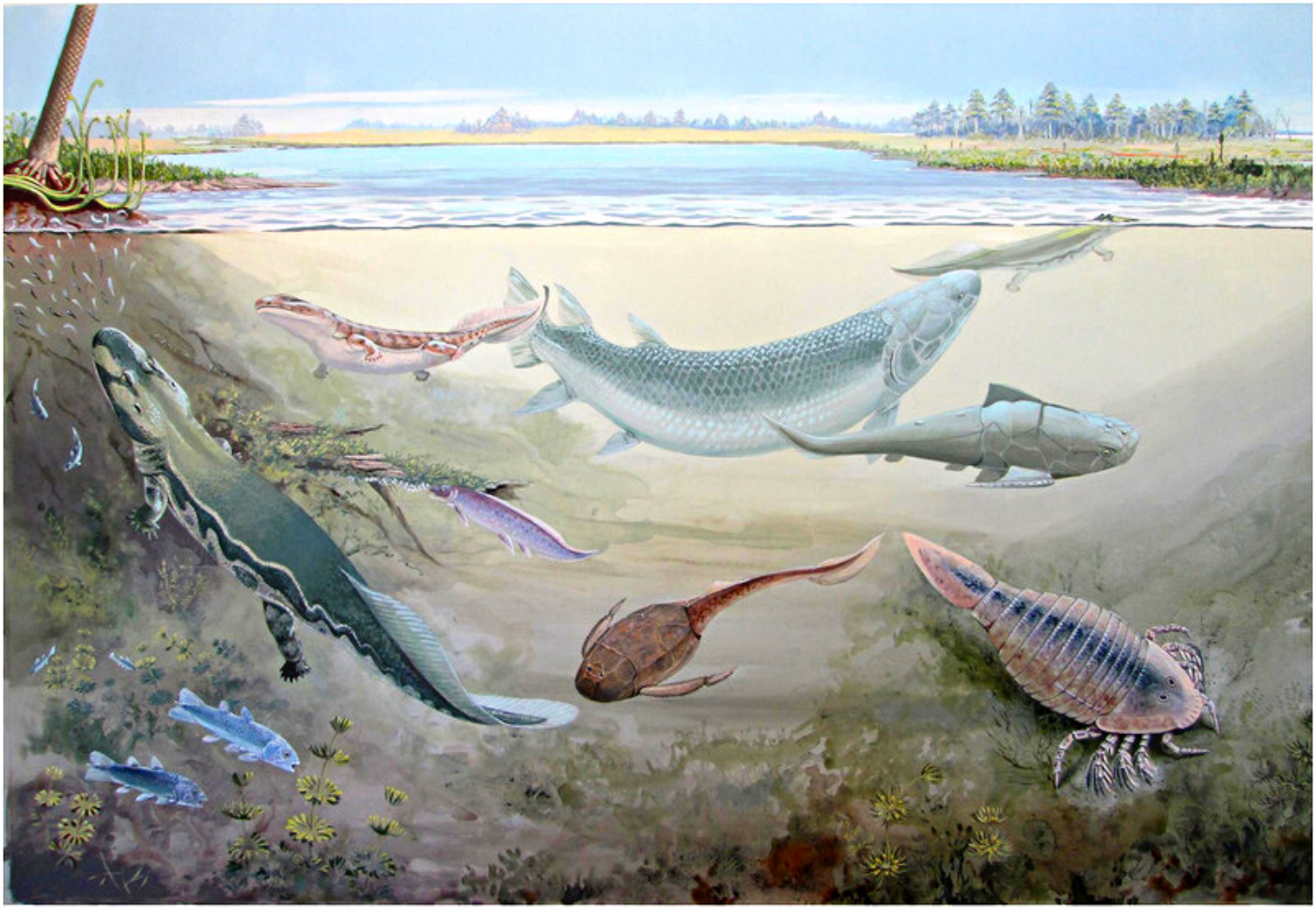
PalNews

Biannual newsletter for the Palaeontological Society of Southern Africa



Part of Maggie Newman's Waterloo Farm triptych, here showing the more freshwater part of the Late Devonian estuarine system - R. Gess

WITH CONTRIBUTIONS FROM

Julien Benoit • Kimi Chapelle • Jonah Choiniere
Anusuya Chinsamy-Turan • Rob Gess • Chris Harris
Nikos Kargopoulos • Jessica Logie • Helke Mocke
Atashni Moopen • Robert Muir • Maria Eugenia Pereyra
Caitlin Leigh-Rabe • Bruce Rubidge • Izak Rust • Roger Smith
Nadia Teixeira • Francis Thackeray • Steve Tolan • Fay-Yaad Toefy
Marc Van den Brandt • Pia Viglietti • Bailey Weiss • Megan Woolley

CONTENTS

PALAEO-PALAVER

From the Editor

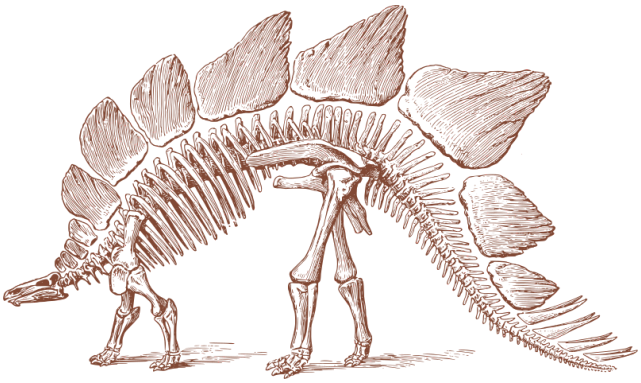
It is my great pleasure to re-introduce PalNews this April. Our community, and indeed the world, has seen many changes since the release of the last issue in September of 2019. In the aftermath of the pandemic, communities are still recovering from the long-term effects of isolation and it is vitally important that we re-establish our pathways of communication.

PalNews has long been an avenue through which we share the interesting developments in our research, community projects, fieldwork anecdotes etc. This is a platform to share that which we are *proud of* and that which *perplexes us*, to update our colleagues across the globe, to enjoy in the exciting work being done in our community, and to hold space in remembrance of those who have passed.

I offer my sincerest thanks to everyone who contributed to this wonderful issue, and I encourage everyone to consider a piece for the October issue. There is room for a little bit of everything in PalNews, so if you are considering writing something, please do!

Sincerely

Caitlin Rabe
PhD Candidate at the University of Cape Town
PalNews Editor



GENERAL ANNOUNCEMENTS

Election of a new PSSA Executive Committee:

Prior to the 2022 BGM, the president solicited for nominations of candidates to stand for election, and to serve as PSSA officers for 2022–2024. The candidates who were voted in as members of the PSSA Executive Committee for the next term are as follows:

PRESIDENT: Prof Anusuya Chinsamy-Turan (UCT)

VICE-PRESIDENT: Dr Miengah Abrahams (UCT)

HONORARY SECRETARY: Prof Emese M. Bordy (UCT)

HONORARY TREASURER: Prof Jonah N Choiniere (WITS)

PALNEWS EDITOR: Ms Caitlin Rabe (UCT)

COMMUNICATIONS OFFICER: Dr Kimberley Chapelle (WITS) with website assistance from Ms Chandelé Montgomery (WITS), Mr Bailey Weiss (WITS) and Mr Brandon Stuart (WITS)

STUDENT MEMBER: Ms Chandelé Montgomery (WITS)

MEMBER-AT-LARGE: Dr. Sifelani Jirah (WITS)

News from Jennifer Botha:

I have recently moved to the Evolutionary Studies Institute at the University of the Witwatersrand. My email has changed to jennifer.botha1@wits.ac.za.
Please distribute to anyone who may need to get in touch with me.

Professor C. Barry Cox

29.07.31 – 24.01.23

Christopher Barry Cox was born in London in July 1931.

Qualifications: Bachelor in Zoology, Oxford University, 1953; Doctor of Philosophy in Palaeontology, Cambridge University, 1956; Doctor of Science, University of London 1974.

Career: Commencing as a lecturer in vertebrate zoology, King's College, University of London in 1956, he left as Assistant Principal in 1993. He was a member of paleontological expeditions to Zambia & Tanzania 1963, Argentina 1967, Brazil 1972 and Australia 1978.

Barry attended Cambridge University to study for his PhD, researching Upper Permian dycnodont *Kingoria* under Francis Rex Parrington from 1953 - 1959. He spent some time at the Natural History Museum in London, where they had developed a new technique using acetic acid to dissolve the crystals that held the matrix of sandstone or mudstone together. It allowed him to transform a nodule with signs of a skull into a skull completely clean of rock, showing all the tiny holes and canals for the nerves and blood vessels, in a detail that had never been seen before. He published his work in 1959 and named his dicynodont *Kingoria* after the name of a village near to where it had been found in Ruhuhu, southern Tanzania.

British vertebrate palaeontologists and anatomists organised a symposium, which took place at Cambridge in 1954. The greatest palaeontologist of his generation, Professor Al Romer of Harvard University came to the symposium. Barry had his acid-prepared specimens out on show, which Romer showed great interest in. Whilst teaching and carrying out research at King's College, London, Barry was successful in achieving a Harkness Fellowship of the Commonwealth Fund in the United States.

After arriving in the States, Barry stayed with Al and Ruth Romer. Romer was the Director of the Museum of Comparative Zoology (M.C.Z.) at Harvard, where Barry was taken to work. George Simpson was also working there, who was one of the great names in not only the vertebrate palaeontology of mammals, but also evolutionary theory and zoogeography, plus some famous geologists.

Romer had recently been on a collecting trip to the Andes in Argentina, and had come back with a skull and skeleton of a completely new dicynodont, for Barry to study and describe. It came from the Triassic Period, and Barry realised that it was a new genus related to a well-known Triassic dicynodont from South Africa.

He named it *Ischigualastia*, and it was quite different from the Brazilian dicynodont, *Dinodontosaurus*.

After much travelling around America, Barry arrived in Berkeley, where he stayed with Malcolm Carnegie McKenna. The Museum in Berkeley had the remains of *Placerias*, the skull of which had been very badly put together from a selection of scores of fragments of some 20 different skulls. Barry was allowed to take much of it to pieces and do a different restoration, which was a lot more credible than the previous one. Barry finally returned to the UK in September 1960.

The British Museum (Natural History) & University of London Palaeontological Expedition to Northern Rhodesia and Tanganyika 1963

James Kitching from the Bernard Price Institute and Alan Drysdall from the Geological Survey of Northern Rhodesia (now Zambia) had found important fossil reptiles, synapsids and amphibians in the Upper Luangwa Valley during two extensive expeditions in 1960 and 1961. Kitching then offered his services to any other team wanting to return there.

It was decided to have a joint expedition to Northern Rhodesia and Tanganyika (where Parrington had found his specimens in the 1930's). It was organized by Alan Charig and Bill Ball from the British Museum (Natural History). Also in the team were Barry Cox, John Attridge, (a palaeontologist from Birkbeck College London), and James Kitching, who joined the team in the Upper Luangwa Valley only.

Left to right: Charig, Attridge, Cox 1963

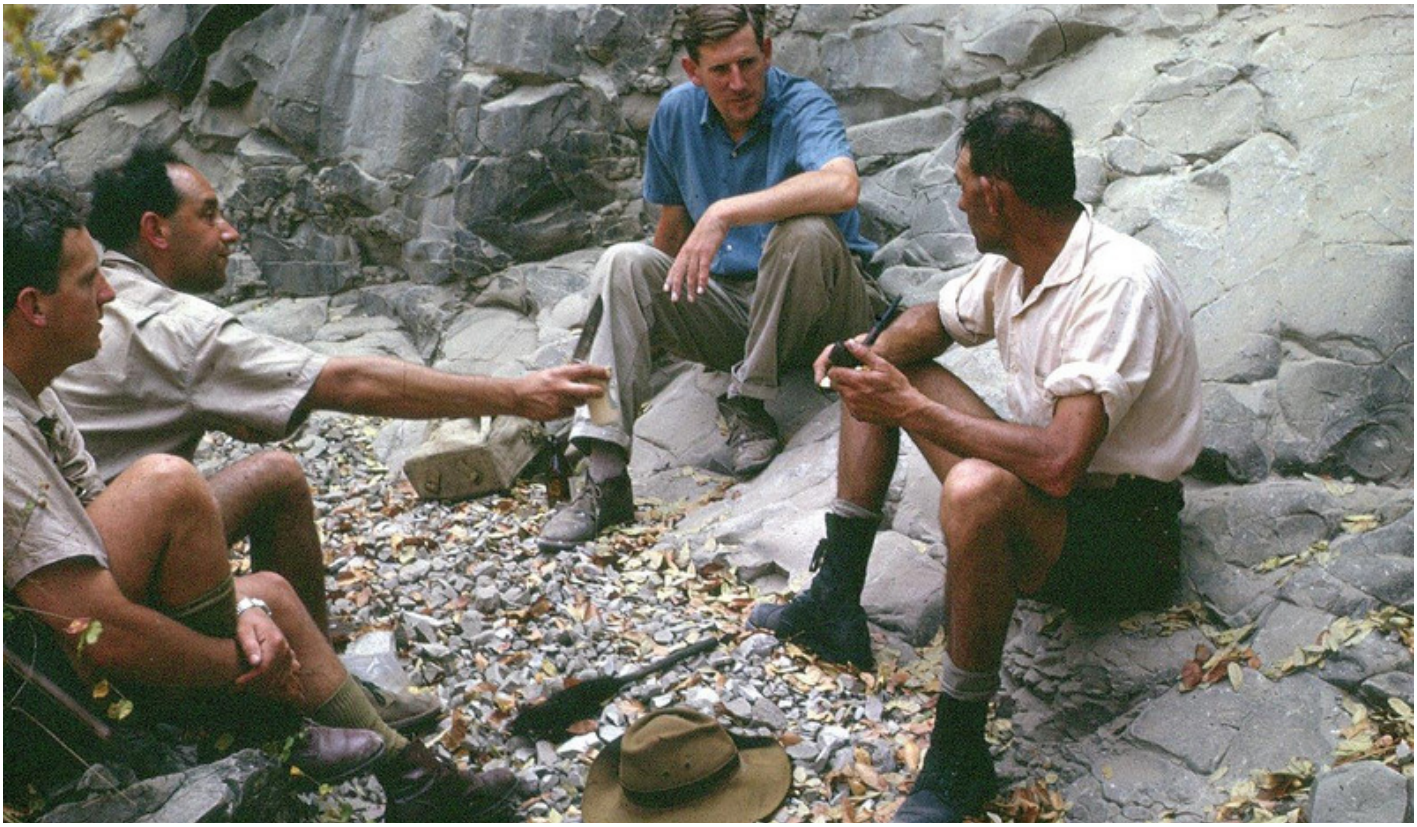
Charig, Ball, Attridge and Cox left England and flew to Salisbury (now Harare). After amassing all their vehicles, equipment and supplies, they drove to Northern Rhodesia via the Kariba Dam and onto Lundazi, which was the location of the government administrative centre closest to their fieldwork. They were allocated a game guard, to protect them from dangerous animals such as buffalo, lion, rhino and elephant.

