursids – with special attention to faunas of Spain, Turkey, China, North America and South Africa. He also studies other Neogene families such as felids, herpestids and viverrids from the same regions. Alberto started his second year of postdoc in May 2019 and has recently published on a new family of Carnivora (Laphocyonidae). He also published a new genus and species *Izmirictis cani* (Morales et al. 2019) of a very primitive carnivorous mammal from the early Miocene of Turkey; a new species of an otter *Lartectictis pasalarensis* (Valenciano et al., 2019a) from the Middle Miocene of Turkey; a new species of a small mustelid from Northwest of China, *Hoplictis bahiu* (Valenciano et al., 2019b); and a new species of a medium-sized hypercarnivorous mustelid from

the Late Miocene of Spain (Valenciano et al., accepted). He also collaborated on a study of some new amphicyonids from the early Miocene of the Czech Republic (Morales et al., in press), and on some bears from the late Miocene of Spain (Abella et al., accepted). With regards to his postdoc, Alberto is making progress in the study of the mustelids and canids from Langebaanweg (early Pliocene, South Africa), and is starting palaeohistological analyses of these carnivorans. Additionally, he was digging with the team of Dr. Romala Goven-der in Langebaanweg in June 2019. He also presented his research at ISPH in August.

Carmen Nacarino-Meneses (Postdoctoral Fellow)

Carmen has recently joined the UCT’s Palaeobiology Research Group as a postdoctoral fellow. Her research focuses on the inference of life history traits (e.g. growth rate, age at maturity, age at weaning) on horses from the histological analysis of their bones and teeth. Specifically, she has focussed her studies on extant species of zebras and asses, and on several extinct taxa from the Pleistocene of Europe. She has also participated in several works dealing with the histological analysis of European Miocene hipparionins, archaeological human remains from Spain and extant ruminant species. Funded by the CoE in Palaeosciences, her postdoctoral research will continue to focus on the histological study of the enigmatic three-toed horse *Eurygnathohippus hooijeri* from Langebaanweg and the recently extinct Cape zebra (*Equus capensis*) from Elandsfontein, aiming to shed light onto their palaeoecology and palaeobiology. Carmen also presented the latest results of her research at ISPH 2019.



Emil Krupandan (Postdoctoral Fellow)

Emil has completed his PhD on material relating to *Antetonitrus* and his revision of the *Plateosaurus* holotype and is currently in the process of submitting his thesis work for publication. He has also started a post-doc working on describing and analysing a large bodied sauropodomorph from the Eastern Cape that was excavated during the 1950's.

Mohd Shafi Bhat (Postdoctoral Fellow)

Dr. Mohd Shafi Bhat is a Postdoctoral Research Fellow in the Department of Biological Sciences, University of Cape Town. He earned his degree in Applied Geology before progressing to Master of Technology (M. Tech.) in Earth System Science and Technology. He completed his PhD thesis on the topic '*A new assemblage of vertebrate microfossils from India: a window on Late Triassic biodiversity and palaeobiogeography*'. He has carried out his PhD work in Vertebrate Palaeontology under the guidance of Dr. Sanghamitra Ray (who was Anusuya's first postdoctoral fellow and is now Associate Professor Department of Geology and Geophysics, Indian Institute of Technology Kharagpur, West Bengal, India).

Shafi's doctoral work involved recovery and study of the Late Triassic vertebrate microfossils from India. The work included standardization and excavation procedures for extraction of vertebrate microfossils, and systematic collection of more than 1800 skeletal specimens from the Tiki Formation of India. The work has resulted in the reconstruction of the Late Triassic ecosystem in both aquatic and terrestrial realms, which were inhabited by various fishes, early tetrapods and different types of reptiles such as the archosauriformes, lepi-

dosauromorphs and mammaliaformes. He has published his work in highly prestigious and peer reviewed international journals including Journal of Paleontology, Palaeoworld, Palaeontology, Historical Biology, Geobios, and Journal of Geological Society of India.

His postdoctoral research focuses on long bone histology of *Chersina angulata* (tortoises) from South Africa to deduce the life history strategy of the species. He started working on tortoise material from the archaeological and open-air sites in October 2018. He sectioned twenty-one limb bones belonging to seven individuals and prepared several transverse sections using cutting and grinding techniques. The outcome of this study has been submitted to Journal of Morphology and is currently under review. Apart from this, he presented his findings at ISPH in August 2019. His Postdoctoral research is funded by the DST-NRF Centre of Excellence in Palaeosciences (CoE-Pal), University of the Witwatersrand, Johannesburg, South Africa.