They continued north to a village called Sitwe, which was just north of the River Luwumbu. Barry was in charge of labour and took on 30 men who went out to make roads towards the localities where James Kitching had found fossils, up to 30 miles away.

Barry took a slightly different path back to camp one day and found several piles of pieces of dicynodont limb bones. He collected several hundred bone fragments that he later described as *Zambiasaurus* ("the drowned reptile from Zambia"). After his restoration, the skull was put on one of Zambia's first sets of stamps. The remains of the skulls showed that the new genus seemed ancestral to a Brazilian dicynodont called *Stahleckeria* – interesting evidence for continental drift. Barry also found and named another Triassic dicynodont, *Sangusaurus*, named after the Sangu River it was found near. At the end of collecting in Northern Rhodesia, the team had collected some 160 specimens, weighing nearly 3 tons which were shipped back to England.

They then met up with Fuzz Crompton, (Director of the South African Museum in Cape Town), Barry Hirschson (an amateur palaeontologist from Cape Town), and Arthur Cruickshank, (who had followed Barry in doing a Ph.D. with Parrington). The team drove northwards through Nyasaland (now Malawi) and crossed into Tanganyika. They set up camp at Litumba, the administrative centre of south-west Tanganyika. They employed a work-force of 20 villagers to make roads and river crossings.

The team collected 220 specimens, weighing 2½ tons, which were shipped back to England. Most of them came from Triassic rocks, but Barry had wanted to collect in the Permian rocks where Parrington had collected from back in the 1930s, where his Ph.D. specimens had been found. There he found some unusual specimens of *Endothiodon* (that Barry published 50+ years later). It had been a very successful expedition and provided a good quantity of research material, which several members of the team used in later years.



Lunchbreak in the field. Left to right: Cox, Charig, Attridge, Kitching 1963

For Barry, it was back to work at King's College. His research on the *Endothiodon* in the American Museum of Natural History appeared in 1964, and his major paper on the Triassic dicynodonts that he had studied at Harvard, appeared in the Philosophical Transactions of the Royal Society in 1966.

Al Romer wrote to Barry in 1967 to say that he had found some more dicynodonts in Argentina and invited him to describe them. Barry spent a few weeks there describing the new genus, *Chanaria* (1968).

Barry also re-described the remains of *Eunotosaurus* from South Africa in 1969, which had been described as the ancestor of the tortoises and turtles. The specimens prepared out well using the acetic acid technique, so that he was able to remove all the rock from around the bones, that showed that it was a very strange, very early little reptile, with very expanded ribs.

Barry went on to write several popular books on prehistoric animals.

Continental Drift

Even in the early 1960s, the idea that the continents might move was still contentious and not accepted by most geologists. But, as Barry had noted, the similarities between the dicynodonts on either side of the Atlantic provided increasing evidence for drift. So, when a geologist published a paper trying to solve an old biogeographical problem (the presence of marsupials in Australia and South America, but not in the intervening continents) Barry was able to answer it with a paper showing how some of the new evidence for continental drift explained it better. That was published in Nature (1970), and led to other invitations to speak or write and he published four other papers on the biogeography of extinct animals in 1973.

It was clear that the earliest land vertebrates, which lived up to the Early Permian geological period, had evolved in a land mass made up of Europe plus eastern North America, and had only spread to other parts of the world in the Late Permian, when Asia and the great southern continent of Gondwana had joined onto Euramerica. However, Barry noticed that there was also evidence for them in one locality in northern Brazil, outside Euramerica. That contradicted his theory, so in 1972 he organised an expedition to go there and investigate.

Barry obtained a grant from the Royal Society, and invited John Attridge to join him. They arrived in Recife, on the north-east coast of Brazil, to be met by Lew Price, the leading Brazilian palaeontologist, who had found the original specimens back in 1947.

They spent several days looking for fossils near Pastos Bons, and found several more amphibian snouts. The genus, *Prionosuchus*, which Lew Price had already described, was very like the modern fish-eating crocodile, the gharial, with a long, narrow snout ending in an expanded tip with a battery of teeth for spearing fish. They also found the remains of lungfish and of other fish, so it was all a fresh-water environment in which they had lived. John Attridge also found the remains of a very big snout, that belonged to what was probably the longest fossil amphibian known. They also found some vertebrae of other amphibians of a type that suggested that the rocks in which they lie are Late

Permian, not Early Permian as Lew had previously thought. That was confirmed by further investigation of the geological sequence. So, the presence of amphibians there did not conflict with Barry's rule that the earliest ones were only found in "Euramerica". The expedition ran from July 19th – September 15th 1972.

Biogeography

In 1972 Barry's friend Malcolm McKenna invited him to give one of the keynote addresses at the opening of the First International Congress on Systematic and Evolutionary Biology (ICSEB), in Boulder, Colorado, in 1974. Barry realised that if he added the positions of the shallow seas to established geological maps and made maps of the results for each of the periods during which the inter-relationships of the continents were unchanged, the result was a set of maps showing the real geography of each period of time. He then added the names and locations of fossils that had been found for each period, so that he could then list the fauna of each land-mass, and see how these changed through time.

The result was revolutionary. For the first time, this provided a simple and compelling explanation of how the moving and colliding continents allowed land vertebrates, after their evolution in Euramerica, to spread to other parts of the world as they diversified. His lecture was deemed a huge success, and he soon published it as a research paper (1974).

One of the sets of lectures that Barry gave at King's College was on biogeography – the patterns of distribution of animals and plants around the world, both today and in the past He later wrote a book on the subject which was published by Blackwells in Oxford in 1973 as 'Biogeography – an Ecological and Evolutionary Approach'. It became very successful and is currently available in its 10th edition (2020).

In 1988 Barry took a year's sabbatical at Stanford University, USA. He also arranged to continue some of his palaeontological work at Berkeley University, working on fossils that he had collected in Africa (*Rechnisaurus*) and Brazil (*Prionosuchus*). As a result, when he got back to Britain, he had 3 completed manuscripts, which were published in 1990 and 1991.

Whilst Assistant Principal at King's (1989-96), Barry was able to return to research for the remaining years of his career. He started by studying the fossils of the dicynodont genus *Endothiodon* that he had collected in Tanzania way back in 1963. But this immediately threw up major problems in the classification of the South African Permian members of the group, so he applied for a grant from the Royal Society to visit South Africa to help in his research. This enabled him to spend time in several of the universities there, and see some of the great specimens that their technical staff had worked on. This gave him some new insights into the evolution of these dicynodonts, and he was able to publish a paper on them that appeared in 1998 – two years after he retired.

Retirement paused

In 2007 I contacted Barry, eager to learn more about his involvement in the 1963 BM (NH) Expedition to Zambia and Tanzania, which I was researching. I met Barry for the

first time at his house in Ashtead, Surrey in 2008, and he told me that he had decided to continue with his palaeontological research, and showed me two well-preserved skulls he had collected in Ruhuhu in 1963. They were *Endothiodons*, but had a unique feature; they were the world's only tusked specimens.

I put Barry in touch with Ken Angielczyk of the Field Museum in Chicago. Ken went to see Barry and the fossils, and they agreed to work together on the paper. Barry named the new species *Endothiodon tolani* (*E. tolani* has since been found in Zambia and Mozambique). Barry described this paper as his 'swan song' which was published in 2015.

Barry passed away peacefully in the UK on 24th January 2023, aged 91.

Obituary written and pictures provided by Steve Tolan, Luangwa Valley, Zambia.

Sitwe Camp 1963

From Left to Right - Cruickshank, Hirschson, Crompton, Attridge, Charig, and Cox 1963

Dr. William J. de Klerk

02.09.52 – 09.07.22

Dr. William J. de Klerk, known to all simply as "Billy," was a relentlessly upbeat colleague with a buoyant personality and a deep love of Africa.

Billy was born in Johannesburg on 2 September 1952 and matriculated from Potchefstroom Boys High where he built many boyhood friendships which became life-long. His huge circle of friends was an asset he greatly prized. He enrolled at Rhodes University for a BSc degree in Geology but this expanded into an MSc and ultimately a part-time PhD on the Bushveld under the supervision of Hugh Eales.

While at Rhodes he met Vivian Cole – they were later married and remained totally devoted to each other. Billy initially worked as an exploration geologist for FalconBridge in Namibia, before embarking on a short career in the platinum industry in Swartklip and Rustenburg, ending up with Atomic Energy Corporation at Pelindaba where he was based out of Krugersdorp. At the time Viv had a part-time teaching position at the Krugersdorp Hoer Skool, but was lured into academia at Rhodes, and Billy was appointed to the staff of the Albany Museum as Curator of Natural History Collections in 1986.

At that time, computerisation of museum natural history collection catalogues was the subject of debate at every SAMA conference but little was being done. Billy took the bull by the horns and used the D-Base compatible and inexpensive database programme PC File to digitize the Albany Museum collections. As a result, he was asked to give courses to curators at different museums in the country and this set the stage for the well-organized state of the Karoo fossil stores nationwide.

Although trained as a geologist, at the Albany Museum Billy was able to indulge his life-long passion for fossils. Eventually the position of Curator of the Earth Sciences Department was established at the Museum, and happily Billy was appointed to the position which he enthusiastically occupied for three decades. In this capacity he built the fossil collections of the museum by initially exploring the relatively unresearched Jurassic and Cretaceous deposits of the Sundays River and Kirkwood formations of the Algoa Basin. This was initially undertaken by himself but the programme expanded to include numerous local and international collaborators, many of whom continued to work with him well into his retirement. This team discovered several new dinosaur species and opened a new avenue of palaeontological research in South Africa.

Because of his keen eye for spotting fossils,

Billy later expanded his horizons to include the Karoo. From the Beaufort Group he described a remarkable palaeosurface bearing the footprints of seven individuals of the large dicynodont *Aulacephalodon* walking across the floodplain. This provided new evidence on the morphology of the genus and also social and herding behaviour of dicynodonts, the dominant herbivores of the Permian period. His collecting prowess included the dinosaur-bearing beds of the Stormberg and his discoveries of well-preserved dinosaur specimens have resulted in several important papers.

Billy lectured Palaeontology to undergraduate students at Rhodes University for more than two decades, overseeing many honours projects (including that of his son, Andrew, also nicknamed "Billy" by his university peers). He was renowned for his field trips, which were widely regarded as "edutainment", and which visited key palaeoheritage sites such as the Kirkwood cliffs, Addo Elephant National Park, and of course the Karoo. He published more than 20 peer-reviewed scientific papers, which have been cited nearly 1000 times. Chief among these contributions was his work in the Kirkwood Formation, including the discovery of *Nqwebasaurus thwazi*, the first dinosaur to bear an isiXhosa name.

Billy made major contributions to the public understanding of Palaeontology through museums and outreach. He had superb manual preparation ability (evidenced by turned wooden bowls and pepper grinders gracing many of our dinner tables), and used it to make beautiful display items out of the specimens he collected. As the Earth Sciences Department at the Albany Museum grew under his headship he taught and transferred his preparation skill to newly appointed fossil preparators in his department.

Billy at Addo Elephant National Park with his display on the Kirkwood Formation. His life-sized model of *Nqwebasaurus thwazi*, an early ornithomimosaurian theropod dinosaur discovered by him, fills the foreground - 2011

Billy's revamped palaeontological displays at the Albany Museum, with artwork by Gerhard Marx, continue to draw visitors and school groups, and graphics from these displays have been widely used in local and international publications. He has been a pioneer in the building of life-sized reconstructions of South African prehistoric animals for the Albany Museum displays and these models have subsequently also been bought by other museums in South Africa. His exhibition on the Kirkwood Formation at Addo Elephant National Park is seen by 160,000 people per year.

Billy was instrumental in setting up the country's first sustainable fossil palaeotourism project in the Karoo, at Nieu Bethesda, and he remained involved in this venture until his death. He also served the disciplines of museology and science through active participation on several committees. For these contributions, Billy was awarded a lifetime membership by the Palaeontological Society of southern Africa in 2016, the highest award of that society.

We remember Billy for his balanced humanitarian view of life, his indomitable enthusiasm and great sense of duty to the Palaeosciences and fellow humans. He energized any fossil expedition he joined, and made visiting the Albany Museum a wonderful experience for many years. Outside of palaeontology he was an expert wood-turner, a keen birder and conservationist, a veritable master sommelier of South African vintages, and a diehard fan of good old rock n' roll. He was loved by children and young people as he always had an unexpected and exciting trick up his sleeve. He treasured his family, was a wonderful father and grandfather, and together he and Viv established a generous and welcoming home in Makanda. Billy is survived by his wife Viv, his children Jenny, Andrew, and Chris, and grandchildren William, Erin, Richard and Michael. He lived a very full life, he and Viv travelled extensively, both locally and internationally, where they always made time to call on their large circle of friends.

Obituary written and pictures provided by Jonah Choiniere

Billy putting the finishing touches onto his reconstruction of the gorgonopsian *Rubidgea* for the palaeontology exhibit at the Albany Museum.

Some news from the PSSA Communications Office

Hello all! It's so great to see everything back up and bustling. At the last PSSA meeting, we elected a brand new Communications Officer, in charge of sharing news and information on the PSSA website and various social media platforms. We have since recruited some wonderful volunteers who will be assisting in this mammoth task. The website will be getting a full upgrade and revamp, and the social media platforms will be going back to daily content sharing.