Carla du Toit (PhD Candidate)

Carla is a doctoral candidate at the University of Cape Town in the Biological Sciences Department, working jointly with the Palaeobiology group and the FitzPatrick Institute of African Ornithology. Her work is co-funded by the Fitz and the Centre of Excellence in Palaeosciences. Her thesis is investigating the unique sensory modality of remote-touch, where buried invertebrate prey is detected using tiny vibrations in the soil, and how it affects the ecomorphology of modern probe foraging birds – with an emphasis on southern African species from the Threskiornithidae family (ibises). The main aim of the project is to use her work on modern birds in order to investigate



evolutionary and ecological inferences of extinct fossil birds, based on their beak morphology. This past year, she has been conducting a massive review of the bony-beak structures and bill-tip histology of all extant bird lineages and using this to infer information about ancient groups of birds from the Quarternary, Paleogene and Cretaceous periods, based on preserved fossil beaks from across the globe. She presented her work at two conferences this year: The Zoological Society of South Africa's Conference in Skukuza (July) and the International Symposium on Palaeohistology in Cape Town (August). She has also taken part in various public engagements in order to promote scientific communication with the greater non-academic community. She presented her work for various groups, including the UCT Summer School program (January), the Cape Bird Club (May) and the Friends of Iziko Museum (June). She also recently gave an interview for the international news channel, eNCA, about the life history and ecology of Hadedra ibises in South Africa. The segment aired several times on their TV channel at the beginning of September, and can be watched online on their YouTube channel at <https://www.youtube.com/watch?v=QBvIXfK0Imk> (at the time of writing, the video has over 1.6k views from the online platform). She is currently writing up her work on the fossil birds and is preparing to start her experiments with captive ibises at the World of Birds in Hout Bay to try and understand in finer detail the effects that soil characteristics have on their foraging abilities and changes in beak morphology and histology.

Iyra Maharaj (PhD Candidate)

Iyra is continuing her work on the enigmatic dicynodont, *En-*

dothiodon, and is now in her second year of PhD, funded by the NRF. Her MSc work on the postcranial anatomy of *Endothiodon bathystoma* is currently being written up for publication. The previously-unknown postcranial elements described in this work provided a stepping stone for her current PhD work, i.e. reconstructing the posture of *Endothiodon*, examining the dentition of the South African specimens, and revising the taxonomy of the genus. This led to Iyra visiting the Indian Statistical Institute in Kolkata, India, in March (funded by PAST) to examine specimens of the Indian species of *Endothiodon*. She is collaborating with Ricardo Araújo's PaleoMoz team who are working on *Endothiodon* material from Mozambique. Iyra also gave a talk to the BioSci Honours class on dicynodonts in May and presented her research at the Zoological Society of Southern Africa congress at Kruger National Park in July.

Caitlin Smith (MSc Candidate)

Caitlin is currently in her second year of her MSc research at UCT (Dept. Biological Sciences). Her research focuses on the osteohistology of *Giraffa camelopardalis* limb bones through ontogeny. She is describing the histology of forelimb elements (humerus, radius, metatarsals), and hindlimb elements (femur, tibia, metacarpals). This year, Caitlin has given many talks based on the life history of giraffes and her MSc research on them – including talks for the UCT Summer School in January, the UCT BioSci Hons students taking the Palaeobiology module, and both ZSSA (held in Kruger National Park) and ISPH. Caitlin also gave a talk to the Friends of South African Museums (Iziko) in August.

News from the UCT Palaeobiology Research Group

Anusuya Chinsamy-Turan & students



Megan Woolley (MSc Candidate)

Megan is a Master's student in the Palaeobiology Group in the Biological Sciences Department at the University of Cape Town. Last year she completed her Honours degree assessing skeletal pathologies in extinct phocid seals from Langebaanweg; these results were also presented this year at ISPH. Her phocid pathology research has been submitted for publication and is currently under review. Her Master's research involves a taxonomic and palaeobiological assessment of the South African Mosasaurid material, which was discovered over 100 years ago in Pondoland, Eastern Cape. Apart a brief description of some of the material by Robert Broom in 1912; and a feature in an International Palaeontological Congress (IPC5) conference poster by Chinsamy et al. in 2018, the material has received little attention and is seldom mentioned in the literature. Therefore, by doing this research we hope to put these iconic marine reptiles from South Africa in the context of mosasaurs in Africa and the world. In June this year, Megan travelled to the Royal Belgium Institute of Natural Sciences in Brussels to examine the anatomy of mosasaurs from their vast collection to aid in the identification of the South African material. This was a great experience for Megan as she learnt so much about her study topic and got to work in and experience a different part of the world. Currently, she is hard at work on the taxonomic results, which she will present in poster format at the upcoming BioSci Postgraduate Research Day in November. Megan has also begun the analyses for the palaeobiological assessment, which includes some isotope work, histology and SEM analysis on the fragmentary teeth.

Publications from the team:

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- Krupandan E., Chinsamy A.** and Pol D. 2018. The long bone histology of the sauropodomorph, *Antetonitrus ingenipes*. *The Anatomical Record*. 301 (9): 1506 – 1518.
- Lee S., Lee Y.-N., **Chinsamy A.**, Lü J., Barsbold R. and Tsogtbaatar K. 2019. A new baby oviraptorid dinosaur (Dinosauria: Theropoda) from the Upper Cretaceous Nemegt Formation of Mongolia. *PLoS ONE* 14(2): e0210867. <https://doi.org/10.1371/journal.pone.0210867>.
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- Morales J., Mayda S., **Valenciano A.**, DeMiguel D. and Kaya T. 2019. A new Lophocyonidae *Izmirictis cani* gen. nov. et sp. nov. (Carnivora, Mammalia) from the Lower Miocene of Turkey. *Journal of Systematic Palaeontology*. 17 (16): 1127–1138. Doi: 10.1080/14772019.2018.1529000
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Valenciano A., Mayda S. and Alpagut B. (2019a). First record of *Lartetictis* (Carnivora, Mustelidae, Lutrinae) in Turkey from the middle Miocene hominoid locality of Paşalar. *Historical Biology*. <https://doi.org/10.1080/08912963.2019.1588894>

In press

Abella J., Hontecillas D., **Valenciano A.**, Montoya P., Morales J., Pesquero M.D. and Alcalá, L. (Accepted). The last record of an ailuropod bear from the Iberian Peninsula. *Geodiversitas* (Stephané's Memorial Volumen).

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The lovely seaside town of Mossel Bay in South Africa was my destination in January 2019, where I attended the 22nd conference of the Southern African Society for Quaternary Research. Here I gave a presentation on the 2014 excavation of a mammoth in the Etosha National Park. I was also able to go on an interesting excursion, which included archaeological sites at Vleesbaai and Pinnacle Point, and Kleinbrak River, where the contact of the Marine Isotope Stand 11 was visited. The two field guides, Prof. Curtis Marean from the Institute of Human Origins, Arizona State University and Dr. Hayley Cawthra from the Council for Geoscience in South Africa put a lot of effort into organizing the field excursion and making the outing extremely interesting and fun.

In March 2019 I had the privilege of joining a multinational team of scientists, mostly geologists and students on an eight-day field excursion to the Witpütz subbasin in southern Namibia to familiarize ourselves with the geology of the subbasin, to identify the Precambrian-Cambrian Boundary and to identify if there is a significant change in fossil fauna across the boundary. Sites visited included Farms Witpütz, Pockenbank, Swartpunt, Swartkloofberg, Aar, and Dreigradberg. At Dreigradberg two tillites, the Marinoan aged (635 Ma) tillite, called Namuskluft and the older Sturtian aged (716-720 Ma) tillite, called the Numees were visited.

Once again it was a pleasure to join my French colleagues Prof. Brigitte Senut and Dr. Martin Pickford on another palaeontological survey to the Sperrgebiet National Park in April 2019. The main aims of this field season were to survey known sites for new fossil specimens and to survey new areas for fossils. A total of 198 fossils were collected. Some of the significant discoveries made included a new in situ fossil oyster layer at Kling-

hardtfelder No. 24 and the discovery of an associated skull and skeleton of the rodent *Bathyergoides neoter-tarius* at the Langental Mammal Site.

I joined my supervisor, the deputy director of Geo-Information, Ms Kombada Mhopjeni on a twelve-day benchmarking visit to Germany in June 2019. We managed to visit various museums and institutions in Freiberg, Chemnitz and Dresden, like the Natural History Museum of Chemnitz, the Senckenberg collections of the Museum for Mineralogy und Geology, the Freiberg Museum and Terra Mineralia to benchmark on museum databases as we are planning on developing a modern database for our museum collections. If you love minerals the Terra Mineralia Museum in Freiberg is definitely a must see.

Then I was fortunate to join another team in July 2019 all the way from Australia, under the competent leadership of Prof. Patricia Vickers-Rich from Swinburne University re-looking at the stratigraphy of Nama Group rocks on Farm Pockenbank and discussing the palaeontology on Farm Aar.