Our aim is to showcase you and your work. Please make sure to send us regular content (your new papers, noteworthy papers in general, field photos, awesome fossil photos, museum photos, or anything you would like to share!).

Our email address is palaeosa@gmail.com. Keep an eye out on the following platforms from April onwards:

Website: https://www.palaeosa.org/
Facebook: PSSA - Palaeontological Society of Southern Africa
Instagram: @palpssa
Twitter: @PalPssa

In the meantime, please meet your new PSSA Communications Office!

Kimberley Chapelle
POSTDOCTORAL FELLOW - EVOLUTIONARY STUDIES INSTITUTE, WITS UNIVERSITY.

I am a vertebrate palaeontologist from South Africa, currently doing a postdoctoral fellowship at the Evolutionary Studies Institute at Wits University. Plant eating dinosaurs are my favourite, especially the baby ones! My research has mainly focused on basal sauropodomorphs, the ancestors to well-loved giants like *Diplodocus*. Using a multidisciplinary approach that includes CT-scanning, osteohistology (looking at bones under a microscope), functional and comparative anatomy, statistics and more, I explore how these creatures grow, move and evolve.

Atashni Moopen

PHD CANDIDATE – EVOLUTIONARY STUDIES INSTITUTE, WITS UNIVERSITY.

I am a vertebrate palaeontologist, currently completing my PhD at Wits university. My research focus is early branching sauropodomorphs, their evolution, and their palaeobiology. I use a multidisciplinary approach that includes comparative anatomy, CT scanning, bone microanatomy and osteohistology, systematics, and statistical modelling to understand the macroevolutionary patterns of these early dinosaurs. During my MSc research, it became quite clear how much experimentation and diversity there was in Late Triassic sauropodomorphs, and this was hampered by low sample size of well-documented specimens.

Bailey Weiss

PHD CANDIDATE – EVOLUTIONARY STUDIES INSTITUTE, WITS UNIVERSITY.

My research focuses on early crocodylomorphs, mostly from the Jurassic of South Africa. By using traditional techniques such as comparative morphology, photography, and thin sectioning as well as more modern methods such as synchrotron imaging, I investigate their morphology and growth patterns. Many species from this group are extremely rare in the fossil record and are poorly understood. My MSc focused on understanding the bone microanatomy and life habits of the dicynodonts from the Karoo.

Robert Muir

SENIOR LECTURER – UNIVERSITY OF THE FREE STATE

I'm a geologist with broad research interests, but a soft spot for understanding how a changing landscape affects the life that occupies it. Typically, I utilise radiogenic isotopes in conjunction with field-observations (sedimentological, structural or palaeontological) to answer research questions, either by dating important stratigraphic units, exposed surfaces, or determining a rock's thermal history.

Chris Harris

PHD CANDIDATE - SCHOOL OF GEOSCIENCES, WITS UNIVERSITY.

I am working on sedimentary deposits in the Cape Fold Belt, with a focus on life and environments of the Late Devonian Witteberg Group.

News from Graaf-Reinet

Bruce Rubidge & Marc Van den Brandt

In mid-2020 Bruce and Marina Rubidge translocated to Graaff-Reinet, not to retire but to rather stimulate palaeontology in the Karoo. Since moving to the Karoo they have worked on improving the displays and public offering of the Kitching Fossil Exploration Centre (KFEC) in Nieu Bethesda which managed to survive the Covid catastrophe. However, their major project is the setting up a new Karoo palaeontological research and outreach centre in Graaff-Reinet, which will be allied to the Evolutionary Studies Institute at the University of the Witwatersrand and will serve as a field-based research and teaching centre for the University.

The nucleus for this centre is the Rubidge Fossil Collection, which will be moved from the farm Wellwood to the new research institute in Graaff-Reinet. Funding has been raised to establish the centre and employ a technician and a postdoc in Graaff-Reinet. Bruce Rubidge (Director), Marc Van den Brandt (Postdoc) and Justin Arnols (Technician) are now set up and are currently working from a temporary facility in Parsonage Street in Graaff-Reinet. Architect plans have been drawn up and displays are being planned for the new institute. It is anticipated that the development will take about 2 years, but will hopefully be well advanced by the time of the next PSSA Meeting in Graaff Reinet in mid 2024.

Marc and Bruce have been active with their various research programmes and Justin has been cutting his teeth preparing parieiasaur material for Marc's research programme and also specimens from the Rubidge Collection for exhibition. Bruce continues with his project on the palaeontology, stratigraphy and palaeoenvironment of the Middle Permian Lower Beaufort around the Karoo Basin. In March 2022 the team, comprising Mike Day, Julien Benoit, Sifelani Jirah, Luke Norton, Marc Van den Brandt, Justin Arnols, Emese Bordy and Bruce Rubidge undertook their usual 2 week fieldwork programme, this time to the area north of Prince Albert in the contact area between the *Eodocynodon* and *Tapinocephalus* Assemblage Zones to explore the new middle Permian biozone which Mike Day introduced at the PSSA meeting last year. This innovative paper earned Mike the coveted Order of the Boot Award. Sue Marriot and Paul Wright from the UK joined the team for a few days to provide palaeosol expertise. Congratulations to Sifelani Jirah for being awarded his PhD on the taxonomy and stratigraphic distribution of Titanusuchid dinocephalians.

Justin Arnols with a dinocephalian scapula discovery, near Beaufort West in January 2023

Marc for his Postdoc has been researching ever more pareiasaurs, at the major collections in SA and undertook a trip to the Natural History Museum in London in December 2022, to study historic South African holotypes still held by the Brits.

Marc hosted Russian collaborators Valeriy Golubev and Elena Boyarinova from the Borisyak Paleontological Institute, Moscow, during an extensive research trip to several institutes and museums in South African in August 2022, for Elena's PhD, which will enable us to use pareiasaur osteodermal morphology for systematics and taxonomic identifications for the first time, and several collaborative publications are planned between these two countries that holds most of the world's best pareiasaur remains.

Marc has also enjoyed Palaeontological Impact Assessment work with John Almond and Madelon Tusenius in the Sutherland and Beaufort West areas, where a plethora of new Wind Farms are planned, which cannot come online soon enough!

Marc and Mike relaxing after a hard day with fossils

Marc Van den Brandt in London with the "Blinkwater Monster" (holotype skull cast of *Pareiasaurus serridens* (Owen 1876)) the world's first named pareiasaur.

Papers published in 2022:

Abdala, F., Norton, L.A., Jasinoski, S.C., Botha, J., Fernandez, V., Rubidge, B.S., Gill, P.G. & Martinelli, A.G. (in press) On taxonomic issues, ontogenetic series and tooth replacement. *Comments on Diphyodont tooth replacement of* Brasilodon—A *Late Triassic eucynodont that challenges the time of origin of mammals* by Cabreira et al. *Journal of Anatomy*.

Benoit, J. Nxumalo M., Fernandez, V., Gaetano, L., Rubidge, B.S, Abdala, N.F. 2022. Synchroton scanning sheds new light on *Lumkia fuzzi* (Therapsida, Cynodontia) from the Middle Triassic of South Africa and its phylogenetic placement. *Journal of African Earth Sciences*, 196: 1 - 20. 10.1016/J.AFREARSCI.2022.104689.

Bordy, E.M., Choiniere, J.M., Smith, R.M.H., & Rubidge, B.S. (in press) Selected Karoo geoheritage sites of South Africa and Lesotho and their contributions to geoheritage. *Geological Society of London Special Publication*

Day, M.O. Ramezani, J., Frazer, R., Rubidge, B.S. 2022. U-Pb zircon age constraints on the vertebrate assemblages and palaeomagnetic record of the Guadalupian Abrahamskraal Formation, Karoo Basin, South Africa. *Journal of African Earth Sciences*, 186, 104435 https://doi.org/10.1016/j.jafrearsci.2021.104435

Groenewald, D.R., Day, M.O., Penn-Clarke, C. & Rubidge, B.S. 2022. Stepping out across the Karoo retro-foreland basin: improved constraints on the Ecca-Beaufort shoreline in the distal sector. *Journal of African Earth Sciences* 104389. 21pp. https://doi.org/10.1016/j.jafrearsci.2021.104389

Groenewald, D.P., Krüger, A., Day, M.O., Penn-Clarke, C.R., Hancox, P.J., Rubidge, B.S. (in press) Unique trackway on Permian Karoo shoreline provides evidence of temnospondyl locomotory behaviour. *PLoS One*

Hancox, P.J. &Rubidge, B.S. 2022. The Beaufort-Stormberg Group contact – Implications for Karoo basin development in the Triassic. *Journal of African Earth Sciences*. https://doi.org/10.1016/j.jafrearsci.2022.104767

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Prevec R., Nel, A., Day, M.O., Muir, R.A., Matiwane, A., Kirkaldy, A.O., Moyo, S., Staniczek, A., Cariglino, B., Maseko, Z., Kom, N., Rubidge, B.S, Garrouste, R., Holland, A. & Barber-James, H. 2022. South African lagerstatte reveals middle Permian Gondwanan lakeshore ecosystem in exquisite detail. *Communications Biology* 5: 1154. https://doi.org/10.1038/s42003-022-04132-y; www.nature.com/commsbio

Van den Brandt, M.J., Benoit, J., Abdala, N.F., Day, M.O., Groenewald, D.P., Rubidge, B.S. 2022. Taxonomy, phylogeny and stratigraphical ranges of middle Permian pareiasaurs from the Karoo Basin of South Africa. *Journal of Systematic Palaeontology* 19: 1367-1393, http://dx.doi.org/10.1080/14772019.2022.2035440

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Bishop, P.J, Norton, L.A., Jirah, S., Day, M.O., Rubidge, B.S.& Pierce, S.E. (in press) Enigmatic humerus from the mid-Permian of South Africa bridges the anatomical gap between “pelycosaurs” and therapsids. *Journal of Vertebrate Paleontology*.

Van den Brandt, M.J., Day, M.O., Manucci, F., Viglietti, P.A., Angielczyk K.D., Romano, M. 2023. (in press) First volumetric body mass estimate and a new in-vivo 3D reconstruction of the oldest Karoo pareiasaur *Bradysaurus baini*, and body size evolution in Pareiasauria. *Historical Biology*.

Van den Brandt, M.J., Cisneros, J.C Abdala, F., Rubidge, B.S. 2023. A re-description of the cranium of the late Permian pareiasaur *Nanoparia luckhoffi* (Broom 1936) from the Karoo Basin of South Africa, and an updated pareiasaurian phylogeny. *Revista Brasileira de Paleontologia* (in prep).

Szczygielski, T., Drozdz, D., Van den Brandt, M.J., 2023. *Saurodesmus robertsoni* (Seeley 1891) Triassic Crocodilian humerus or Cynodont femur? *Anatomical Record* (in prep).

Boyarinova, E., Golubev, V.K., Smith, R.H.M., Van den Brandt, M.J. 2023. Osteodermal arrangement pattern and detailed morphology revealed for the first time in *Pareiasaurus serridens* (Owen 1876). 2024. *Journal of Vertebrate Palaeontology* (in prep).

Devonian Ecosystems Project, Albany Museum, Makhanda

Rob Gess

Not having contributed since Feb 2018 it's hard to know where to begin, so I'll kick off with the present and then jump back to where I left off some time long before the plague.

2023 finds us in a bustling lab, looking forward to another productive year. Towards the end of 2022 Rose Prevec successfully presented a proposal, first to the Albany Museum Management, and then to the Trustees, for the Devonian Ecosystems Project to be allowed to extend our utilisation of the historic 'Old Priest's House', from the basement, into the street level portion of the building. Thanks to Rose, the Museum Management and the Trustees.

Our first reaction was to set up a small public gallery of fossils from the 360 myo Waterloo Farm lagerstätte - illustrated with some of the beautiful paintings that Maggie Newman (sponsored by SANRAL), has been painting for the roadside info centre that is slowly manifesting east of Makhanda.

The historic "Old Priests" House, where the Hopetown diamond was identified in the Catholic bishops sitting room - R. Gess

The gallery is proving a great success with well over a hundred individual visits a month. A number of schools have shown keen interest and we will be hosting school groups as the year unfolds.

We're also looking to enter into a partnership with someone to open a Devonian themed coffee shop in the former sitting room where the Hopetown diamond was identified.

Mpilo Nxumalo admiring part of our exhibit - R. Gess

Kokhela Camagu, with ten years' experience as a technical and outreach assistant in the Albany Museum Earth Science Department, joined us part time last year and this year has taken up a permanent position (funded by the Millennium Trust) as our outreach officer. She is a wonder with learners, who become infused by her positivity and enthusiasm. Her ability to explain the Devonian world in isiXhosa makes it accessible to a wide range of learners, and she has regulars of diverse backgrounds who keep coming back for more. Last year Khokela did two online courses in palaeontology and this year has embarked on studying Zoology One at Rhodes University.

Khokela helping out with some curation - R. Nel

Shawn Johnstone, who also did part time technical assistance in our lab last year is working full time in the lab this year (funded by the Millennium Trust). He is simultaneously finishing his Masters degree in Igneous Petrology at Rhodes. Shawn is our most practical team member and can be relied on to make or fix whatever needs making and fixing. He is passionate about extending our public display and is enthusiastically engaged in preparing additional exhibits.

Shawn mounting a slab of placoderm plates for display - C. Reddy

Chris Harris is in the latter stages of his PhD project, based at the school of Geosciences, Wits University (Co-supervised by Jubair Jinnah, Cameron Penn-Clarke, myself and Asinne Tshibubudze) - unravelling the mysteries of the Witpoort Formation to determine the depositional environments of the Late Devonian fossil localities around Makhanda. In his usual thorough way he is pursuing all lines of evidence including stratigraphy, sedimentology, petrography, and ichnology.