In August 2019, I was invited to be a co-leader for the Geological Society 50th Anniversary Conference Geology and Stratigraphy of Southern Namibia pre-conference field excursion by the current chairperson of the Geological Society of Namibia and leader of the southern Namibia excursion, Dr Ingrid Stengel. During this trip we visited sites such as Brukkaros Mountain, Nama Group sediments and fossils, Dwyka and Eccca Group sediments and fossils and learned a lot about the geomorphology in southern Namibia. After this field excursion I attended the Geological Society 50th Anniversary Conference in Windhoek, Namibia, where I gave a presentation on the two new discoveries made in Karoo rocks at

National Earth Science Museum, Geological Survey of Namibia – Windhoek

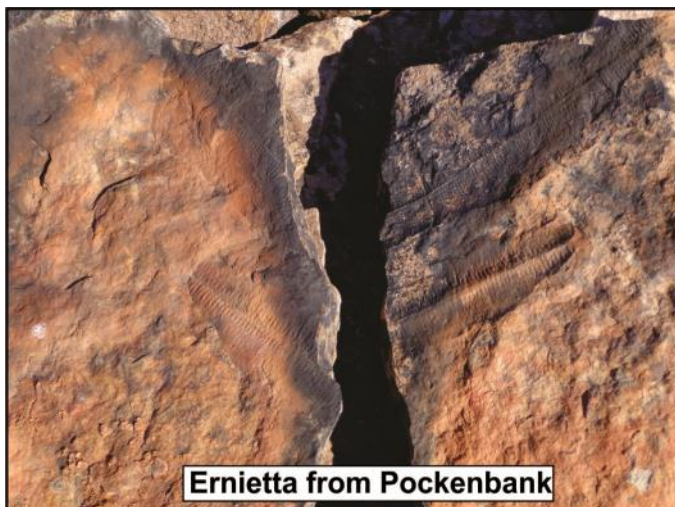
Helke Mocke, Geological Survey Museum of Namibia



Rhenosterkloof in Namibia and their possible implications.

This year once again our museum was lucky to receive a grant of N\$ 10 000 from the Museums Association of Namibia for its Heritage Week activities in September 2019. The theme for this year is “*Namibiab |o|gauba Sao*”, which means “Follow the Namibian Beat” in the KhoeKhoegowab (Nama) language. This year the museum has decided to hold an art competition based on the following two themes; 1) Geology (rocks, gems, minerals, mountains, fossils) and you, and 2) Geology (rocks, gems, minerals, mountains, fossils) and music in the museum for grade 5 primary school pupils from various schools in Windhoek.

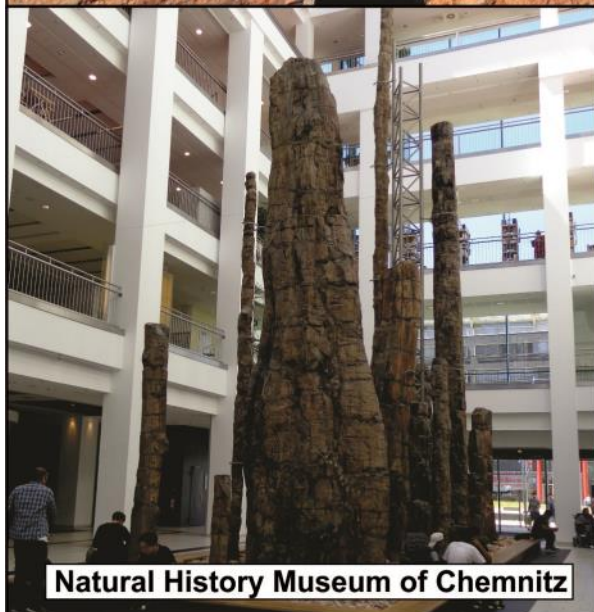
Various scientists and students visited the country for research on our collections and field surveys. These included Prof. Brigitte Senut and Dr. Martin Pickford, who visited the Sperrgebiet for a palaeontological survey, Dr Jonah Choiniere and his M.Sc. student Rick Tolchard to describe and study the rauisuchid specimen from Omingonde, Prof. Roger Smith and his team, who visited the Gai As for a palaeontological survey, Dr Simon Darroch and his team, who visited Neoproterozoic sites in southern Namibia, Prof. Patricia Vickers-Rich who visited Ediacara fossil sites and Dr Christian Kammerer to study Karoo specimens.



Ernietta from Pockenbank



Ernietta Hill on Farm Aar



Natural History Museum of Chemnitz



Terra Mineralia Mineral Exhibit



I suspect it's been a long time since the Palnews last heard from Florisbad Quaternary Research Station (FQRS), but I'm pleased to say we are still very much alive and kicking down here in sleepy Bloemfontein.

Our Department has undergone some profound staffing changes in the last 12 months. November last, Lloyd Rossouw, Head of Archaeology at the National Museum, took over as interim director (while remaining HOD of Archaeology) at FQRS and as of a month ago his appointment to FQRS has become permanent. We are excited and deeply relieved (or at least I am) that Lloyd is staying – mostly because he is the only person that knows anything about the fossil collections. The author, for one, would definitely be lost without him. James Brink, I am sad to say, lost a long fight with cancer on Monday 23 September 2019. He was a key figure in Cenozoic palaeontology in South Africa and his absence will be felt by many. We at the FQRS would like to express our deepest condolences to his family and to all those whose lives he touched.