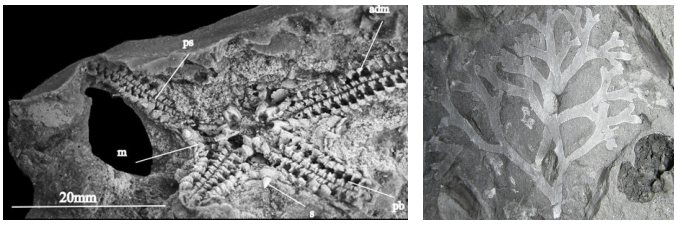
Chris with a pleasing Coombs Hill trace fossil in our lab - R. Gess

Ryan Nel is making good progress with his PhD project, reviewing South Africa's placoderm record. Ryan has a Masters in Geology/Palaeontology from UFS and spent a few years as a school teacher in Queenstown, before realising that life without palaeontology was a pale shadow of the real thing. He joined our lab in 2021, testing the waters with a year as our lab/research assistant. He soon found his feet, or should I say flippers, in the Devonian lagoonal setting, developing a deep fascination with armour plated fish, whilst also exhibiting signs that his passion as an educator had not been left behind in the classroom.

At the beginning of last year he registered through the Rhodes geology department for his PhD, co-supervised by myself and Prof. Kate Trinajstic of Curtin University (Western Australia). He is reviewing the Placoderm taxa from Waterloo Farm, both previously undescribed and described – drawing on a far larger collection than was available at the time of the first placoderm publications. In addition he is learning segmentation and applying it to Bokkeveld Group placoderm fossils from the Klipbokkop Formation.

Ryan getting up close to a large disarticulated Waterloo Farm Arthrodire Placoderm - S. Johnstone

Cait Reddy is starting her Msc journey in the Devonian lab, registered through the Rhodes Geology Department. Last year she did her honours project in the lab, for which she received a first class result. Her honours project involved taxonomically describing South Africa's oldest known Brittle Stars Ophiuroids, from the Baviaanskloof Formation of the uppermost Table Mountain Group. Her project, co-supervised by Mhairi Reid, involved breaking up blocks from a lag deposit in order to collect more specimens and silicone pealing mould and cast preserved ophiuroids, before taking a deep dive into the world of early Ophiuroid taxonomy. Her results should appear in print this year.



Silicone peal of an Early Devonian Ophiuroid (C. Reddy) and a Late Devonian seaweed (R. Gess)

For her Msc she has leapt forward 50 million years to study Late Devonian seaweeds, principally from Waterloo Farm, under the co-supervision of myself and Dr Cyrille Prestianni of Liege University (Belgium).

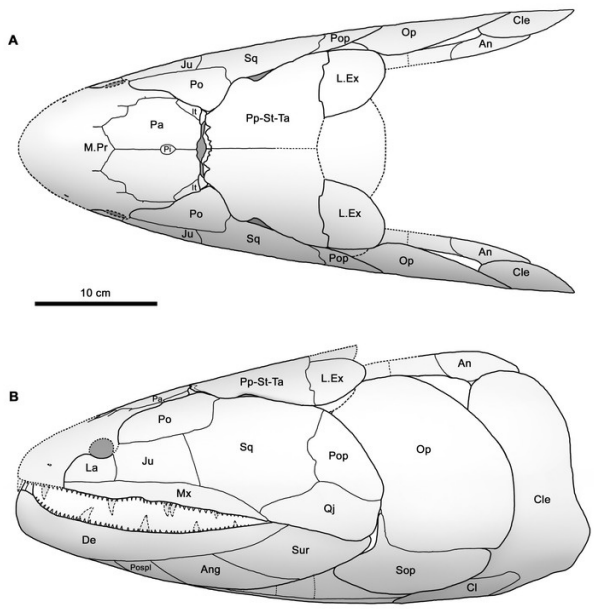
Cait Reddy discussing a small Ophiuroid with myself and Mhairi Reid in 2021 - R. Nel

Artistic reconstruction of *Hyneria udlezinye* by Maggie Newman.

Our first paper this year was: 'Gess, R.W. and Ahlberg, P.E. (2023) A high latitude Gondwanan species of the Late Devonian tristichopterid *Hyneria* (Osteichthyes: Sarcopterygii), PLoS ONE 18(2): e0281333.'
This resulted from a lengthy collaboration between Prof Per E. Ahlberg (University of Uppsala) and myself. It involved three-dimensional reconstruction of the head and shoulder girdle of a giant Lobe-finned-fish, based on geologically flattened isolated bones and scatters of bones, recovered from Waterloo Farm shale over almost 30 years.

Extinct Tristichopterid fish are the nearest relatives of Elpistostegalians and tetrapods and thus distant cousins of land-living vertebrates. This is the first tristichopterid fish from a polar stetting; Waterloo Farm having been well within the Antarctic Circle during the Late Devonian. In addition it adds significant support for a hypotheses of a Gondwanan origin of giant derived forms.
The new description furthermore identifies the top osteichthyan predator in the Waterloo Farmecosystem, which reached up to 3 metres in length, and probably snacked on our ancestral tetrapods *Tutusius* and *Umzantsia*.

Whilst I recently battled to get the media interested in an Early Devonian flora, the concept of a viscous near 3 metre long lurking predator with fangs, lying in wait for our distant ancestors, really lit the journalistic flames. *Hyneria udlezinye*, elevated to the company of *Dunkleosteus*, Gorgonopsians, *T.rex*, *Megaladon*, Sabre-toothed Cats and the Vikings, was enthusiastically covered around the world.



Scientific reconstruction of the head and shoulder girdle of *Hyneria udlezinye* from Gess and Ahlberg, 2023.

So on, or should I say back, to a brief catchup of some Devonian research highlights from the last few years.

2018 witnessed publication of two descriptions of Waterloo Farm plants in collaboration with Dr Cyrille Prestianni – one a new species of lycopod, *Kowieria alveoformis* and the second, one of the few known Devonian sphenophytes *Rinistachya hilleri.*

A sprig of the lycopod *Kowieria alveoformis* & a fertile whorl of the sphenophyte *Rinistachya hilleri* - R. Gess.

The year's highlight though was publication, in Science, together with Per Ahlberg, of two species of tetrapod from Waterloo Farm. *Tutusius mlambo* and *Umzantsia amazana* are the earliest known 4 legged creatures from Africa by 80 million years. They join under two dozen other known Devonian tetrapods. Their description overturned the text book belief that all Devonian tetrapods lived in tropical habitats, generally in Euramerica, with one each from China and the tropical northern shore of Gondwana, represented by Australia. As Waterloo Farm was deep within the Antarctic Circle, their description was revolutionary. It's only because of Waterloo Farm that we now know that all the prerequisites for subsequent terrestrialisation of tetrapods were present in southern Gondwana by this time: that is aquatic stem tetrapods, wooded environments and terrestrial invertebrates.

Painting of *Umzantsia* (left) diving to catch a Bothriolepis, with *Tutusius* (right) perched on a submerged Archaeopteris trunk, eyeing a *Gondwanascorpio* - by Maggie Newman

This combination was previously only recorded from tropical Eurasia, informing assumptions about the cradle of terrestrial tetrapods. Now the field of possibilities is wide open. The lab enjoyed numerous visits international colleagues. Chris Harris and I both enjoyed presenting at PSSA in Bloem and Chris at the 5th IPC in Paris. Chris Harris as our research/lab assistant was incredible at outreach, such as Scifest Africa and made a head start on his work on the Coombs Hill fossils.

2019 - The years' publications included one with Alice Clement (Flinders University, Australia), describing the first known polar Devonian lungfish, *Isityumzi momlomde*. Prof Hari Tsikosand I co-supervised the BSc Honours project of Ms Naadiya Hoosen in the Rhodes Geology Department, for which she received a distinction. Her dissertation, explored geochemical signatures of alternating reddish and blackish layers within the fossiliferous Witpoort Formation Coombs Hill sequence, concluding that they probable represented salinity fluctuations of a possibly seasonal nature.

Together with Prof Marion Bamford I also co-supervised Chris Harris' dissertation for his MSc at ESI, which described a number of new species of lycopod plant from the Late Devonian and provided a detailed analysis of new material of *Archaeopteris notosaria*, southern Africa's earliest known tree. Most of the material was previously collected by Chris from the Coombs Hill locality.

International research visitors included Dr Cyrille Prestianni and Dr Tetsuto Miyashita (University of Chicago) who came to continue our work on Devonian lampreys. In September the 15th International Symposium on Early and Lower Vertebrates was held in Yunnan, China where I authored and co-authored a number of presentations and we enjoyed fantastic fieldtrips.

Dr Tetsuto Miyashita and I debating the finer anatomical points of a juvenile lamprey fossil - C. Harris)

Gess enjoying dinner with Donglei Chen, Prof Per Ahlberg, Prof Mike Coates and Dr Ben King - M. Brazeau

2020 was well, different. Nonetheless, I managed to get a lot done alone at the lab and as soon as 'travel for work' was permitted I managed to do fieldwork in early and mid Devonian strata, whilst socially distancing. 'Estuarine fish and tetrapod evolution: insights from a Late Devonian (Famennian) Gondwanan estuarine lake and a southern African Holocene equivalent', co authored by Alan Whitfield of SAIAB came out in Biological Reviews.

This extensive review paper put the tetrapods *Umzantsia* and *Tutusius* into a holistic ecological context. The Waterloo Farm lagerstätte is the ecologically best understood Devonian tetrapod bearing locality and this paper brought together and synthesised all that was till then known about it, with reference to other related sites throughout the world. The reconstructed ecosystem was compared with the modern Swartvlei Estuary. This highlighted the enduring role of estuaries in providing sheltered nursery areas for fish. Furthermore the paper pointed out that most Devonian tetrapod bearing sites have evidence for fish nurseries or for estuarine conditions, and suggested that the shallow-water-adapted piscivorous adaptations of the first tetrapods may well have been specifically adapted to exploit fish nurseries. In 2020 Chris Harris received his MSc cum laude, and by year end had launched into his ambitious PhD project.

In **2021** we started getting back to normal. Ryan came to take up the main Research/Lab assistant post at the lab. As the journals began to run smoothly again we enjoyed a bumper crop of publications:
These included a formal description of the non-marine bivalve *Naiadites devonicus*

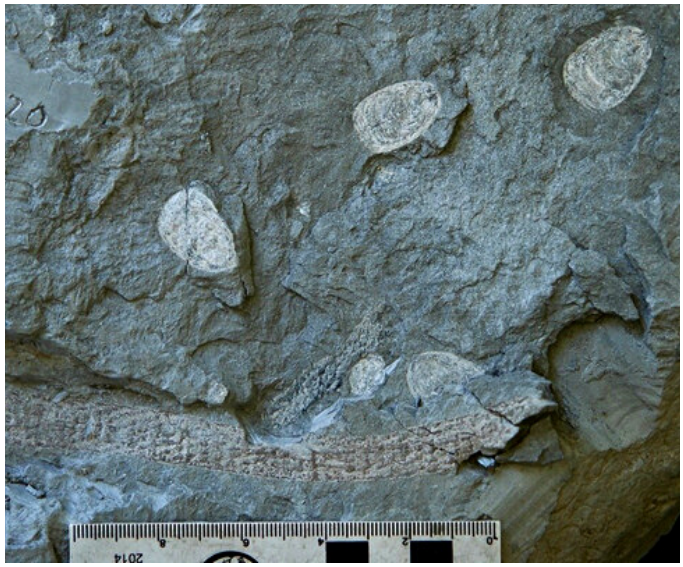
from Waterloo Farm in conjunction with Frank Sholtz; description of South Africa's earliest known flora from the earliest Devonian Baviaanskloof Formation of the Table Mountain Group with Cyrille Prestianni; and two multiauthor papers with Chris Harris as lead author, one an overview of the Coombs Hill fossil locality, and the other a description of two new species of the lycopod *Colpodexylon*, one from Coombs Hill and the other from Waterloo Farm.

Our highest impact paper was: Miyashita, Gess, Tietjen, and Coates (2021) 'Non-ammocoete larvae of Palaeozoic stem lampreys', published in *Nature*. This important paper described a full ontogenetic series of *Priscomyzon*, the previously described oldest known lamprey, from Waterloo Farm. This demonstrated lack of an ammocoete stage. Examination of previously undescribed juveniles of Carboniferous stem lampreys within the context of the *Priscomyzon* series indicated that they too lacked ammocoete larvae. This negates the theory, commonly held for the last 150 years, that the ammocoete to adult metamorphosis of modern lampreys preserves an ontogenetic recapitulation of the evolution of vertebrates.

In 2022 Ryan started his PhD, Cait did her honours project and Khokela, Shawn and Mpilo Nxumalo all started at the lab. Chris Harris and I described a lower Witpoort Formation locality, Rabbit Ridge, containing the youngest brachiopods known from the Cape Supergroup in the journal PALAIOS. Maggie Newman's (SANRAL sponsored) painting of the ecosystem made the front cover.

In addition, I described a new fern-like plant *Flabellopteris lococannensis* from Waterloo Farm with Cyrille Prestiani.

Reconstruction of a growth series of *Priscomyzon* at Waterloo Farm, amongst a meadow of *Octochara crassa* - Kristen Tietjen



Fossil lingulid brachiopods associated with a lycopod stem from the site - C. Harris

News from the Palaeobiology Research Group at UCT

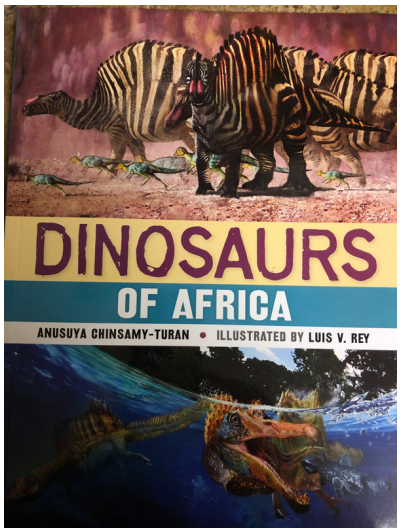
University of Cape Town, Palaeobiology Research Group. From left to right, top row: Fay-Yaad Toefy, Nadia Teixeira, Prof. Anusuya Chinsamy-Turan, Dr. Maria Eugenia Pereyra, Megan Woolley, Dr. Nikos Kargopoulos.
Bottom row: Jessica Logie, Caitlin Rabe. T-shirt design by Gina and Pia Viglietti.

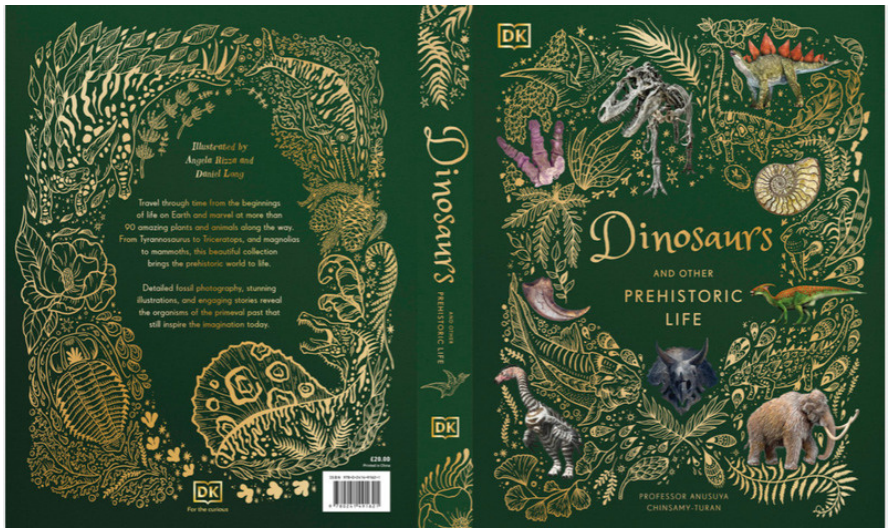
News from Anusuya Chinsamy-Turan

It was wonderful to catch up with many of you at Golden Gate Highlands National Park at the last PSSA meeting. Congratulations Jonah Choiniere and team for pulling it off! I am incredibly pleased that a decision was made at the meeting to revive the PSSA newsletter and I look forward to hearing everyone's news!

It is, however, tricky to decide where to begin! I think it might interest several of you to know that I published two popular level books during the pandemic: 1) "Dinosaurs of Africa" published by RandomHouseStruik; 2) "Dinosaurs and Other Prehistoric Life" published by Dorling Kindersley (DK).Despite the challenges of COVID I also managed to catch up with several research papers (see below). I am very relieved that we are returning to some semblance of normality these past few months.

Last November, me and two of my postgrads (Caitlin Rabe and Fay-Yaad Toefy) as well as former postdoc, Carmen Nacarino Meneses were able to attend the 6th International Palaeontological Congress in Khon Kaen in Thailand where we all





Covers of the new "Dinosaurs of Africa" and "Dinosaurs and other Prehistoric Life" books written by Anusuya Chinsamy-Turan

presented oral presentations about our research. We also had the wonderful opportunity of visiting the incredible Early Jurassic sauropod bone bed locality called Phu Noi, as well as the Early Cretaceous Phu Kum Khao locality (from whence *Phuwiangasaurus* was recovered), in Kalasin Province in Thailand. In December I was very happy to participate in the TEDx talks organized by GENUS Palaeosciences in Johannesburg.

Here is a link to the talk: Anusuya Chinsamy-Turan: What dinosaur bones reveal | TED Talk

Earlier this year Jesus Marugan-Lobon from the University of Madrid Autonoma, Spain, visited our lab where he presented a workshop on 3D morphometric analyses. He also gave a seminar on the incredible locality in Spain called Las Hoyas, which preserves both skeletal and soft tissue remains of a wide range of biota that lived in this Cretaceous wetland. I am thrilled to be collaborating with him and others on an enantiornithine from this locality.

I am especially delighted to let you know that in 2026 South Africa will be hosting the 7th International Palaeontological Congress conference in Cape Town. This is a huge “scoop” for our palaeontological community, and it will be a wonderful opportunity to highlight our palaeontological work here in South Africa.

Watch this space!

So, 2023 has kicked off to a great start for us here in the Palaeobiology Research Group at the University of Cape Town. We are thrilled that our lab is once again full, and bustling with new students and visiting researchers. It looks to be an exciting year as we work together on a diverse and multidisciplinary array of research projects, taking us from the Permian to the present across a plethora of fascinating species.

What follows are some brief introductions from our current complement of students on what it is that we do here in the "Bone Lab".

Visiting the bone beds at Phu Noi. From left to right: Carmen Nacarino-Meneses, Fay-Yaad Toefy, Caitlin Rabe, Anusuya Chinsamy-Turan and Varavudh Suteethorn

Maria Eugenia Pereyra
POSTDOCTORAL FELLOW

I studied biology at the University of La Plata, Argentina. I did my PhD on postcranial osteohistology of extant and extinct sauropsids, particularly in Argentinian species of crocodiles, birds, and turtles. My line of research now is mainly focused on the growth dynamics of neosuchian crocodiles through the analysis of the postcranial bone microstructure of both fossil and modern species. The study of extant species is essential to build a solid theoretical framework and to address inferences to closely related fossil forms. The results obtained will allow me to elucidate the growth dynamics of crocodiles and their relationship with the different body sizes (gigantism and dwarfism) that they developed, and to understand what were the evolutionary mechanisms that operated in the evolutionary history of the different lineages of this group.

Nikolaos Kargopoulos
POSTDOCTORAL FELLOW

I am a postdoctoral fellow at UCT working on extant giraffe cranial morphology using Geometric Morphometrics, in collaboration with the Giraffe Conservation Foundation. The topic of giraffe taxonomy has been obscure since the times of Linneaus, seriously affecting conservation efforts even today. The morphology of the skull can show important distinguishing features between populations, especially concerning the ornamentation of the males. Our goal is to present the outcomes on giraffe taxonomy based on cranial shape, in order to better understand the patterns of giraffe variability and assist genetic and ecological studies.

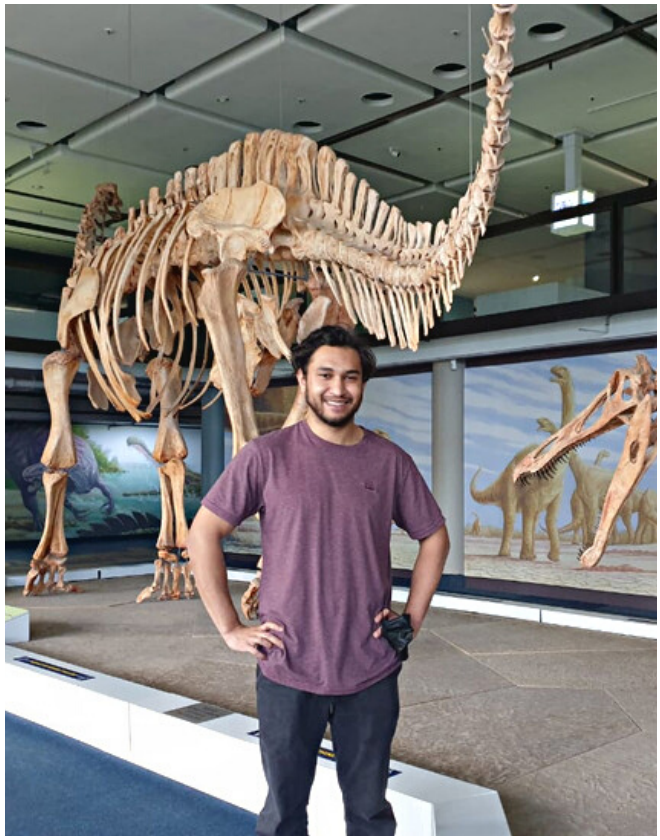
Caitlin Rabe
PHD CANDIDATE

For my doctoral thesis I am conducting a comprehensive investigation of the palaeobiology of the Permian dicyndont, *Diictodon*, through an ontogenetic series. I am using a multi-scale approach to examine crania, dentition and postcrania, and my project employs various methodologies including geometric morphometrics, CT scanning, and histological thin sectioning. The aim of this research is to provide a detailed description of *Diictodon's* growth and development in terms of functional morphology and physiology, with implications for diet, sexual dimorphism and behavioural ecology.

Megan Woolley
PHD CANDIDATE

I am a new Ph.D. student in Prof. Anusuya Chinsamy-Turan's Palaeobiology Lab at UCT. The working title of my project is 'Age estimation, life-history traits, and feeding ecology of modern and fossil cetaceans from South Africa'. We are going to assess several modern baleen and toothed whales using a combination of histology and isotope analysis. By applying what we learn about the modern balaenopterids, we hope to gain insight into the lives of the fossil balaenopterids from the Mio-Pliocene deposits of Langebaanweg. Histological assessment of undescribed, unidentified fragmentary ear bones may enable further taxonomic identification and a clearer picture of how these animals were living (and dying) off the west coast of South Africa 5 million years ago.

Fay-Yaad Toefy
MSC CANDIDATE



I am a vertebrate palaeontolgist working on dinosaurs. My master's project investigates the growth strategies pf sauropodomorph dinosaurs. By examining their bone microstructure, using histological thin-sectioning techniques, I hope to deduce their growth dynamics, and infer how gigantism may have evolved among the sauropods.

Nadia Teixeira
MSC CANDIDATE

I am a first year Master's student at the University of Cape Town. My research is focused on the cranial morphometric analyses of *Lystrosaurus*. *Lystrosaurus* is one of just a few therapsid genera to survive the End-Permian Mass extinction Event. I plan to utilise 3D geometric morphometrics to search for features that distinguish between the crania of the four different *Lystrosaurus* species, through an ontogenetic series. Given that landmarks model skull morphology geometrically, it will be possible to code for dietary changes (manifested in cranial morphology) and measure biting optima to assess not only the role of biomechanics in taxonomic divergences, but also whether such functional differences may have played a role in survivorship across the P-T boundary.

Jessica Logie
MSC CANDIDATE

I completed my undergraduate studies in Archaeology and Geography at UNISA and completed my Honours in Archaeology and Environmental Science at UCT in 2022. My thesis looked at the "Foraging and Locomotive Abilities of *Agriotherium africanum*", a giant Miocene bear from Langebaanweg. This year, I am starting my Master's in Palaeobiology where my project aims to identify and describe a basal sauropodomorph dinosaur specimen from the Early Jurassic. The specimen was excavated from the Barkley East Pass in the Eastern Cape by the late Billy de Klerk, and is curated by the Albany Museum.

Here is a list of recent peer reviewed publications from our lab:

MS Bhat, A Chinsamy, J Parkington 2023. Bone histology of Neogene angulate tortoises (Testudines: Testudinidae) from South Africa: palaeobiological and skeletochronological implications. *Royal Society Open Science*, 10(3).

JM Jannello & A Chinsamy 2023. Osteohistology and palaeobiology of giraffids from the Mio-Pliocene Langebaanweg (South Africa). *Journal of Anatomy.*

MR Woolley, A Chinsamy, & MW Caldwell 2022. Unravelling the taxonomy of the South African mosasaurids. *Frontiers in Earth Science.*

G Montoya-Sanhueza, NC Bennett, A Chinsamy et al. 2022. Functional anatomy and disparity of the postcranial skeleton of African mole-rats (Bathyergidae) in Recent Advances in the Ecology and Evolution of the Bathyergidae.

C. Nacarino-Meneses & A Chinsamy. 2022. Mineralized-tissue histology reveals protracted life history in the Pliocene three-toed horse from Langebaanweg (South Africa). *Zoological Journal of the Linnean Society*,196(3):1117-1137.

CJ du Toit, A Chinsamy, & SJ Cunningham 2022. Comparative morphology and soft tissue histology of the remote-touch bill-tip organ in three ibis species of differing foraging ecology. *Journal of Anatomy*, 241(4), 966-980.

C Rabe, A Chinsamy, & A Valenciano. 2022. Taxonomic and palaeobiological implications of a large, pathological sabretooth (Carnivora, Felidae, Machairodontinae) from the Lower Pliocene of South Africa. *Papers in Palaeontology*, 8 (5).

A Chinsamy, WD Handley, TH Worthy 2022. Osteohistology of *Dromornis stirtoni* (Aves: Dromornithidae) and the biological implications of the bone histology of the Australian mihirung birds. *The Anatomical Record.*

CA Forster, WJ de Klerk, KE Poole, A Chinsamy-Turan et al. 2022. *Iyuku raathi*, a new iguanodontian dinosaur from the Early Cretaceous Kirkwood Formation, South Africa. *The Anatomical Record.*

IA Cerda, D Pol, A Otero, & A Chinsamy 2022. Palaeobiology of the early sauropodomorph *Mussaurus patagonicus* inferred from its long bone histology. *Palaeontology.*

Bhat, M.S., Shelton, C., A. Chinsamy. 2022. Bone histology of dinocephalians (Therapsida, Dinocephalia): palaeobiological and palaeoecological inferences. *Papers in Palaeontology.*

Montoya-Sanhueza,G., Šaffa, G. Šumbera, R, A Chinsamy, JUM Jarvis. 2022. Fossorial adaptations in African mole-rats (Bathyergidae) and the unique appendicular phenotype of naked mole-rats. *Communications Biology* 5 (1), 1-13

Canoville, A., Chinsamy, A., & D. Angst. 2022. New Comparative Data on the Long Bone Microstructure of Large Extant and Extinct Flightless Birds. *Diversity* 14, no. 4: 298. https://doi.org/10.3390/d14040298

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News from the Field Museum of Natural History, Chicago

Pia Viglietti

I've been based at the Field Museum of Natural History in Chicago for four years now, where I am currently a Research Scientist in the Geology section of the Negaunee Integrative Research Center. I have also been appointed as an Honorary Research Associate of the Evolutionary Studies Institute. During this appointment I became a Y1 National Research Foundation rated researcher, so thank you to the NRF and the ratings panel for awarding me this rating.

I wanted to also update the community on research avenues that I have begun to develop. Much of the research focuses on southern and eastern Africa's Triassic record, which is an interesting period of time because it is bookended by two major mass extinctions. As a result, it documents the recovery from the End-Permian mass extinction event, transition to reptile-dominated communities, and later those dominated by dinosaurs after the extinction of many of these reptile groups at the close of the Triassic.

Two main research projects I am developing help to better understand these important transitions, and involve collaborators in the USA, South Africa, Tanzania, and Zambia.