Other changes at FQRS include the departure of Daryl Codron, who is pursuing new adventures at the University of the Free State Zoology Department. A move which precipitated the appointment of yours truly to the FQRS. I am learning that the Free State is full of Quaternary fossils and that Bloemfontein is full of a different (still breathing) kind of fossil. Sharon Holt, Collections Manager in the FQRS and PhD candidate at the University of the Free State, has continued to hold the fort, our last defender, who by the time this goes to publication will have completed her PhD (on the Leopard Tortoise and *Chelonia* remains from Wonderwerk Cave) and be graduating from UFS, later this year. Many congratulations to her as it's been a lot of work, even precipitating the building of the largest comparative collection of modern tor-

toises in the country, and the only one to make an effort to collect post-crania.

As I write the field season at FQRS is coming to an end. It's been another successful year for the #ModderRiverProject with international collaborators Britt Bousmann (Texas State University), Michael Toffolo (Bordeaux Montaigne University) and Kirsten Wroth (University of Tübingen) conducting excavations into two previously untested sites Lovedale and Damvlei, and continuing work on the massive Erfkroon project. Wonderwerk Cave and the Matjies River collection also attracted Liora Horwitz and Pat Smith (both from the Hebrew University of Jerusalem). It has been a great season, that has seen some marvellous finds and established some new and exciting collaborations which I hope to be able to tell you about soon. I had the opportunity earlier this year to attend the East African Association of Palaeontology and Palaeoanthropology (EAAPP) conference in Nairobi, where I presented some small carnivore research. Sharon also represented the department at the Association of Southern African Professional Archaeologists (ASAPA) conference where she presented a poster on Oldowan and Earlier Stone Age tortoise remains from Wonderwerk Cave.

Lloyd and I also made the news! – well the local Volksblad anyway, for the discovery of a new Pleistocene and Holocene fossil locality near the town of Theunissen, Free State (the article can be found online here: <https://www.netwerk24.com/Nuus/Wetenskap/fossiele-buite-theunissen-gevind-20190828>). We were contacted by mining engineers when a sand mine on the banks of the Vet River turned up bones. I wrote up a little blurb of the find for the facebook page and next thing we knew we were in the newspaper! The finds are interesting, but not unusual and most of the bed looks to have

Florisbad Quaternary Research Station

Brigette Cohen, FQRS



been mined out, but we will monitor the situation for further developments.

We are also pleased to announce that the FQRS is receiving a makeover! The long overdue renovations should be starting later this year. We will, to the best of our abilities, endeavour to keep the collections and facilities accessible, so if you were hoping to access the collections please drop us a line ahead of time so we can get things ready for you.

Finally, as my arrival has substantially reduced the average age of the department, I was promptly tasked with

dealing with all social media stuff. So, if you want to know more about what's happening with the FQRS then you can follow the museum's facebook page or me on Instagram (Search using my handle **cohenbrigette** – sorry but I refuse to use twitter)

- Ed's note: Do follow Brigitte, you won't be disappointed!



Brigette Cohen attending the EAAPP conference in Nairobi earlier this year.



Lloyd Rossouw & Brigitte Cohen pose for a selfie at the new fossil locality outside Theunissen.



Lloyd Rossouw shown discussing Middle Stone Age lithics recovered from the Lovedale excavations with Britt Bousmann



Britt Bousmann conducting a tour of the site Erfkroon. Delegates paused on top of the dongas to view the stratigraphy across the valley



Article on the new fossil locality near Theunissen which appeared in the Volksblad 29 August 2019.



Wat sê jy?



Stuur 'n
WhatsApp na
066 390 6855

Drs. Brigette Cohen en Lloyd Rossouw van die Florisbad-navorsingstasie het die terrein buite Theunissen besoek.

Foto's: NASIONALE MUSEUM, FACEBOOK

Fossiele buite Theunissen ontdek

Alet van der Walt

Die oer-lêplek van hiënas asook werktuie van mense uit die Ysertydperk en talle beendere wat 10 000 jaar of ouer is, is naby Theunissen ontdek.

Werknemers van 'n sandmyn in die Vetrivier buite die dorp het op die fossiele afgekom.

Drs. Lloyd Rossouw en Brigette Cohen van die Nasionale Museum se Florisbad-navorsingstasie het die terrein besoek en beendere uit twee tydperke geïdentifiseer.

Rossouw sê van die beendere dateer uit die meer onlangse Holoseen-tydperk, wat die laaste 10 000 jaar verteenwoordig, en dan is van die ander uit die Pleistoseen-tydperk, wat tussen 10 000 en 200 000 jaar oud kan wees.

Volgens Rossouw is van die beendere moontlik dié van 'n reuswildebees- of buffelspesie wat tot sowat 20 000 jaar gelede in die sentrale binneland voorgekom het.