Mass extinction recovery project

Surprisingly, mass extinction recovery has been poorly studied. Much of the prior focus on the End-Permian mass extinction event has emphasized the cause of this mass extinction event, and recently it has also been shown that ecosystem recovery in the Karoo after this event was not rapid as previously thought (Viglietti et al. 2021, PNAS; Smith et al. 2022). The exploration of specific species traits like body size and trophic level, could expose relationships between ecosystem functioning (i.e., how changing foodweb structure impacted community stability) and survivorship that ultimately led to true ecosystem recovery.

In collaboration with Ken Angielczyk (Field Museum), Adam Huttenlocker (University of Southern California), James Crowley (Boise State University), Jennifer Botha (Evolutionary Studies Institute), Claire Browning (Iziko South African Museum), Roger Smith (Evolutionary Studies Institute), and Wendy Taylor (Arizona State University, University of Cape Town) we are submitting a National Science Foundation Proposal that will complement the work already underway on Botha and Smith's African Origins Platform grant.

My PhD student registered in the Wits School of Geosciences, Thabile Seerane, will also be joining this project by collecting body size data on Permo-Triassic tetrapods, and in co-supervision with Dr. Grant Bybee (Wits Geosciences) she will also be collecting non-destructive data on trophic structuring in Permo-Triassic tetrapods from the Karoo Basin using Calcium isotopes. Seerane is moving down section from her MSc where in co-supervision with Jonah Choiniere (Evolutionary Studies Institute) and myself she was awarded a distinction for her work on body size change in dinosaurs spanning the Triassic-Jurassic Boundary in the Karoo Basin.

Timing Triassic tetrapod radiations in southern and eastern Africa

This project was inspired during fieldwork conducted in Zambia in 2019 (with Brandon Peecook, Chris Sidor, Megan Whitney, Joseph Museba, and Steve Tolan) and aims to provide improved geochronology for key Middle Triassic stratigraphy in South Africa (Katberg and Burgersdorp formations), Tanzania (Kingori Sandstone and Manda Beds), and Zambia (Escarpment Grit, Ntawere Formation, and Red Marl).

Currently, southern and eastern African fossil-bearing assemblages suggest a “long fuse” evolution of archosaurs – particularly for bird-line archosaurs (Avemetatarsalians) that began soon after the End-Permian mass extinction. But, this is in conflict with the better time-calibrated South American assemblages that suggest a Late Triassic evolutionary “burst” scenario. This project forms part of another NSF grant proposal that will be submitted this year and involves

In the field with Brandon Peecook during the 2019 expedition to the Luangwa Basin, Zambia - Steve Tolan (Chipembele)

collaborators from South Africa (Claire Browning, Roger Smith, Wendy Taylor), Tanzania (Pastory Magayane Bushozi), USA (Ken Angielczyk, James Crowley, Sterling Nesbitt, Brandon Peecook, Peter Roopnarine, Chris Sidor), and Zambia (George Mudenda, Joseph Museba, Steve Tolan). These temporal refinements will facilitate more informed comparisons and a new, quantitative picture of Triassic tetrapod biogeography that spanned southern Gondwana in a post End-Permian mass extinction world, and leading up to the Age of Dinosaurs.

Bill Stanley Memorial Fund

Another exciting avenue I have been developing with the founder of Puppet Planet and PalaeoLink (Wendy Taylor), Iziko South African Museum Curator of Karoo

Palaeontology (Claire Browning) and Ken Angielczyk (Field Museum) are ways to promote knowledge-sharing between the Field Museum and Iziko South African Museum. We have been rewarded with a successful collaboration between PalaeoLink and our recently awarded Stanley Field Proposal which will bring Iziko Karoo Palaeontology collections manager Zaituna Skosan and Sibusiso Mtungata from the Karoo Palaeontology Fossil Preparation lab to the Field Museum of Natural History in mid-2023. Zaituna, Sibusiso, and Wendy visited the Field Museum in May 2019 for the SPNHC conference (Society for the Preservation of Natural History Collections), which inspired us to begin fostering this inter-museum collaboration. At the Field Museum later this year, we plan to create educational video content using PalaeoLink platforms, and will keep you all updated on how this progresses.

Zaituna Skosan (left) Sibusiso Mtungata (middle) and myself pose in front of Sue the *T.rex* in the popular Evolving Planet exhibit at the Field Museum of Natural History, Chicago.

Relevant Publications

Viglietti, P. A., Rojas, Alexis., Rosvall, Martin., Klimes, Brady., Angielczyk, Kenneth, D., Network-based biostratigraphy for the late Permian-mid Triassic Beaufort Group (Karoo Supergroup) in South Africa enhances biozone applicability and stratigraphic correlation. *Palaeontology*, doi: 10.1111/pala.12622.

Smith, R.M., Botha, J., Viglietti, P.A., 2022. Taphonomy of drought afflicted tetrapods in the Early Triassic Karoo Basin, South Africa. *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology* 604, 111207.

Viglietti, P. A., Benson, R. B., Smith, R. M. H., Botha, J., Kammerer, C. F., Skosan, Z., Butler, E., Crean, A., Eloff, B., Kaal, S., Mohoi, J., Molehe, W., Mtalana, N., Mtungata, S., Ntheri, N., Ntsala, T., Nyaphuli, J., October, P., Skinner, G., Strong, M., Stummer, H., Wolvaardt, F. P., and Angielczyk, K. D., 2021, Evidence from South Africa for a protracted extinction event on land. *Proceedings of the National Academy of Sciences*, https://doi.org/10.1073/pnas.2017045118.

National Earth Science Museum, Geological Survey of Namibia

Helke Mocke

Museums around the world have been affected in many ways by the Covid pandemic and we were only recently able to return to a sense of normality. As our museum forms part of the Geological Survey of Namibia, we have been becoming more involved with the International Union of Geological Sciences. The IUGS embarked on a new chapter called the "First 100 Geological Heritage Sites".

Geological surveys around the world and those working with geological heritage were tasked with nominating key places with geological elements and/or processes of scientific international relevance, used as a reference, and/or with a substantial contribution to the development of geological sciences through history. Five sites were nominated for Namibia and of these the Namib Sand Sea, Glacial Record of the Marinoan Snowball Earth and the Tsumeb Ore Deposit were chosen to become part of the first 100 sites accepted worldwide. The other two sites, "Ediacaran-Cambrian paleontological and geological sites of the Nama Group, Namibia" and "Fish River Canyon" will be re-evaluated for the second round of proposals.

The final first 100 sites were distributed as follows: Africa 15 sites, America 34 sites, Asia – Pacific / Middle East 23 sites and Europe 28 sites. Presentations of the sites took place in Zumaia, Spain from 25-28 October 2022 during the IUGS 60th anniversary event and I had the privilege of attending this remarkable event and presenting two of the three accepted sites for Namibia.

Helke Mocke presenting on the Glacial Record of the Marinoan Snowball Earth at the First 100 Geological Heritage Sites Event

In September 2022 we once again celebrated Heritage Week under the theme "Unity in Diversity", which was also translated to !Kung "!Hao wese g//e-//xae". We reached out to five schools in the Khomas Region. During our visits, we performed activities on the importance of geosciences in our everyday lives using rock, mineral and fossil specimens of the museum collections and posters. At Fowler House, a Montessori school I read a small book called "As Hard as a Rock" and brought some rock samples along including a fossil for identification.

Pupils during Heritage Week at Waldorf Private School

Pupils during Heritage Week at Hage Geingob High School

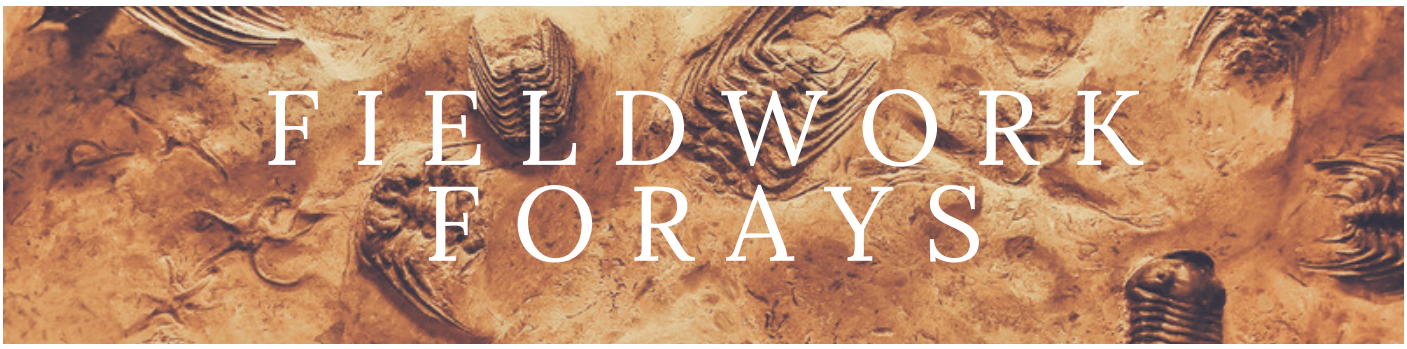
Finally, several long overdue palaeontological surveys took place to the Sperrgebiet, Otavi Mountains and Kaokoland searching for Miocene to Plio-Pleistocene aged fossils with Martin Pickford, Brigitte Senut and Dominique Gommery of France, and to southern Namibia looking for Ediacara fossils with Simon Darroch and team from the Vanderbilt University, USA.

Fossils hunting in the Sperrgebiet or Forbidden Territory with Vickey do Cabo and Andreas Nduutepo

Two publications arose from this fieldwork and more will soon follow:

Helke Mocke, Martin Pickford, Brigitte Senut and Dominique Gommery, 2022. New information about African late middle Miocene to latest Miocene (13-5.5 Ma) Hominoidea. *Communications of the Geological Survey of Namibia*, 24, 33-66.

Helke Mocke, Martin Pickford, Brigitte Senut and Dominique Gommery, 2022 Large mammal bone breccia in Pleistocene calc-tufa, northern Kaokoland, Kunene Region, Namibia. *Communications of the Geological Survey of Namibia*, 25, 66-79.



Looking for Oranje: student fieldwork in the footsteps of James Kitching

Julien Benoit

In his 1977 thesis, James Kitching reported the discovery of a Triassic therocephalian (NMQR389) at a farm he called Oranje, in the Bethulie District. This therocephalian was subsequently re-identified by Dr. Christian Kammerer as a gorgonopsian. If the Triassic age of the outcrops is confirmed, this Triassic gorgonopsian would be an extremely rare occurence, as it would mean it survived the "Great Dying", 252 million years ago. There are two farms in the Bethulie area that may correspond to Kitching's Oranje: Orangia, near Donovan's Kop in the Bethulie District, which is a well-known *Lystrosaurus* Assemblage Zone locality, and Oranje in the Phillipolis District.

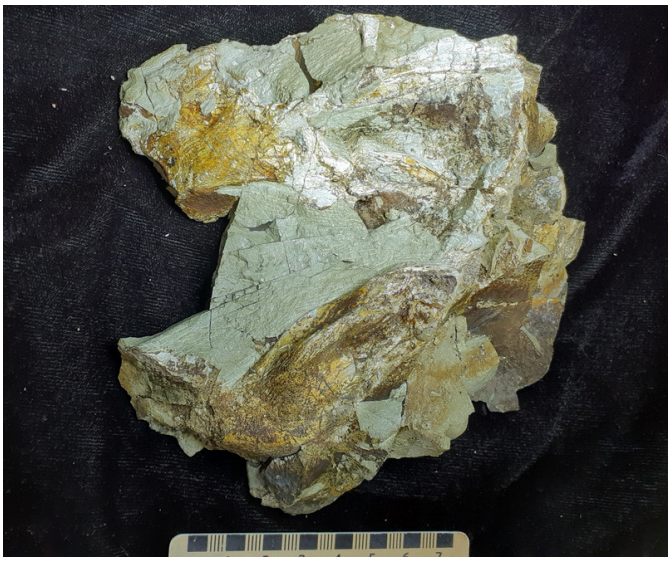
The only things certain about Kitching's Oranje is that its rocks have delivered many *Lystrosaurus* specimens and that it is located in the Bethulie District. As such, Orangia has been classically considered the same as Kitching's Oranje; however, according to the landowner, Mr. Bertie Gobler, who gave us the warmest welcome on his farm, Oranje used to belong to the Bethulie District in Kitching's time. Moreover, Orangia is located on Tweefontein, which is inconsistent with the fact that James Kitching (1977) provides separate entries for Oranje and Tweefontein in his thesis.

There is thus a fair chance that Oranje near Philippolis might be the original Oranje mentioned by Kitching in 1977.

My students from Wits, post-doc fellow Luke Norton and myself thus travelled in August last year to Oranje to address whether this could be the locality of origin of NMQR389. Collecting fossils would quickly demonstrate if *Lystrosaurus* is as abundant as it is supposed to be according to Kitching's thesis.

Fonda Mathalga and Erin Lund, with the first fossil that they discovered at Oranje: a large dicynodont skull.

This was the first fieldtrip for Erin and Fonda, and first time camping below 0°C temperatures for many of us, but the fossil hunt was rewarding! In the first few hours, we discovered an abundance of fossils, including large dicynodont fragments. After three days thoroughly exploring all exposures on the farm, we discovered a nice female *Diictodon* skull. No *Lystrosaurus* were recovered.



The skull and lower jaw of this female *Diictodon* (tusks absent) evidence that the rocks at Oranje date from the late Permian.

This fauna supports that the farm' is fully located in the *Daptocephalus* Assemblage Zone which does not match Kitching's description. The fossiliferous exposures are flat and topologically located below the Ripplemead sandstones, which are exposed on the hills of the farm (in some places, the sandstone was painted by the Khoesan).

Oranje is likely not the farm that James Kitching was referring to in 1977. This fieldtrip enabled us to safely conclude that NMQR389 came from Orangia, rather than assuming so. It also provided a live experience of how the fossils can be used to date rocks in the Karoo.

Moreover, given that Orangia from Tweefontein is often referred to as Oranje in the literature, this work will prevent future possible confusions between the two localities. Later on, our fieldwork at Orangia supported that both the *Lystrosaurus* and *Daptocephalus* Assemblage Zones are represented there. So whether MQR389 is a surviving Triassic gorgonopsian thus remains a mystery. More fieldwork will be needed to relocate the exact provenance of this specimen.