Dié diere het in die Vrystaat voorgekom gedurende 'n tydperk toe die gebied meer waterryk en die grasveld meer pro-



Die uitgrawings waar die beendere en klipwerktuie ontdek is.



Heelparty beendere wat uit twee tydperke dateer is buite Theunissen in die Vetrivier gevind.

duktief as vandag was, soortgelyk aan die hedendaagse Okavango-delta.



Werkers van 'n sandmyn het op die beendere afgekom en die Nasionale Museum in Bloemfontein in kennis gestel.

Dit dui daarop dat dit baie lank gelede neergelê is.

Rossouw sê dit lê ook aan die kant van die rivier, wat daarop dui dat die rivier se loop oor die jare verander het.

Hoewel vermoed word dat van die beendere moontlik dié van 'n uitgestorwe buffel is, sal nog toetse gedoen moet word, waarna 'n kunstenaarsvoorstelling van die dier bekend gestel sal word.

Rossouw sê die teenwoordigheid van dié beendere lig die sluier oor hoe die omgewing duisende jare gelede gelyk het toe kos hier buitengewoon volop was.

Hy sê dit lyk asof van die nuwer beendere in die lêplek van 'n hiëna was.

Die klipwerktuie dateer uit die laat Pleistoseen-tydperk en die tekens van verwerking dui daarop dat dit afgespoel het in die rivier, waar dit in 'n gruislaag saam met die ouer beendere neergelê is.

Die beendere en klipwerktuie is 7 m onder die sand gevind.

The Turkana Hominin Cranium KNM-ER 1470 and its taxonomic issues

Francis Thackeray, ESI



Almost 50 years ago, on the eastern shore of Lake Turkana in Kenya, Richard Leakey (1973) discovered a remarkable hominin cranium (KNM-ER 1470) of early *Homo*, now thought to be close to 2 million years old. It has generally been attributed to *Homo rudolfensis* although there is still a question as to whether it might represent *Homo habilis*. However, as I have noted elsewhere (Thackeray 1999, 2013), there are several interesting observations that deserve attention. I look at them again in the context of two comparisons (Fig 1 a&b).

In mid-sagittal plane, the inner cranial wall of KNM-ER 1470 matches very closely the outer mid-sagittal contour of Ralph Holloway's (1972) reconstructed endocast of SK 1585 (*Paranthropus robustus*) from Swartkrans in South Africa (Fig. 1 b). In addition, the dental arcade of SK 83 (*P. robustus*) matches that of KNM-ER 1470 (Fig. 1a), and both specimens have broad flat faces like those of robust australopithecines (Thackeray, 1999).

Just as remarkably, the mean mesiodistal (MD) length of first lower molars attributed to *H. rudolfensis* is 14.4 +/- 0.8 mm (n=5), which is almost identical to the mean MD length of lower first lower molars for *P. robustus* (mean MD length = 14.7 +/- 0.7 mm, n=31; Thackeray et al, 2005).

The coefficient of variation associated with the mean cranial capacity of robust australopithecines is small (less than 4%). Perhaps one explanation is that specimens attributed to *Paranthropus* are sampling only part of a typical range of variation in a species. This in turn raises the question as to whether there is an extraordinary problem with Plio-Pleistocene hominin taxonomy, for the period between about 1.5 and 2.0 million years. How many hominin species are represented in the interval?

KNM-ER 1470 is thought to have a cranial capacity of 752 cc, whereas that of SK 1585 is only 530 cc (Holloway 1972, Holloway et al, 2004). Unfortunately, SK 83 is distorted such that its brain size cannot at the present time be accurately estimated, but it may be similar to that of SK 1585, recognizing that both have been attributed to *P. robustus*. A sagittal crest is recognizable in the case of SK 83, which evidently required such a crest to increase the surface area for the attachment of temporalis muscles of this presumed male. KNM-ER 1470 can be considered to have been sufficiently large to preclude the need for a sagittal crest, recognizing that the probability of sagittal crest development decreases in proportion to cranial capacity.

In 1990, in the pioneering years when CT scanners were beginning to be used to study hominin fossils, I placed the reconstructed plaster endocast of SK 1585 (attributed to *P. robustus*) within a cast of the right side of the cranium of KNM-ER 1470 (as shown in Fig 1b), and scanned them together. The results were absolutely extraordinary in the sense that one obtained a distinct impression of plastic deformation of the skull attributed to *H. rudolfensis*. The impression was that, if the flat facial bones of KNM-ER 1470 had been compressed directly from the front (breaking at nasion), *the temporal bones could have splayed laterally, expanding outwards as if they were hinged along the closed sagittal sutures (!)*. If this impression were to be correct, it could potentially account for an artificial increase in an estimate of the cranial capacity of KNM-ER 1470. Bromage et al (2005) have indeed indicated that the cranial capacity of 752 cc for KNM-ER 1470 is probably an overestimate. Conservatively, they proposed a value of *circa* 700 cc.