Motivation for collection permit extension for fieldwork at Orangia, farm Tweefontein 508 (Bethulie District):

Orangia is located on farm Tweefontein 508 (Bethulie District). In his 1977 thesis, James Kitching reported here the discovery of a Triassic therocephalian (NMQR389). This fossil was subsequently re-identified by Dr. Christian Kammerer as a gorgonopsian. If the Triassic age of the locality is confirmed, this Triassic gorgonopsian would be an extremely rare and worthwhile occurence, as it would mean it survived the Great Dying, 252 million years ago.

In 2022, our fieldwork at Orangia supported that both the *Lystrosaurus* and *Daptocephalus* Assemblage Zones are represented there. This means that in the current state of knowledge, it is impossible to determine whether MQR389 is from the Permian, or if it is a genuine surviving Triassic gorgonopsian.

To address this, more work at Orangia is needed in order to:
- more precisely relocate where NMQR389 came from. Tweefontein is an expansive

The team posing near the *Diictodon* locality at the "waterfall site", near the dam at Oranje.

farm with a lot of productve exposures that remain to be explored by our team. Our work in 2022 only focused on a few selected of outcrops.

- map the contact betweenthe *Lystrosaurus* and *Daptocephalus* Assemblage Zones (i.e. the Permian-Triassic Boundary) across the whole farm.

***References*:**

Kitching, J.W. 1977. The Distribution of the Karroo Vertebrate Fauna: With Special Reference to Certain Genera and the Bearing of this Distribution on the Zoning of the Beaufort Beds. Published PhD Thesis, Memoirs of the Bernard Price Institute for Palaeontological Research, University Witswatersrand.

A Table Mountain Sandstone Fossil Story

Izak Rust

I remember vividly the day I discovered brachiopod shells in abundance in the "upper shale" (now Cedarberg Shale Formation) of the TMS. The magnificent arthropod tracks in the "lower shale" (now Graafwater Formation) at Brandenburg in the Sandveld had been known since 1961. At the time a concerted search for more tracks in the region around Brandenburg came to nothing. Later, however, I did find arthropod tracks and abundant traces elsewhere in the TMS, and not just in the Graafwater Formation. Also, of course, at that time no shelly fossils had been found anywhere in the TMS.

By the second half of 1965 I was committed to a full-time systematic sedimentological investigation of the western sector of the TMS. Even though my focus was on sedimentological characteristics, I certainly remained on the lookout for "real fossils".

So, on 18 December 1965, after two days of unseasonal torrential rain had interrupted my fieldwork programme, a sunny and warm Saturday found me on the Dasklip Pass above Porterville, driving south in my trusty grass-green VW Beetle on a worn-out sandy farm track on my way to outcrops of the Pakhuis tillite exposed some distance away in the Winterhoek Mountain towering above Tulbagh. About halfway to my destination for the day the very sandy and monotonous track at Akkerboomdraai made an abrupt zig-zag dog-leg, crossing the "upper shale" almost at a right angle. In a hurry to get to the tillite outcrop I stopped only briefly, looking at the unusual shaley gravel in the otherwise sandy track, and, not even getting out but simply leaning out, I picked up among the chips of dun-coloured shale and siltstone scattered in the track a very short sliver of crinoid stem. Strange, I remember thinking … how come the farmer carted Bokkeveld shale all the way up here as road metal? Silly, I thought, and throwing the sliver away, went off to my real job for the day: the Pakhuis tillite.

Well, during the rest of the day that bit of now lost crinoid sliver refused to let me go, and, close to sunset, when the day's tillite work was done, I took the long road back down the Dasklip Rass to my base camp at Witbrug, near Mitchell's Pass. But first I stopped at Akkerboomdraai and, in the failing light, did a systematic stratigraphic traverse of the "upper shale", this time round looking very closely at the few low (and mostly grotty) siltstone outcrops along the cut side of the track.

The rest, as they say, is history.

After rushing off to the South African Journal of Science a brief note on the brachiopod discovery I asked around locally for an expert on brachiopods, and was referred to Cocks at the British Museum of Natural History. At his request I went back to the Akkerboomdraai site where I crated several fairly large lumps of shelly siltstone for dispatch to London. Those were carefree days: no special export permit, no paper work, no SAHRA, no palaeontological society, no sweat, just a box of rocks sent off to London (at my expense, of course).

After Cocks, Brunton, Rowell and Rust published the paper on the Cedarberg fossils in the Quarterly Journal of the Geological Society of London in 1969 I wrote to Cocks – we wrote actual letters folded inside stamped envelopes those days – and asked for the return of "my brachiopods". In a most gracious manner he replied that return of the specimens was quite impossible seeing that --- and I remember his phrase well because I was so incensed and shocked by it --- "they have the Queen's numbers on them".

After I had calmed down somewhat I wrote to Cocks assuring him that next time I find myself in his home town I will be knocking on his door demanding the return of "my brachiopods", stressing that I do not intend leaving without them, never mind the Queen's numbers being on them. Don't mess with a fossil finder, I say! So, at the first opportunity I did indeed knock on Cocks's door, and he very smartly averted a threatening international palaeontological incident by presenting me with a set of Cedarberg brachiopod paratypes, which ever since lies archived in the rock store of the Geology Department at the University of Stellenbosch. Lesson learnt: "All's well that ends well".

The brachiopod discovery for the very first time put a firm date on the Cedarberg Shale, namely Ordovician/Hirnantian/ca. 443my, and, for that matter, gave us a better handle on the age of the TMS as a whole. Of course, subsequent discoveries by Hannes Theron and co-workers of a unique and spectacular fossil assemblage in the Soom Shale (basal Cedarberg Formation) placed the TMS firmly in the realm of late Ordovician palaeontology.

What remains up to this day as unfinished business is a comprehensive review of TMS palaeontology. First of all the brachiopod–bearing zone of the Cedarberg Shale needs to be investigated in its entirety. Further work on the Soom Shale assemblage is certainly necessary. Secondly, the assemblage of traces in the TMS merits attention. Traces, albeit relatively rare, occur throughout the TMS. Nevertheless, by far the best research target is the rich assemblage of traces in the Graafwater Formation in its type area.

News from the Karoo

Roger Smith

Late Permian palaeoecosystems of the western Gondwana.

A 3-year project targeting the *Cistecephalus* AZ ended at end of 2021 yet there remained a COVID caused backlog of some 50 fossils awaiting preliminary preparation before accurate identification could be made. A taphonomically interesting specimen of a large *Aulacephalodon* skull and its scattered skeleton was completed in 2022. A single broken serrated tooth was found within the disarticulated post-crania allowing us to identify (to genus level) the likely scavenger.

In November an Iziko excavating team travelled to Northern Cape to retrieve the tusked skull and skeleton of a large late Permian dicynodont, possibly *Odontocycops*, based on its unusual chimney-shaped pineal boss. This well -preserved fossil was discovered in a stream bed by the farmer during the Friends of SA Museum annual field excursion. It clearly needed to be rescued before the rainy season did any more damage. It will hopefully be prepared in 2023.

The skull and semi articulated skeleton of a large dicynodont ?*Odontocyclops* found by Johan Moolman on his farm Dunedin between Beaufort West and Loxton - R. Smith

A semi-articulated skeleton of the fleet-footed late Permian gorgonopsian Gorgonops torvus collected by Roger Smith in 2004 from Oukloof Pass Fraserburg revealed, after preparation, a complete “tripartite” sternum. PhD student Eva-Maria Bendel of Humboldt University Berlin in collaboration with Roger and several overseas experts published a paper in 2022 describing the specimen as the first appearance of this essentially mammalian structure discussing the functional advantages of such a structure.

A manuscript, co-authored with Helke Mocke, Christian Kammerer and Claudia Marsicano, was submitted to Palaeontologia Africana in early 2022. This reports the first discovery of late Permian tetrapods in Namibia that were fortuitously made by our Early Permian research team back in 2019. Roger Smith re-visited the locality at the base of Mount Etjo in central Namibia in late July 2022 to measure a section through the lower Omingonde Formation to find and document the unconformity (accounting for

In December 2022 Roger Smith, Sibusisu Mtungata, Nyaniso Nofingxana and a very confident tractor driver rescued the specimen which is now in Iziko SA Museum awaiting preparation - R. Smith

Left, Nyaniso Nofingxana working on the gorgonopsian during lockdown. Right, the fully prepared *Gorgonops torvus* skeleton (associated skull prepared separately) with tripartite sternum fully exposed - R. Smith

+/- 20My) between the newly discovered late Permian Endothiodon AZ strata, and the overlying middle Triassic Cynognathus AZ fauna.

End-Permian mass extinction in the Karoo basins of southern Africa and Antarctica

Although Roger Smith's current research is focussed on the earliest Triassic post-extinction ecosystems of the Karoo basin, there remains a number of collaborative research topics on the PTB that are still ongoing.

1.Using the PTB database of over 720 well provenanced, and expertly identified, in-situ tetrapod fossils logged by Prof Smith over the last 15 years, Chicago-based post-doc Pia Viglietti conducted network analysis published in 2023 that showed the 3-phased pulsed extinction proposed by Smith and Botha in 2014 is likely only 2-phased.

2. Roger Smith is a team member of the PALEOMOZ project led by Ricardo Aroujo working on Permo-Triassic stratigraphy and fossils in North Western Mozambique. Although no fieldwork was conducted in 2022 due to travel problems, a manuscript recording the occurrence of a rare dicynodont species, *Dicynodon angielczyki*, found in 2019 in the late Permian strata of the Metangulu Graben has been published.

3. In 2019 Roger Smith and Jennifer Botha collaborated with Chinese researchers to sample Karoo PTB sections for mercury as a proxy for volcanically-derived aerosols. The results were published in Nature Communications and showed a mercury spike co-incident with the 3rd phase of tetrapod extinctions recorded by Smith and Botha 2014, and moreover, this anomaly bore an isotopic signature similar to that of the Siberian Traps.

Sibusisu Mtungata helping Chinese workers Jun Shen and Juibin Shen collect closely-spaced samples of the Karoo PT extinction beds in the search for mercury anomalies linked to the Siberian traps volcanism - R. Smith

The making of "Fateful Planet". Left, the *Dinogorgon* skull from the Wellwood Collection placed back in its late Permian setting on Old Wapadsberg pass near Nieu Bethesda with the P-T extinction beds in the background. Right, Erin Lund and Zoleka Sibiya plastering a spreadeagled *Lystrosaurus* skeleton while a drone hovers above to catch the action - R. Smith

Early Triassic post-extinction ecosystems in the Karoo basins of South Africa and Antarctica

This new 3-year project headed by Roger Smith and Jennifer Botha funded by NRF/AOP shifts the focus of his Karoo PTB research into the Early Triassic by studying the dynamics of the surviving populations in the drought-afflicted Karoo basin for the first million years after the end-Permian mass extinction. Fieldwork in August and October 2022 concentrated on outcrops in the Bethulie district. During the August trip, accompanied by Julien Benoit and several Wits honours students, our fieldwork was filmed for a German documentary with the working title "Fateful Planet". The aim of this trip was to re-locate the outcrops where James Kitching reported finding Permian gorgonopsian skulls in Triassic strata. This was done and from the combined lithological, sedimentological stratigraphic and biostratigraphic data it is concluded that none of these localities are of Triassic age.

These results were presented at SVP annual meeting and PSSA biennial conferences in 2022.

The main aim of the October trip was to create a detailed sedimentologic and taphonomic map of a 750m square block of the *Lystrosaurus* rich site on the farm Donald with a view to testing the hypothesis that this is a drought accumulation. Interesting fossils recovered during the two weeks of fieldwork include two articulated complete skeletons of small ?insectivorous therocephalians *Regisaurus* & *Tetracynodon*, a complete articulated skeleton of ? immigrant archosaromorph *Prolacerta* as well as an unusual multi-taxic bonebed type occurrences of numerous disarticulated *Prolacerta* remains in association with *Lystrosaurus* elements. The first report on this work entitled "Sedimentology and taphonomy of drought-afflicted tetrapods in the Early Triassic Karoo Basin, South Africa" was published in 3P's during 2022.

One locality yielded numerous curled-up and paired *Procolophon* skeletons. The latter has very similar taphonomic style to a *Procolophon* concentration on Kitching Ridge in Antarctica that was originally found by James Kitching in 1965. Chris Sidor and Roger Smith re-located the quarry and collected more specimens from this locality

back in 2018. These two sites will form the base for a full taphonomic investigation into the origin of Procolophon rich occurrences in the Early Triassic of western Gondwana.

Fully articulated curled up *Procolophon trigoniceps* from the rich "*Procolophon* corner" locality, having benefitted from Tiffany van Zyl's (Pushing Up Daisies) expert preparation - R. Smith

Dr Juan Cisneros, a parareptile specialist from Teresina Brazil was brought out to study the Triassic procolophonoid specimens from the Bethulie and Aliwal North localities. He selected potentially important specimens from our 2021 and 2022 collecting to describe the ontogeny and sexual dimorphism of the "horned" procolophonoid, *Teratophon*. These will be given priority for preparation in the Iziko labs in 2023.

Juan Cisneros, the Brazilian parareptile expert showing off a *Prolacerta* skull he has just found - R. Smith

Euparkeria *type locality re-discovered*

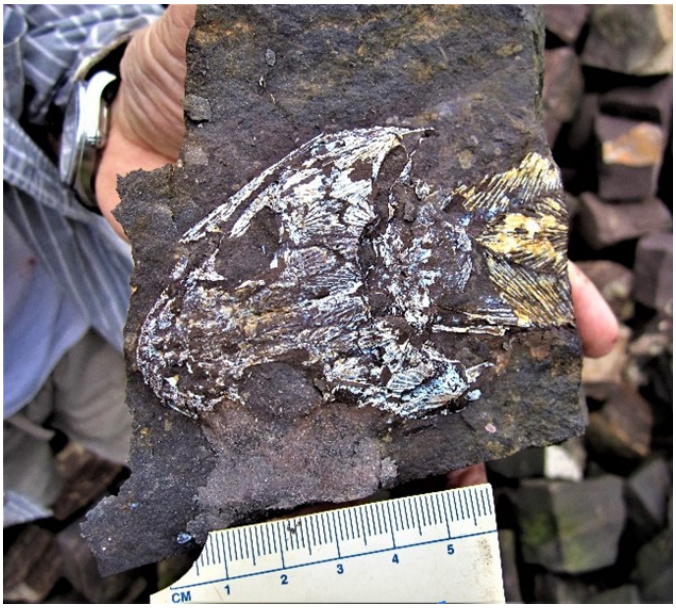
A manuscript co-authored with Derik Wolvaardt and Andrea Arcucci was submitted to Palaeontologia Africana in early 2022 and it reports our re-discovery and paleoenvironmental analysis of the type locality, and to date the only locality, of the renowned "basal" archosaur *Euparkeria capensis*.