On close inspection of the two casts shown in Fig 1 (b), I found that in mid-sagittal plane there was a differ-

The Turkana Hominin Cranium KNM-ER 1470 and its taxonomic issues

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ence of about 2 mm between the inner cranial wall of KNM-ER 1470 and the outermost mid-sagittal contour of Ralph Holloway's reconstructed endocast of SK 1585. The implication is remarkable if one assumes that a difference of only 2 mm was uniform in three dimensions. It would suggest that KNM-ER 1470 might indeed have had a brain size substantially less than 752 cc. In fact, from one calculation based on a new reconstruction, Bromage et al (2005, page 49) indicated a diminished value of 625 cc.

Concluding Comments and Questions.

I express my deep admiration of Bernard Wood's (1991) outstanding efforts in describing KNM-ER 1470 and other hominins discovered in the Lake Turkana Basin by Richard Leakey. I thank Dean Falk and Ralph Holloway for kindly commenting on my photograph reproduced here (Fig. 1b), showing a comparison between the right side of the cranium of KNM-ER 1470 (attributed to *H. rudolfensis*), comfortably enclosing the white plaster endocast of SK 1585, attributed to *P. robustus*. Both Dean Falk and Ralph Holloway said they were astonished. I also thank Richard Leakey for his comment on a previous version of this article about 25 years ago when he said that he was amazed.

In response to perceptions of astonishment and amazement, I strongly recommend the use of sophisticated virtual reconstructions and comparisons based on CT scans of both KNM-ER 1470 and the reconstructed right hemisphere of SK 1585, as well as SK 83, in the context of taxonomy. Here are a few questions (and there is no harm in simply asking questions *in an exploratory line of thought*). Firstly, how many genera and species do these particular hominin specimens represent? Secondly, what are the implications if KNM-ER 1470 were to be considered a large-brained robust australopithecine (with large

molariform premolars; a broad flat face; and with a brain size sufficiently large to preclude the need for a sagittal crest), representing the same species as that which is represented by both SK 1585 and SK 83 (*Paranthropus robustus* Broom, 1938)? Or, thirdly, should all of these specimens be placed in the genus *Homo*, recognizing that some may regard KNM-ER 1470 as *H. habilis*, identifiable with the type specimen OH 7 with a cranial capacity of *circa* 700 cc (Holloway, 1980), described by Leakey, Tobias and Napier (1964)? Fourthly, is there necessarily a clear boundary between *Paranthropus* and *Homo*? Fifthly, and finally, what does one do (in terms of nomenclature) if there is no distinct boundary between species in these genera?

I do not intend to try to answer these outrageous, perplexing, provocative, extraordinary and bewildering questions, but I am simply playing the role of Devil's Advocate (with a thick skin that is required in the field of palaeoanthropology). I am prompting a thought experiment of the existence of *Homo robustus*, recognizing that the species nomen *robustus* (Broom, 1938) precedes that of *habilis* (Leakey et al, 1964), and recognizing that the genus nomen *Homo* (Linnaeus, 1758) precedes that of *Paranthropus* (Broom, 1938).

It was Darwin (1854) who wrote 'it is not easy to exaggerate the difficulty of discriminating species and varieties' and it is Thackeray (2018) who advocates the concept of sigma taxonomy (as opposed to alpha taxonomy) when boundaries between genera let alone species are not always clear.

I conclude by making the statement that this thought experiment may lead to nothing. But nothing may be accomplished without exploratory thought experiments. "A thought experiment is a device with which one performs an intentional, structured process of intellectual delibera-

The Turkana Hominin Cranium KNM-ER 1470 and its taxonomic issues

Francis Thackeray, ESI



tion in order to speculate, within a specifiable problem domain, about potential consequents (Yeates, 2004). One advocate of thought experiments was Einstein who even chased light beams.

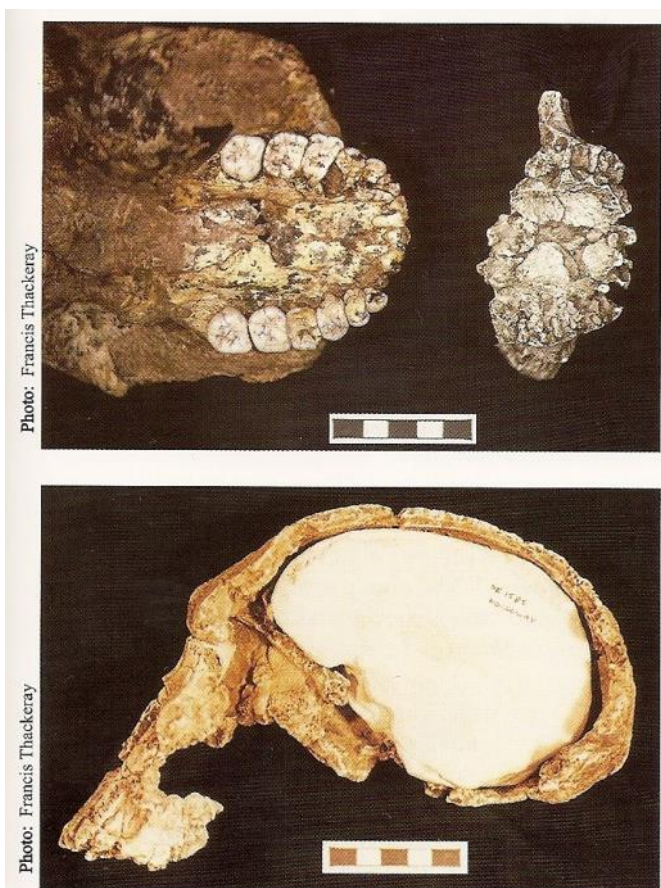
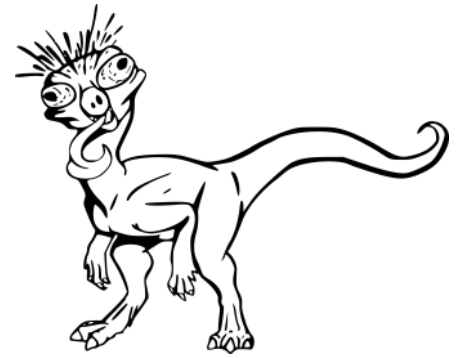


Fig. 1 (a) Upper photograph (left) shows the maxilla of SK 83 (attributed to *Paranthropus robustus* from Swartkrans, South Africa), compared to (upper right) a cast of the maxilla of KNM-ER 1470 (attributed to *Homo rudolfensis* from East Turkana, Kenya). The two maxillae have almost identical dental arcades in terms of both size and shape. (b) Replica of the right side of the cranium of KNM-ER 1470 (attributed to *Homo rudolfensis*), comfortably enclosing the plaster endocast of a specimen from Swartkrans (SK 1585) attributed to *Paranthropus robustus*, with a gap of only about 2mm. Plaster endocast reconstructed by Ralph Holloway. This comparison was first published by Thackeray (1999).

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Comic Corner

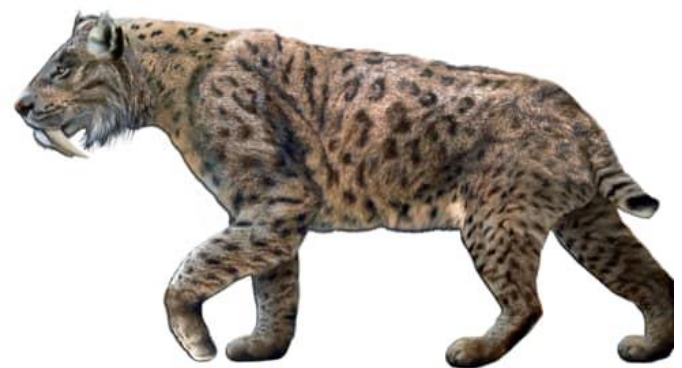


The Great American Interchange ***The Abbreviated Version***

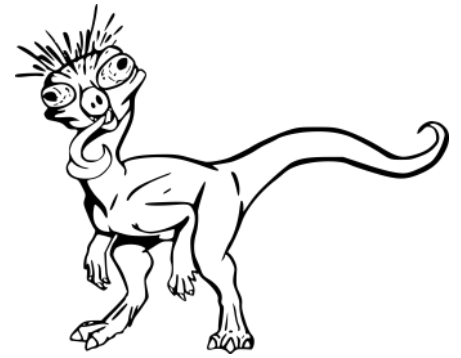
"Who are you?"



"I'm you but better."



Comic Corner



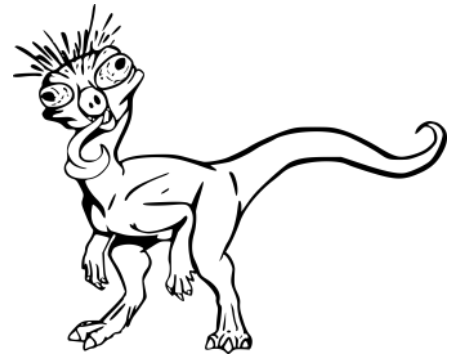
**PEOPLE: OMG,
IT'S LIKE A LIVING DINOSAUR!**



ACTUAL LIVING DINOSAURS:



Comic Corner



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