Searching for Early tetrapods in Gondwana

An ongoing project with leading experts on temnospondyls, basal synapsids and fluvio-lacustrine paleoenvironments, working in close collaboration with Namibian and Brazilian researchers and students.
Namibia (C Marsicano, A Mancuso, H Mocke, F Abdala, J Pardo) side of the project is ongoing with a formal description of a large flattened skull that contains a spectacular array of curved palatal fangs. The initial identification was temnospondyl, however phylogenetic analyses suggest it is a basal tetrapod and likely a stem-tetrapod. Two manuscripts, a short high profile one and a longer formal description are in final stages of preparation, both await positive results of latest PAUP analyses being performed by Jason Pardo.

Brazil: (J Cisneros, K Angeilczyk, J Frobisch, C Kammerer, M Richter, J Pardo) The Pedra de Fogo Formation of the Parnaíba Basin in NE Brazil comprises vast lake deposits located in the tropics of Pangaea during the Permian. Over the past four years our team has collected hundreds of vertebrate, invertebrate and plant fossils from over 200 localities in the areas surrounding the town of Pastos Bons and the city of Teresina.

Fieldwork was again postponed in 2022 however a manuscript was published entitled "Deep-scaled fish (Osteichthyes: Actinopterygii) from the lower Permian (Cisuralian) lacustrine deposits of the Parnaíba Basin, NE Brazil" featuring the novel taxon Piratata rogersmithii gen. et sp. nov. in recognition of the ongoing efforts of the finder. Fieldwork for this project is scheduled to re-start in March 2023.



Early Permian rocks are quarried for paving stones in the area around Teresina in northern Brazil. The research team regularly visit quarries in Teresina to collect fossils mainly from the excavated blocks. Roger is holding part and counterpart of the skull of the primitive temnospondyl *Timonya anneae* - K. Angielczyk

Palaeoecology of Cretaceous crater lakes in Northern Cape, South Africa

R,Smith, P Makovicky, Oliver Wings, Mike De Wit & many more in future

Situated beneath the Kalahari sands on the farm Stompoor near Marydale in the Northern Cape Province of South Africa is a fossil rich ancient volcanic crater that has provided fossil evidence of a little known Late Cretaceous terrestrial ecosystem. A drill core produced by De Beers Consolidated Mines Ltd. while prospecting for diamond-bearing kimberlites revealed up to 76m of lacustrine sediments with excellently preserved fossils of new types of frog (*Vulcanobatrachus* sp.) and fish (*Stompooria* sp.) both with rare soft tissue preservation and colour pigments (i.e. melanosomes on the scales of *Stompooria*).

Follow-up pitting along the margin of the crater revealed tantalising vertebrate remains from the site, include a possible bird humerus as well as the impressions of several articulated caudal vertebrae of an ornithopod dinosaur both of which offer huge potential for future finds. The rich invertebrate and plant fossil record includes ostracods, bivalves, gastropods, winged insects, fossil wood, seeds and leaf impressions.

As the only known Cretaceous lagerstätte from the Mesozoic of Africa, and one of few Southern Hemisphere localities to exhibit exquisite preservation of soft tissues, the Stompoor crater lake represents a unique opportunity to conduct a full multidisciplinary study of a Late Cretaceous continental ecosystem. This project was postponed due to COVID travel ban but has at last been revived.

Overview of a Late Cretaceous crater in Northern Cape filled with fossil-bearing lacustrine sediments.

From November 16-25 2022, Roger Smith and Mike De Wit (Research Fellow Stellenbosch University) led collaborators Peter Makovicky (Minnesota, US), Oliver Wings (Bamburg, Germany) on a reconnaissance trip to the Stompoor crater-lake deposit, as well as similar occurrences nearby, to liaise with the landowners and assess their potential for further excavation and research. Numerous Late Cretaceous wood and tetrapod fossils were recovered from the surface of 3 separate diatremes – including tooth-bearing jaws of two dinosaur taxa that could potentially be identified to genus level.

We await the results of CT scans of the jaws for more detailed identification other than theropod and ornithopod. We also await news of various funding applications, but we are optimistic that we can start prospecting, in earnest, in late 2023.

US researcher Pete Makovicky (top) sifting through surface deflation rubble for identifiable dinosaur bones (bottom) - R. Smith

Thackeray's "log sem statistic"

Francis Thackeray

Since 1997 I have been developing a morphometric method, whereby it is possible to quantify variability in the shape of skulls or mandibles from anatomical measurements of a diversity of vertebrates. It makes use of "log sem" statistics where "sem" refers to the standard error of the m-coefficient in equations of the form

$$y = mx + c$$

from least squares linear regression analyses of measurements of pairs of crania. For pairs of hominoid specimens known to be the same species, a mean log sem value of -1.61 +/- 0.1 has been obtained, reflecting a typical degree of variation within a species. This facilitates a probabilistic morphometric definition of a species at least for hominoids, and is valuable in cases where boundaries are not necessarily clear.

Making use of log sem statistics (Thackeray, 2018), I provided a definition of what I call "sigma taxonomy", where sigma is the Greek letter for S (Σ): 'The classification of taxa in terms of probabilities of conspecificity, without assuming distinct boundaries between species', as opposed to alpha taxonomy which does assume such boundaries. More recently my article in the South African Journal of Science (Thackeray, 2022) makes use of "log sem" statistics in cluster analyses to draw up phenetic trees for Plio-Pleistocene hominin species, for two chimpanzee species, and for six Galapagos finch species ("Darwin's finches"). The cluster analyses strongly demonstrate that "log sem" statistics have biological and evolutionary significance. Also in 2022, I was the co-author of a paper with Ottmar Kullmer on "The use of Z-scores to facilitate morphometric comparisons between African Plio-Pleistocene hominin fossils: An example of method". We used both "log sem" and Procrustes Distances (PD) to analyse measurements of skulls and mandibles of hominins. We consider it remarkable that Z-scores, based on my "log sem" statistics and on (widely accepted) Procrustes Distances, indicate a high degree of consistency (confirming robusticity of the "log sem" method). This is the first time that Z scores have been used to integrate "log sem" and PD values for hominins.

I met Svante Pääbo (2022 Nobel laureate) a few years ago. He is a palaeogeneticist who recognised in 2010 that there was not a clear boundary between neanderthals and humans (Green, Pääbo et al, 2010). Five years before then, my "log sem" statistics were pointing towards the probability of interbreeding between neanderthals and humans, based on anatomical evidence (Thackeray et al, 2005). My view (using "log sem" statistics) was contentious at the time but has been borne out through

palaeogenomics. I like to think that my use of "log sem" statistics in recent articles has strongly demonstrated viability of the morphometric method. In 2016 I was greatly encouraged by Svante Pääbo's positive views on the probabilistic approach, despite criticisms with which I have been confronted.

Stephen Jay Gould referred to three stages in the development of new ideas in any field of science. Firstly, a new idea is received with scepticism. Secondly, the idea is totally rejected, but in a third stage it is recognised as being viable. It is satisfying to hear a few palaeontologists say that Thackeray is approaching the third stage. Hopefully the palaver regarding the "log sem" approach can be settled with a degree of modesty if not pride, having its origins about 25 years ago. Thanks to everybody (especially the late Sue Dykes) for their support. Sue was my "star student", and she regarded me as her "favourite Professor". Her MSc thesis, including the use of "log sem statistics" in the context of hominin molars, was triumphantly awarded cum laude, despite trials and tribulations which she experienced.

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Why are we not achieving genuine transformation in South African Palaeoscience?

Pia Viglietti

I am a South African who grew up during our country's dramatic change to a democratic society. I remember the feeling of collective jubilation and hope that the ideals of this new democracy would be realized for all. Yet, as an adult entering a science career, I saw how black South Africans and other historically excluded groups, are still minorities in my particular research field – Palaeontology.

This is not a problem unique to South Africa or palaeoscience, but is particularly true for Geoscience fields which are consistently the least diverse of the sciences (particularly at PhD level and up), and have shown little evidence of sustained improvement (Bernard and Cooperdock, 2018). And, after nearly 30 years since our first democratic elections, there are only a handful of black South African palaeoscientists. The reasons relate to a legacy of socio-economic factors from Apartheid and colonial history (Biyela, 2019). They also relate to a systemic university culture that continues to alienate and exclude such students even when they are present (Vilakazi, 2021).

These statements corroborate exit-interviews taken from students at the University of the Witwatersrand (*Palaeoscience Accelerator Program, 2018) who said many see academia and its institutions as "white spaces" where they feel undervalued, inferior and unwelcome. They become products of consistent trauma from these institutions as a result. This view is also supported by the lack of representation and role models in leadership positions – instead seeing representation in often overlooked support roles such as fossil preparation and technician positions (Kuljian, 2016).

So *why are we not achieving* ***genuine*** *transformation in South African palaeosciences*? I love my science so I want everyone to enjoy it too, and feel like a valued member of this research field. This is why I bring up this issue with our palaeontological community. At our most recent biennial meeting, I saw the great diversity of our graduate palaeoscience student body. But, this recruitment is not translating into retention, and therefore not genuine transformation as indicated by the recently released National Research Foundation evaluation of Palaeosciences Strategy (2022) which stated: "*While black and women researchers in general benefited from the strategy implementation, transformation remains a major challenge. There are very few emerging South African black researchers driving palaeosciences research. The research ecosystem is dominated by more senior, and mostly white researchers.*"

How do we tackle this retention problem? Firstly, dominant groups in science, such as myself (ie., a white researcher), must be

accomplices to change (Hesse, 2007, 8 White Identities) by dismantling the power dynamics and biases that benefit us. We must also educate and challenge our white colleagues and institutional leaders, even if these conversations are uncomfortable. Within dominant groups, there is often much lip service towards being an ally to transformation and implementation of such policies (Dancy and Hodari, 2022), but there is also an entrenched skepticism for the need to change, a lack of knowledge on how to constructively change, and hold colleagues accountable for their actions when they cause harm. This results in ally work that only involves few risks and sacrifices, but greater rewards for being perceived as "good" (Patton and Bondi, 2015). These "nice guy" activities do not challenge the status quo because they do not attend to the multiple barriers black and minority students face at institutional and systemic levels.

Kivel (2007) indicates that allies should find themselves in contentious relationships with those in power. Contentious relationships with power can be in the form of consequences such as confronting powerful decision-makers and posing suggestions that conflict with the status quo. (Cox, 2021) goes further to suggest we should be demanding institutions provide explicit examples that show they are protecting black and minority students from workplace harm, including hiring and retention data, diversity policies, discrimination reports, and leaderships' public actions against racism and discrimination.

Secondly, allyship must also happen on an individual level. This means reflecting on the culture of our own research groups and labs. Students are often faced with academic mentors who feel that institutions are being forced to cater for individuals who are not 'cut out for research' (Vilakazi, 2021). Transformation as a result is often associated with mediocrity. This flawed assumption continues to stereotype black students in harmful ways, contributing to the perpetuation of scientific racism (Kuljian, 2016, Glennon et al. 2020). It is therefore hugely important that senior academics invest time and effort in not only providing mentorship but also considering ways in which they can ensure that diverse students are not alienated by the culture of their own research labs. This may mean that they need to make adjustments to their style of teaching and supervision (Vilakazi, 2021).

We white researchers must also reflect on the workplace culture that we encourage and support. Students are watching and remember how we respond. Did we validate a student's lived experiences or concerns about a certain individual's behavior, or a workplace's culture? Did we do nothing, or worse become hostile toward the student who spoke up? By observing whose stories are believed, who is given multiple chances, and who's harmful behavior is not addressed, students come to realize who is valued in a research group, lab, or institution. They will know who we are in hard times, and how silent we will be when diverse people are harmed in our workplaces (Cox, 2021).

We therefore must focus on retention to achieve genuine transformation in South African palaeoscience. By not addressing the mentioned institutional and cultural stumbling blocks, we continue to alienate

diverse students, and retention is not achieved (i.e., diverse students are lost to palaeoscience). But, if we are dedicated to tackling them, we remove this disproportionate burden put on black and minority students to fix these problems, validate their lived experiences, and we show we respect and value our black and minority colleagues. This will naturally create a welcoming and transparent research space, and promote retention.

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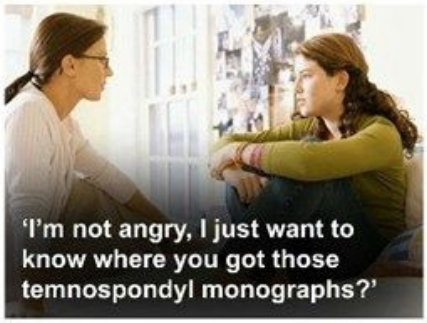
COMIC CORNER

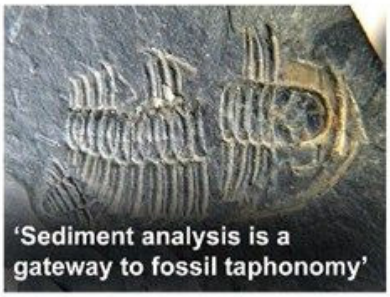
saying “my life sucks” when things go wrong

- self-deprecating
- depressing
- makes you sad

Saying “Spinosaurus Aegyptiacus wouldn’t want this for me” when things go wrong

- motivating
- makes you think about Spinosaurus
- reminds you that Spinosaurus cares for you





Tetrapods: I can't, I'm busy defending my niche and fighting for food

Land: terrestrial vertebrates haven't evolved to exploit my resources

Tetrapods: