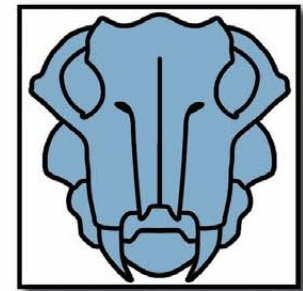


PALNEWS

BIANNUAL NEWSLETTER OF THE PALAEONTOLOGICAL SOCIETY OF SOUTHERN AFRICA

(HALFJAARLIKSE NUUSBRIEF VAN DIE PALEONTOLOGIESE VERENIGING VAN SUIDER AFRIKA)

Vol/Band 18 No. 2



September 2011



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

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Front cover: Roger Smith - intrepid Atarctic explorer at Gordon Valley fossil locality, Central Trans-Antarctic Mountains.

EDITORIAL

Dear Friends and Members of the PSSA,

These are exciting times to be involved in palaeosciences in South Africa. Maybe it is just me, but there seems to be a building sense of impending change for the better, as the recognition of the importance and value of our fossil heritage is being thrust to the fore, after many years of sustained effort by members of our palaeocommunity. Murmurings and musterings from the Department of Science and Technology are making their way even here to Grahamstown - let's all do what we can to keep the momentum going! How marvellous to watch the story of *Australopithecus sidba* unfold - profound scientific fodder carried in style by Lee Burger's charisma and his broad and excellent research team. High profile studies such as this are no doubt forcing the Powers-That-Be to take our remarkable palaeontological heritage all the more seriously.

Although we are a little short on news from the membership in this issue (*hint, hint*), there are two wonderful articles for your perusal. Many thanks to Norton Hiller for the fascinating account of his experiences in earthquake-stricken Christchurch (pp. 16-19). I was ignorant of the potentially devastating effects of liquefaction - it is amazing to see Norton's pictures illustrating the effects of this phenomenon.

Roger Smith provided the second article (pp. 20-26), giving us some insight as to what an intrepid Antarctic fossicker can expect to encounter. How many people in the world have spent their 60th (or any) birthday up a mountain in Antarctica? And congratulations Roger, on some wonderful finds. If you can brave the severe conditions, Antarctica clearly has a bounty of treasures to offer.

Be sure to check out John Long's latest sexy contribution to the literary world (pp 14-15). I've heard about those Argentine ducks.... (surely this calls for a limerick, Francis?).

Also keep an eye out for the soon-to-be released volume on the Molteno sphenosids by John Anderson and Heidi Anderson Holmes (pp. 26-27),

The new PSSA website is currently under construction - I greatly look forward to seeing the final product. A thumbs-up to Alex Parkinson and Jen Botha for getting the ball rolling, and thanks to Billy de Klerk for all his efforts in having maintained a web-presence for the society up until now. It looks like the web address of the new site will be: **www.PalaeontologicalSociety.co.za**. First choice of www.pssa.org.za was already taken by the Pharmaceutical Society of South Africa. It is unfortunate that there are at so many societies in South Africa with the acronym PSSA. If you Google 'PSSA' you get some interesting results: Philosophical, Photographic, Physiology, Phycological etc. of South Africa, as well as: Political Science Students Association, Pennsylvania State Snowmobile Association, Particularly Sensitive Sea Area, Primary Schools Sports Association, Pennsylvania Skeet Shooting Association. So if you meet a few confused folk at the congress next year (possibly carrying rifles, large cameras and/or snorkels), you know why....

Something we really need to discuss in earnest as a society is the business of conducting Palaeontological Impact Assessments. It is wonderful that Mariagrazia Galimberti at SAHRA is enforcing a higher standard of PIA method and report-writing. But as a recent newcomer to the field, I can attest to a certain initial bewilderment as to what exactly was expected. Thanks to advice from colleagues, the internet, Government Gazettes and SAHRA policy statements, I was soon on my way, but I think the PSSA has a responsibility to write up a user-friendly and accessible set of guidelines in concert with SAHRA's expectations.

There is a distinct whiff of territoriality when it comes to PIA's - they represent a rare means for palaeontologists to earn income approaching the industry standards that most academics dream of. But there is a chronic shortage of qualified palaeontologists in South Africa. How is this diminished handful of

academics going to adequately assess every development across the entire country for its palaeontological impact? Perhaps we need to recognise this avenue as an industry, and start marketing it as such to those interested in pursuing palaeontology as a career option, but who are wary of the lack of employment options, and don't necessarily want to pursue a Ph.D.-level education. If we brand the PIA as the domain of the Ph.D.'ed academic, we run a serious risk of creating such a bottleneck with our limited skills base that the system becomes overwhelmed, and developers lose all respect for the PIA process.

Surely we need to open things up a bit, have some more transparency as to who is conducting PIA's, who is training ECO's on site, and what are the outcomes and recommendations of the PIA process. How about a repository of PIA documents on the PSSA website, or even a bulletin board advertising PIA opportunities and calls for quotes? A repository of documents with guidelines as to the palaeontological sensitivity of rock formations in different parts of the country would be a fantastic resource that would both speed up report-writing and help to create a community standard. Doesn't it feel frustratingly like re-inventing the wheel each time you work in a new area? By sharing information and advice, and offering help to people entering this field, we can help to create an effective system that will serve to protect our heritage as well as add significantly to our knowledge base and collections. We need to get people out there doing an efficient, adequate job, and not leave the system to rely entirely on just a few highly trained, and really busy academics. But I understand that many of these issues are currently being addressed by SAHRA and members of the PSSA executive committee. I'm sure we will be hearing more about this at the Congress.


The upcoming PSSA congress is to be held in Cape Town next year. Good luck to the Cape Town team with the organising - I look forward to seeing everyone again, at what is without fail the friendliest conference around.

On a concluding note, please all spare a thought for Arthur Cruickshank, dear friend and stalwart member of the PSSA, who has been very ill of late. On behalf of the Society I would like to extend our heartfelt support to both Arthur and Enid during this very difficult time.

With best wishes to you all for the second half (third?) of the year,

Rose

PUBLIC LECTURE



Hosted by Wits and the Palaeosciences Centre

Reconstructing complex cognition in the Middle Stone Age of South Africa: an archaeological case study from Sibudu

Prof. Lyn Wadley


The Karoo Basin and the Rise of the Dinosaurs

Dr Adam Yates

Date: Thursday, 22 September 2011
Time: 17:30 for 18:00
Venue: Science Stadium, Auditorium WSS2, Wits West Campus
Parking: Science Stadium

ALL WELCOME

To book your seat
E-mail: rsp.events@wits.ac.za



ALBANY MUSEUM & RHODES UNIVERSITY - Grahamstown

Billy de Klerk, Rose Prevec, Robert Gess, Marius Vermaak (July'11)

In late 2010 we received notice of a NRF call for applications for excavation and casting staff to be appointed on a contractual basis to palaeontology departments in the country. For some time now we have been exploring ways of appointing technical staff of this nature and I'm pleased to report that our motivation for three posts was successful. After advertising, head-hunting, short-listing and interviews we appointed three new members of staff to our Albany Museum palaeontology team and they started work at the beginning of March. So we welcomed **Mr Armstrong Khoso**, **Ms Khokela Camagu** and **Mr Lindikhaya Sandi**. Under the watchful eye of our experienced **Mr Luvuyo Mayi** they have been quick to learn the fine art of fossil preparation and curation and have already made significant inroads into the preparation backlog at in the collection.



Luvuyo Mayi (left and our new NRF-supported staff: Armstrong Khoso, Khokela Camagu and Lindikhaya Sandi.

Khokela (or KK as she is fondly known) has been working closely with **Rose Prevec** and has been helping with the processing of the many fossil plant slabs that she and her American palaeobotany colleagues have collected in over the past six years or so.



Billy proudly sitting at the site of his "scrappy" dinocephalian fossil find; Merweville district..

The year started off well when **Marius Vermaak** and I joined Bruce Rubidge, Tom Kemp, Fernando Abdala and the rest of the Wits team on a research field trip in the south-western Karoo during mid March. Pickings were a bit slim but it was wonderful to get out into the open Karoo again.

On a very happy note we congratulate **Robert Gess** who graduated PhD at Wits in June. It was around March that we were unofficially informed that Robert had passed and, at that stage, he had to make some corrections before graduating in July. We all extend hearty congratulations to "Dr Rob" - we now await the publication of numerous papers that will expound on the faunal complexities of the Grahamstown upper Devonian estuary. In addition Rob plans to continue researching the many upper Devonian plant fossils that he excavated from the Grahamstown site now that he has some idea of the vertebrate and invertebrate forms.

Earlier in the year I was co-opted by the Eastern Cape branch of the Royal Society to help Prof Mike Davies-Coleman (Rhodes Chemistry Dept.) with the organisation of the **Broom Memorial Colloquium** which we held at Rhodes University on 18th April. This event was to commemorate the massive contribution the Dr Robert Broom had made in South African palaeontology. Speakers at the colloquium included Bruce Rubidge, Adam Yates and Francis Thackeray (Wits), James Brink (National Museum, Bloem) and Rose Prevec (Grahamstown). It was a wonderful opportunity to catch up with our northern palaeontology colleagues in the Eastern Cape again (see report by Mike DC below).

As the teaching of evolution in the science syllabus becomes more of a reality in high school science and biology we are now regularly being invited to present lectures to grade 10 school groups from the local high schools. In early March Billy presented talks to the St Andrews and DGS girls and Kingswood College pupils on the Karoo palaeontology. In addition Kingswood College, Grahamstown, invited **Mike Raath** to present a lecture on the evolution of hominids and the origins of modern man. This gave Mike and Anne the opportunity to visit the Eastern Cape and catch up with old friends.

In late June I was delighted to host a visit from my US dinosaur research colleagues for two weeks to continue with our field exploration and laboratory study of dinosaur fossils from the lower Cretaceous Kirkwood Formation. The research team included **Prof. Cathy Forster** and her Ph.D. student **Karen Poole** from The George Washington University in DC and **Dr Jonah Choiniere** (a post doc student from the American Museum of Natural History). Cathy and I are at present putting the finishing touches to a paper describing a new species of ornithomimid dinosaurs from the Kirkwood Formation. Karen is doing the phylogenetic analysis and Prof Anusuya Chinsamy-Turan has completed the histological analysis. In his Ph.D. research Jonah completed a phylogenetic review of the Kirkwood theropod (coelurosaur) that Cathy and I had described in 2000. My additional

preparation of the skull area of "Kirky" (*Nqwebasaurus thwazi*), in the holotype block, revealed a previously unknown maxilla and lacrimal and the more complete exposure and identification of the braincase and parietal bones. The maxilla contains at least four small, unserrated, procumbent teeth, atypical for theropod dinosaurs. Jonah concluded that "Kirky" is the basalmost, and stratigraphically earliest ornithomimid. In addition it is the first ornithomimid taxon known from Africa and the first Gondwanan ornithomimid known from more than fragmentary material.



Cathy, Karen and Jonah at Shamwari.

Our Kirkwood field work included the investigation of an exciting new dinosaur discovery made on the Shamwari Private Game reserve between Port Elizabeth and Grahamstown. In May the head game warden at Shamwari, Mr John O'Brien, discovered the distal part of a HUGE iguanodontian femur and a couple of large long-bone fragments in the dry Bushman's River bed. Unfortunately no additional bone of this animal was found but

that site contained an abundance of fossilised wood - numerous large logs (> 6m long) and patches of fragmentary wood (and possibly charcoal) in the coarse sandstone.



Rose looking at fossil wood at Shamwari.

Fossil exploration at several sites in the Kirkwood district yielded some new fragmentary material but what was exciting was the discovery and excavation of the third large sauropod vertebrate at the original "Kirky" discovery site some 17km west of Kirkwood village. Additional excavation at this site is planned for the future.

Till next time.....
Cheers
Billy

Rob Gess

Robert Gess graduated last month at Wits University with a Ph.D. in Science. His doctoral research was on the hundreds of Late Devonian, Famennian (360 million year old) fish fossils that he has excavated at Waterloo Farm near Grahamstown, over many years. His degree recognizes the significant contribution that his study of the fossils has made, enhancing knowledge of the diversity and emergence of early vertebrate life, the timing and effects of the world's second great extinction event, and ancient patterns of fish distribution. The many new species discovered

by Rob include the oldest fossil lamprey (*Priscomyzon riniensis*), which received international attention when it was published in Nature.

Rob's supervisors were Dr Michael Coates of the University of Chicago and Professor Bruce Rubidge of the Bernard Price Institute of Palaeontological Research at Wits.

Thesis: Gess, R.W. 2011. High latitude Gondwanan Famennian biodiversity patterns - evidence from the South African Witpoort formation (Cape Supergroup, Witteberg Group). PhD thesis, University of the Witwatersrand.



Dr Robert Gess and his wife Serena
at the Wits graduation ceremony

Rose Prevec

The first half of the year has disappeared in a blur! After returning from six months in Canada, I have managed to be busier than usual, despite being officially in limbo as far as employment goes. To keep the coffers from entirely drying up, I entered the initially daunting world of Palaeontological Impact Assessment. As a new-comer, I can say with confidence that we need some more informative and easily accessible guidelines as to what is expected from PIA practitioners.

For the past few months I have been continuing my research as a Research Associate at the Albany Museum, and (as of this month) a Research Associate of the Geology Dept at Rhodes. March saw another intense work-session with **Dr Conrad Labandeira**, documenting insect-plant interactions in the new Permian plant collections at the Albany Museum, adding to our enormous and still growing database. We hope to publish some of our fascinating results in the next year or so. We have found some amazing new damage types, and are starting to see interesting trends through the Permian. We are still searching for a useful Early Triassic plant fossil site, so please keep your eyes peeled! Conrad will return in November for the next gruelling session.

I have been slowly working through the backlog of fossil plant material from several field trips, accessioning and cataloguing them with the industrious help of the Museum's wonderful new preparator Khokela Camagu, who has been doing all of the hard work involving basic slab preparation and painting of labels.

As Billy mentioned, the Broom Colloquium was a great experience, and contrary to Prof Mike Davies-Coleman's rather predatory title in the report below, it was a great treat to see our fellow palaeontologists and friends here in Grahamstown.

Over the past few months I taught a week's worth of palaeobotany to the 2nd Year Geology students at Rhodes, as well as a full, four week course on Plant Diversity (with lots of palaeo additions) to the 1st year Botany class. It was heartening to see a number of the students showing a keen interest in palaeontology, with two or three determined to pursue a career in the field.

Publication:

Bordy, E.M., Linkermann, S. and Prevec, R. (In press). Palaeoenvironmental aspects of some invertebrate trace fossils from the Mid- to Upper Permian Middleton Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup), Eastern Cape, South Africa. *Journal of African Earth Sciences*.

Fossil Hunters Descend on Grahamstown The 2011 Broom Colloquium

Prof Mike Davies-Coleman

Royal Society of South Africa, Eastern Cape Branch

The Eastern Cape Branch of the Royal Society of South Africa, together with Rhodes University, hosted the 2011 Robert Broom Colloquium on 18th April 2011. The colloquium brought South Africa's leading palaeontologists to Grahamstown for a series of lectures celebrating the rich diversity this country's unique palaeontological resources and highlighting the lifework of Dr Robert Broom (1856 -1951). Broom is widely regarded as South Africa's pre-eminent palaeontologist, credited with the discovery of the early hominid fossil "Mrs Ples" and widely renowned for his seminal work on the mammal-like reptiles of the Karoo basin. **Professor Bruce Rubidge** (Director: Bernard Price Institute of Palaeontology at Wits University) opened the Colloquium by eloquently summarizing Broom's pioneering and extensive contribution to the knowledge of our reptilian ancestors which stalked the Karoo 250 million years ago long before the age of the dinosaurs. **Dr Rose Prevec**, a palaeobotanist based at the Albany Museum, then provided a glimpse of the fossil record of the *Glossopteris* plants that were once widespread across Gondwanaland 299 - 251 million years ago. Interestingly, these plants ultimately decayed to produce the extensive coal fields stretching across Southern Africa today. Following on from Dr Prevec, **Dr Adam Yates** (Bernard Price Institute of Palaeontology) showed the importance of South Africa's fossil record in shining light on the emergence of the world's first dinosaurs about 230 million years ago. Dinosaurs went on to dominate the world for another 165 million years and the South African fossil record is crucial in our understanding of why they became so successful. Bringing the audience closer to the present time,

Dr James Brink from the National Museum in Bloemfontein described how the effects of global glaciations over the last hundred thousand years led to the isolation of South Africa's endemic black wildebeest, bontebok and springbok populations. The colloquium ended with the 2011 Amy Jacot-Guillarmod lecture delivered by **Professor Francis Thackeray** (Director of the Institute for Human Evolution, Wits University). The lecture was a *tour de force* of human evolution in which Professor Thackeray provided convincing evidence to suggest that the present boundaries between Australopithecine species and our direct human ancestors is statistically blurred and not clear cut. Given our current concerns about global warming Professor Thackeray also showed, from fossil evidence, how climate change may have been one of the main drivers of hominid evolution and extinction over the last three million years. Interest in the colloquium was widespread with people travelling from as far afield as Johannesburg, Port Alfred, Kenton, Hofmeyer and Graaff-Reinet to attend the colloquium.



From Left: Prof Bruce Rubidge, Dr James Brink, Professor Bruce Thackeray, Dr Billy De Klerk, Dr Adam Yates and Dr Rose Prevec.

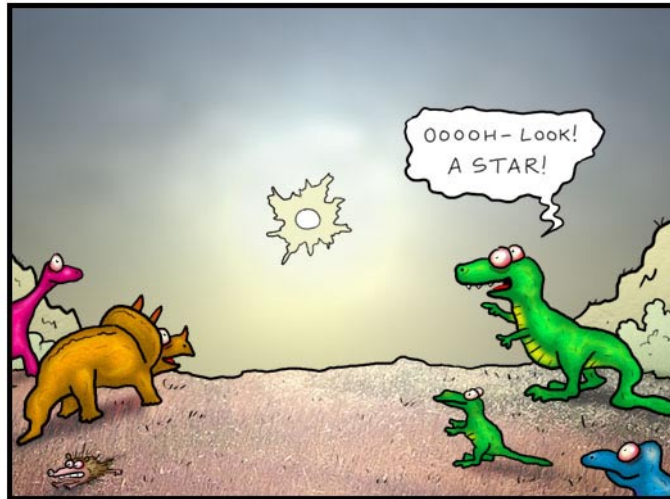
BERNARD PRICE INSTITUTE FOR PALAEOLOGY & INSTITUTE FOR HUMAN EVOLUTION WITS UNIVERSITY, JOHANNESBURG

Lucinda Backwell has spent the past few months concluding a number of manuscripts. The first presents the results of excavations at Wonderkrater, a spring and peat mound site in Limpopo Province, South Africa. This research, made in collaboration with **T. McCarthy, L. Wadley, Z. Henderson, C. Steininger, C. Sievers, M. Lamothe, M. Barré, L. Pollarolo, S. Woodborne, L. Scott, J. Brink, B. deKlerk, B. Chase, R. Sukumar, M. Sheshashayee, L. Rossouw and M. Bamford**, has provided a multiproxy record of late Quaternary climate change and Middle Stone Age human occupation in the region, currently spanning the past 84 ka. A second paper on termites as modifiers of bones in South African cave deposits, made in collaboration with **Alexander Parkinson** (MSc candidate in Palaeontology), presents the results of an actualistic experiment conducted with **Eric Roberts** and **Fernando Abdala** in the Cradle of Humankind, in which bones in different diagenetic stages of preservation were inserted directly into termite mounds for six months and a year. Criteria are provided for the identification of termite damage, and implications for the fossil record are discussed.

A paper on regional traditions in Middle Stone Age bone technology, written in collaboration with **Francesco d'Errico** and **Lyn Wadley**, describes an expanded collection of worked bones, including 23 pieces from Sibudu Cave in KwaZulu-Natal. Technological and use-wear analysis of these objects, and their comparison with experimental and ethnographic data, reveals that a number of specialised bone tool types (wedges, pièces esquillées, probable pressure flakers, smoothers, sequentially notched pieces), previously known only from the Upper Palaeolithic and more recent periods, were manufactured and used at least

DOCTOR FUN

16 Dec 2005



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A Cretaceous Christmas

30,000 years earlier in South Africa. A manuscript on the results of **Godwin Nhauro's** MSc dissertation, written in collaboration with co-supervisor **Ewa Cukrowska**, on the chemistry of bone diagenesis: leaching and enrichment of elements in bones embedded in cave soils in the Cradle of Humankind, is about to be submitted. Ongoing taphonomic analysis of *Australopithecus sediba* and associated fauna from the site of Malapa in South Africa, made in collaboration with **Aurore Val** (PhD candidate), has led to the development of a number of controlled actualistic experiments concerning invertebrate modification of bone, including ants, Achatina land snails, slugs, cockroaches, millipedes, dermestid and dung beetles. *Vive la taphonomie!*

Francis Thackeray

Francis Thackeray is currently working on a concept which he would like to call "Palaeo-spectroscopy", applied to early Pleistocene African hominid fossils. Instead of assuming that hominid fossils can be pigeon-holed into discrete taxa changing through evolutionary time and ecological space, an attempt is

being made to quantify degrees of similarity between certain specimens, including Sts 5 (Mrs Ples, *Australopithecus africanus*), KNM-ER 1813 (attributed to *Homo habilis*) and KNM-ER 3733 (attributed to *Homo ergaster*).

The approach is based on a statistical probabilistic definition of a species (Thackeray, 2007). Preliminary results have been obtained with Eddie Odes, leading to the compilation of a "hominid family matrix" for Early Pleistocene African hominid specimens. The results are coded in seven colours, in a matrix reflecting degrees of similarity. The approach contributes to an ability to recognize chronospecies without relying on the binomial system of nomenclature.

DITSONG: NATIONAL MUSEUM OF NATURAL HISTORY- Pretoria

Heidi Fourie

We are still amidst a repair and maintenance programme and progress is very slow. Once completed the entire Karoo palaeontology collection will be housed on one floor, leaving the Palaeoanthropology collection on the ground floor.

Since I last wrote, I attended the 9th International Congress of Vertebrate Morphologists in Punta del Este, Uruguay during July 2010.

My research still focuses on descriptions of postcranial morphology and this has proven to be very useful for biostratigraphical studies. Having just completed the description of *Ictidosuchoides longiceps* from the *Dicynodon* assemblage zone. *Ictidosuchoides* has been listed as occurring in the middle four biozones, but the advanced postcranium puts it firmly in the *Dicynodon* assemblage zone only.

I am currently describing two *Procolophon trigoniceps* specimens that I collected in the eastern Cape whilst doing field work, both have their postcranium preserved. Susanna Kümmell and I will be revisiting the manus and pes and mode of locomotion of the Therocephalia later this year.

IZIKO MUSEUMS - Cape Town

Karoo Palaeontology

Roger Smith

It has been a year since I last reported back to Palnews and there is so much to tell, so I will be selective and brief. The undoubted highlight was my 2 month expedition to the Trans-Antarctic Mountains which I have reported on separately and in some detail (see p. X). A total of 5 weeks was spent in the Karoo doing fieldwork for The NRF-funded PT boundary project entitled Anatomy of an Extinction which now has an impressive total of 576 in situ identifiable vertebrate fossils, which have been taphonomically assessed and plotted on maps and sedimentological logs. The preparators **Zaituna Erasmus, Cindi Mtalana, Annelise Crean and Georgina Farrell** are working almost exclusively on these specimens in an effort to confirm identifications to at least generic level. Masters student **Pia Viglietti** is finishing up her taphonomy and palaeoenvironments of *Lystrosaurus* bonebeds in the Early Triassic. She joined us on 3 trips and demonstrated a keen eye for fossils- hopefully this will continue into her doctoral phase.

Amongst the more interesting Karoo fossils recovered over the past year are a number of multi-individual monospecific bonebeds of a small archosauromorph (?*Prolacerta*), several *Prolacerta* skulls, 3 *Micropholis* amphibians, an articulated *Lystrosaurus murrayi* with possible skin preservation, another skull and skeleton of a dwarf pareiasaurian (c.f. *Anthodon*), and only the second skull ever of the primitive biarmasuchian *Lemurosaurus*.

As part of the Argentina/South Africa collaboration Claudia Marsicano (Buenos Aires) and Fernando Abdala (Wits) and I spent last August on Etjo Mountain near Omururu, central Namibia, looking for mid Triassic vertebrates in the Omingonde Fm. outcrops and dinosaur tracks in the overlying Etjo Fm. Pickings were meager but significant- several cynodonts including

Chiniquodon (previously only found in S. America) an amphibian sternal plate, jaw elements of a rausuchid, and possibly the star fossil, a complete skull and lower jaw of a tuskless kannemeyeriid dicynodont (tentatively identified as *Stahleckeria* only known from Brazil). These fossils have been prepared in South Africa and will be returned to Namibia in July 2011 when we make our second and final trip to Etjo. We were fortunate to have a bright young Namibian geology student Eliasa Iyambo accompany us last year, and hopefully he will join us this year.

In the last year of the AOP-funded West Coast Fossil Park project we held a very successful research conference "Langebaanweg 2010: Changing Landscapes and Biotas of the Cape West Coast: Mio-Pliocene to Recent" from the 15-18 November 2010. Some 80 international and South African delegates attended and shared their research results, predominantly from the west coast, but some international delegates presented papers on sites which shared taxonomic and/or taphonomic similarities to west coast fossil sites. Thirty-six oral presentations and six posters were presented, and the third day concluded with a very successful Workshop entitled 'The way forward for research on the West Coast'. A field trip up the west coast took place on the last day of the conference and included a very fruitful discussion in the WCFP dig site with the world experts on the genesis of the Langebaanweg sivatere bonebed.

Although the research funding has dried-up (temporarily we hope) we were fortunate to be awarded a technical support grant to continue processing the excavated material at the fossil Park. Three trainee sorters employed from the local community are currently sieving, sorting and classifying all the micro faunal remains recovered from the dig site.

A new education program is now up and running at the West Coast Fossil Park. At least 60 worksheets/activity sheets have been developed for the Foundation, Intermediate, Senior and FET phases. The worksheets provide pre- and post- information, activities and lessons for learners and teachers visiting the

Fossil Park. These may be freely downloaded from the Fossil Park website (www.fossilpark.org.za), but are also available on CD for schools. The CD includes booking forms, information on the Fossil Park, evaluation forms, and so on. Several exciting, hands-on activities have been designed for learners visiting the Fossil Park. These include curriculum-based activities dealing with food-chains, natural selection and so on, and include a mock fossil dig. As part of the AOP/WCFP project a tunnel has been erected to provide a weather-proof area for the fossil dig to take place. Twelve Animations covering various parts of the school curriculum are available on the website. These animations explain various concepts such as natural selection, how the different rock types form, genesis of the sivathere bone-bed etc. Posters for schools to take home, sivathere caps, and certificates have also been designed as part of the new education program. For the benefit and enjoyment of visiting school groups and tourists a set of 9 artworks were commissioned to illustrate how the sivathere bonebed was formed and subsequently discovered. These are now mounted as poster boards in the dig site structure

Things of palaeo-interest in the foreseeable future are: moving the Karoo collections to a nearby building to make way for re-modelling of the collection areas of the SA Museum-scheduled for August - December 2011. The collections should be accessible in their temporary accommodation from Jan 2012 but they will probably not move back until 2014.

In Sept I will attend VI Latin American Vert Palaeo conference in San Juan as co-convenor of a 2 day vertebrate taphonomy symposium followed by 4 days in the mid/late Triassic Ischigualastio basin. In October I spend week in Seattle with Chris Sidor working on Niger taphonomy then on to SVP Las Vegas. And in February 2012 I hope to join a group of South Americans looking for the PT boundary in Patagonia.

Papers published and in the pipeline over the past year:

- ANGIELCZYK, K.D., STEYER, J.-S. SIDOR C.A., **SMITH R.M.H.**, WHATLEY, R. L and TOLAN S (submitted) Permian and Triassic Dicynodont (Therapsida: Anomodontia) Faunas of the Luangwa Basin, Zambia: Taxonomic Update and Implications for Dicynodont Biogeography and Biostratigraphy Special volume of edited papers on Synapsids, Chicago.
- SMITH R.M.H.** and BOTHA-BRINK, J. (submitted) Morphology and composition of bone-bearing coprolites from the Late Permian Beaufort Group, Karoo Basin, South Africa. *Palaeoecology. Palaeogeography Palaeoclimatology.*
- BOTHA-BRINK, J. and **SMITH, R. M. H.** (in press) The growth patterns of the South African Triassic archosauriforms *Proterosuchus*, *Euparkeria* and *Erythrosuchus*, deduced from bone histology *Journal of Vertebrate Palaeontology.*
- SMITH, R.M.H.**, RUBIDGE, B.S. AND VANDER WALT, M (in press) Therapsid Biodiversity Patterns And Palaeoenvironments Of The Karoo Basin, South Africa in A Chinsamy-Turan ed. *The forerunners of mammals.*
- ROBERTS, D.L., MATTHEWS, T., HERRIES, A., BOULTER, C., SCOTT, L., DONDO, C., MTEMBI, P., BROWNING, C., **SMITH, R.M.H.**, HAARHOFF, P. and BATEMAN M.D. (2011). Regional and global context of the Late Cenozoic Langebaanweg Palaeontological Site: West Coast of South Africa. *Earth Science Reviews* 106:191-214.
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IZIKO MUSEUMS (cont.)

Quaternary Collections

Graham Avery

In a landmark move that will bring us in line with other collections already using the system, upload of Iziko's Natural History collection databases on Specify 6 is almost complete. Most databases have been converted and minor details (standardization and protocols) are being sorted out where necessary. We'll be up and running in a couple of weeks.

Most of the Cenozoic Studies collections have been packed in preparation for Iziko's "Courtyard Project", with a few exceptions where researchers have scheduled visits. At this stage we have a building in central Cape Town and the move is to take place in November. There will be limited disruption but careful planning will see us back on track very quickly and looking forward to brand new and larger research/storage facilities for the natural history and pre-colonial archaeology collections in a couple of years. In the meantime it will be business as usual.

Publications in advanced preparation:

Spreeuwalle: a Late Pleistocene Wetland on the Western Cape Coast, South Africa, and its Implications for the Pleistocene History of the Fynbos (Avery, G. and Klein, R.G.), Middle Pleistocene birds from the Western Cape Province, South Africa (Avery, G.), A new Pliocene species of *Arctocephalus* (Pinnipedeae: Otariidae) from the west coast of South Africa (Avery, G.) and A modern brown hyaena (*Parahyaena brunnea*) bone accumulation in the Uniab River coastal fan, Skeleton Coast Park, Namibia and taphonomic implications (Avery, G., Fosse, P., Fourvel, J-B., Tournepiche, J-F, Loutit, R. and Avery, D.M.).

Recent Publications:

Avery, D.M. and Avery, G. In Press. Micromammals past and present in the Northern Cape Province of South Africa. *African Natural History* 7.

Avery, G. and Klein, R.G. 2011. Review of fossil phocid and otariid seals from the southern and western coasts of South Africa. *Transactions of the Royal Society of South Africa* 66(1): 14-24.

Govender, R., Avery, G. and Chinsamy-Turan, A. 2011. Fossil phocid seal pathologies. *South African Journal of Science* 107(1-2): 72-77.

NATIONAL MUSEUM -Bloemfontein

Karoo Palaeontology

Jennifer Botha-Brink

Our lab is frantically busy as usual. In March this year, **Dr Sean Modesto** from Cape Breton University in Canada joined my team and me for a field excursion to the farm Nooitgedacht in the Bethulie District. We have been working on this locality since 2008 and it's proved to be a particularly rich and interesting Permo-Triassic site. During the latest trip, one of our preparators, **Nthaopa Ntheri**, found another gorgonopsian skull and partial skeleton, lying adjacent to an articulated skeleton of the thercephalian *Moschorhinus*. After several days of very hard work, we managed to excavate the specimens and they are now currently undergoing preparation. Our findings regarding this site have now been submitted as a contribution to an edited book entitled "Early Evolutionary History of the Synapsida".

DOCTOR FUN

13 Feb 2006



Copyright © 2006 David Farley, d-farley@ibiblio.org
<http://ibiblio.org/Dave/drfun.html>
This cartoon is made available on the Internet for personal viewing only. Opinions expressed herein are solely those of the author.

Coach Darwin gives a pep talk at the Permian/Triassic halftime.

The hard work put in by myself and colleagues for Anusuya Chinsamy-Turan's edited book entitled "Forerunners of mammals: radiation, histology and biology" is also nearing fruition and will hopefully be published in the next few months.

The accumulation of fossils that **Gideon Groenewald** rescued from Eskom's Ingula Pump Storage Scheme are currently being stored in our collection and are beginning to produce some interesting results. Amongst them is a skull of the exceptionally rare dicynodont *Dinanomodon*.

In other exciting news, the museum has just hired two new fossil preparators, **Ms Sabi Chaka** and **Mr William Molehe**. They have begun training with **John Nyaphuli**, our most experienced preparator. The Palaeontological Scientific Trust (PAST) has generously awarded us funding to make use of John's extensive experience for another year. He will continue to mentor the new preparators until March 2012.

The next few months will involve completing research on the bone histology of Triassic archosauromorphs and procolophonids and preparing a presentation for the 1st International Symposium on Paleohistology, which I will be attending in Spain in July.

Recent Publications:

Botha-Brink, J. and S. P. Modesto. 2011. A new specimen of the therocephalian synapsid *Olivierosuchus parringtoni* from the Lower Triassic South African Karoo Basin. *Palaeontology* 54: 591-606.

NEWS FROM AROUND THE WORLD

John Long

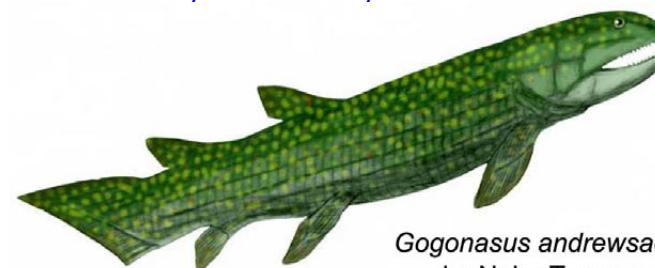
Natural History Museum of LA County, USA

We have just opened our spectacular new Dinosaur Hall, see images from http://la.curbed.com/archives/2011/07/heres_the_awesome_new_dinosaur_hall_at_the_natural_history_museum.php and I invite any of you who might be passing through to come and see it.

Dr Luis Chiappe did an amazing job as lead curator on the exhibition which displays a number of never before seen mounted skeletons, including our centrepiece *T. rex* growth series featuring 17-year old Thomas, along with a 14 year old and a 2 year old juvenile. The preparation of new material for the gallery uncovered a few surprises along the way. These include the description of the smallest ornithischian dinosaur known, *Fruitadens haggardorum*, published by Butler et al. in *Proc. R. Soc London B* (2009), the world's best preserved mosasaur fossil (PLOS One, Lindgren et al., 2010) and a beautiful pliosaur fossil with an embryo inside it (in press, O'Keefe & Chiappe). It just shows that what treasures museums might have right under their noses but are unaware of until they are readied for exhibition.

Research on Devonian Gogo fishes continues, with work about to be submitted soon on the reconstruction of musculature in a Gogo placoderm fish using CT and synchrotron imaging. John Long's new book about the origins of sex in vertebrates, based on his Gogo fish finds, will be out in Australia Sept 1st -titled "**Hung Like an Argentine Duck**" it will be easy to order through amazon or from the publisher, HarperCollins, Australia

(<http://www.harpercollins.com.au/books/Hung-Like-Argentine-Duck-Journey-Back-Time-Origins-John-Long/?isbn=9780732292737>).



Gogonaspis andrewsae
by Nobu Tamura
(<http://en.wikipedia.org>)

John has another book out in October with Jeff Stilwell on the complete prehistory of Antarctica, no doubt something of possible interest to our fellow southern Gondwana dwellers.: Stilwell, J. & Long, J. *Frozen in Time* (C.S.I.R.O Publishing, Melbourne 250pp.) see <http://www.publish.csiro.au/pid/6431.htm>

Ever wondered how animals first became intimate and where sex fits into the whole evolution theory?

From homosexual penguins to necrophiliac snakes and fellating fruitbats – it's all here.

Leading paleontologist Dr John Long journeys back in time to explore the beginnings of sexual intimacy in the animal kingdom only to discover that the gap between human and animal behavior is not as great as many of us might have thought. Like an eagle up high looking down, we can only get such breathtaking views of evolution by taking a very big step backwards from the primates to the primeval beginnings of our vertebrate line.

So, without wishing to sound like a Peeping Tom, enjoy the view!

'John Long breaks new ground in our understanding of the origins of sex as it is written in the fossil record. He reconstructs a detailed 400-million-year history in which survival of not only the best, but sexiest, continues to dominate all species, including humans.'

CARMELO AMALFI
Science writer

'I shall never feel the same about ducks again. Or fish. This is first-class science told with brilliance and flair. Read and be astounded.'

ROBYN WILLIAMS

ABC Radio National
Science broadcaster



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HUNG LIKE AN ARGENTINE DUCK

DR JOHN LONG

A journey back in time
to the origins of sexual intimacy



HUNG LIKE AN ARGENTINE DUCK

'You are now holding a compromise between a book that you should carry hidden inside an opaque bag, and a sober, respectable scientific treatise.

It's a deliciously written account of the evolution of sex, in all of its bizarre manifestations.

Read, blush, and enjoy!

JARED DIAMOND

Pulitzer Prize-winning
author of *Guns, Germs,
and Steel*

'John Long is renowned as the discoverer of the earliest evidence for internal fertilisation. Encompassing 380 million years of sexual evolution, he lays the full significance of his discoveries in fascinating context.'

TIM FLANNERY

Leading Australian scientist,
explorer and author of
The Future Eaters and
The Weather Makers

A journey back in time
to the origins of sexual intimacy

DR JOHN LONG

Earthquake

by Norton Hiller
Canterbury Museum, Christchurch

Well, what an interesting and unsettling nine months it has been! At 4.30 am on 4 September last we were wakened by the sound of a freight train rushing through the house. Then everything started to shake. Half out of bed, we could hear things falling off shelves but the fabric of the house seemed to remain intact. After 40 seconds, but seeming much longer, the shaking stopped and we could stand upright again and start an exploration of the property. However, the power was off and I was unable to locate the torch I was sure resided in my bedside cabinet. [At times like this you wish you had paid more attention to the Civil Defence messages about being prepared for a natural disaster.] Carol retrieved a little battery-operated radio and we retired to bed to wait for daylight. There was a fair old frost outside and bed seemed like a good place to be. However, we live by the coast so we contemplated evacuating in case of a tsunami but decided to wait for the warnings. I did wonder if the bed would float.

News reports started coming over the radio with tales of building collapses in the central city, but no word of casualties. Estimates of the quake magnitude were also reported at about 7.2 M on the Richter Scale. Hmm that's big, I thought, we'd better check the house. Once it was light we went through every room and I checked the outside walls and roof. Fortunately there were no cracks and all the doors opened and closed without problem so the framework was sound. The only damaged we suffered was to a few fallen objects. We were very lucky. As news kept coming we learned just how lucky we were. We even got our power, water and land lines restored by lunchtime.

Yay, we survived! Where can I buy the t-shirt?

Indeed we all survived and in spite of the magnitude of the quake there were no casualties. It seems that if you are going to have a major earthquake, then 4.30 am is the perfect time. The night owls will have gone home but the early birds would not be up just yet.

That, of course, was only the beginning. Over the next few months we had lots of aftershocks but by Christmas they had tailed off a lot and barely gave most folks pause. We even grew tired of playing earthquake roulette (guessing the magnitude of an aftershock). This was turning out to be the most studied earthquake in history. Within hours, geologists, seismologists, geophysicists and many others were out there looking for the fault, deploying mobile seismic stations, documenting the affects of liquefaction in suburbs along the river, and studying the responses of different types of buildings. At the Geoscience Society of NZ conference at the end of November, a whole session was devoted to the quake and we heard talks covering every aspect. As a survivor but not a victim I was able to sit back and enjoy it in total fascination.

In complete contrast, 12.50 pm is not a good time to have a big earthquake. At that time on Tuesday 22 February I had just gone up to the museum staff room on the top floor (Level 5) and poured myself a cup of tea. There was a bang, a rumble and then the most violent shaking I have ever experienced. The water cooler fell over, my tea was all over the floor and I had to grab the door post to keep myself upright. After another 40 seconds of having one's comprehension tested to the limit, it was over. The alarms went off so we evacuated the building and I was surprised to find that I had no problems getting to an exit. All passageways were clear and doors open. We assembled in the Botanic Gardens next to the

museum and were joined by lots of people who had been visiting the museum and other tourist attractions close by. After about 10 minutes there was a big aftershock.

Earthquakes are different when you are outside. The ground really does move in waves, trees sway like they never do even in a strong wind and buildings and statues come to life in the most bizarre way.

This one was different. As we milled about trying to regain composure and contact loved ones, we became conscious of hoards of people coming up from the city centre a couple of blocks away. Many looked ashen, others were covered in dust.

You just got the feeling that this time there would be no t-shirt.

The Richter Scale magnitude was recorded as 6.3. Not as big as September's quake but the affects were considerably greater. The epicentre was much closer to the city and the movement took place on a different fault. Unprecedented ground accelerations were recorded. A new hidden fault under the hills immediately southeast of the city was responsible for this one. The hills are now about 50 cm higher while the land to the north of them is up to 1 m lower.

Sadly, this time there were casualties - 182 people died and many more were injured, some very seriously, as a result of collapsing buildings and falling masonry. In addition, the effects of the tremors were much more widespread. Liquefaction devastated the eastern suburbs. Houses were moved, roads wrecked, water and sewage pipes destroyed and power lines broken. On the hill suburbs, built on rock, liquefaction was not the problem; because they were virtually on top of the fault, many houses were practically shaken to pieces and falling rocks destroyed others. Those built close to the edge of cliffs were left precariously perched and uninhabitable.



What happens to a footbridge when river banks move towards one another



You can't keep a good geologist down.

In the days following, those of us who had lost power, water and sewerage were encouraged to dig latrine pits in private corners of our gardens until the authorities were able to set up port-a-loos along affected streets and eventually deliver chemical toilets. Fortunately, we only had to last a week at home before we could flush again. It was just as well as I found squatting in the garden murder on aged knees!



Liquefaction.

The 22 February event started a whole new round of aftershocks and once again the citizens of Christchurch tested their skills at guessing the size of each new shake. Each aftershock was presaged by a loud bang or a rumble, and then the shaking came through the house in a south to north direction and faded away. Every time we would hold our breath waiting to see if the shaking was going to build and got ready to dive under a table if necessary.

After almost four months, things had quietened. The roads had been made passable, if still very rough, and many businesses were operating as normally as they could. At the museum, we were not allowed back for about a month until the buildings had been inspected and declared safe, and power and water had been restored. Since about mid-April, we have been working short hours on earthquake recovery projects. Collections on display took a bit of a hit so exhibitions staff members have worked their way through all the cases recovering broken items, repairing mounts and cleaning up debris. They had just completed this task when, on Monday 13 June, we had it all again.

In a cruel action replay, we had another 6.3 but this time it was preceded by a 5.6 about 80 minutes earlier. By the time these shakes hit, most folk were out of the building. I had gone to the university and was standing outside the library tower when it started to shake and make odd noises. Workmen up scaffolding on the outside of the building came down like rats down a drain-pipe and gathered with sighs of relief at the bottom. Campus was evacuated so I headed home but got snarled up in traffic. I had not quite made it home when the 6.3 hit. I have to say it is a decidedly weird experience driving in a major earthquake when the road does strange things. In such circumstances control of a car is a foreign concept.

Again, home was fine, but many of those unfortunate folk who had barely finished clearing their properties of silt from February's liquefaction had to start it all over again. Roads are once again like assault courses but the guys working on them are doing a fantastic job. It will be years before our city recovers but every day we take a small step in the right direction. After more than 7000 recorded aftershocks, we are well and truly over it. Now we look forward to the time when our little piece of the crust settles down to some sort of equilibrium.

Carol and I really appreciate all the calls and messages we have received asking after our well being. It is quite humbling that so many people, in many parts of the world, were thinking about us.



13th fairway at Waimairi Beach Golf Club.



Another victim of liquefaction.

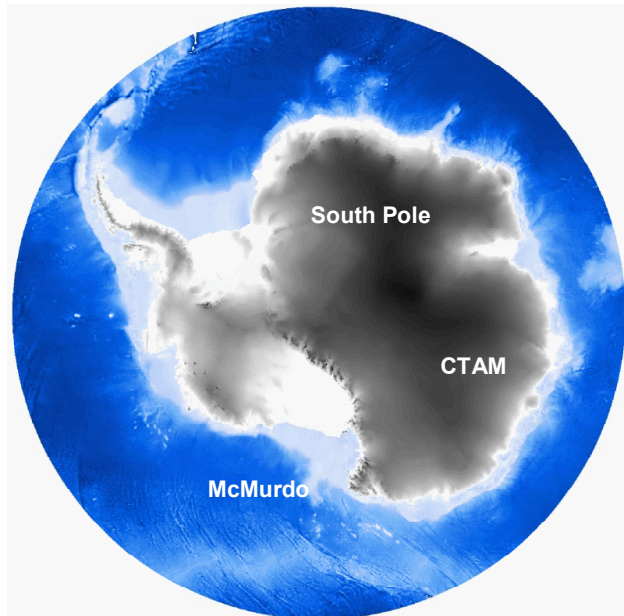


Liquefaction crater, Bower Ave playing fields

Antarctic Expedition

By Roger Smith
Iziko South African Museum, Cape Town

The National Science Foundation of America has, over the past 20 years funded 4 temporary base camps in the Trans Antarctic Mountains with the express purpose of helping teams of earth scientists do research on the rocks, fossils and glaciers of the area. In Nov/Dec 2003 I was fortunate to be invited to join a team of geologists working on the Karoo-aged rocks near Beardmore glacier. Even more fortunate was the fact that whilst measuring a section on Graphite Peak I found a near complete curled-up skeleton of *Thrinaxodon*- a cynodont mammal- like reptile that also occurs in South Africa which is now on display in the SA Museum's Stone Bones gallery.



Satellite image showing position of our CTAM base in relation to the South Pole and the US base at McMurdo. CTAM is 500 km from the south pole.

In 2006 the NRF invited research teams to submit proposals for future fieldwork in the Trans-Antarctic Mountains. In early 2010 I was invited to be part of a team working on the Karoo -aged rocks and fossils to find out more about how the terrestrial tetrapods, therapsids, reptiles and amphibians, managed to survive the End-Permian mass extinction, and flourish in this part of southern Gondwana during the Triassic Period (250-200 Mya). According to the latest continental reconstructions this region was 700 south in a cold temperate zone. My specific job was to test the models against sedimentological evidence from the rock and palaeontological evidence from the fossils- especially the vertebrate fossils. After extensive medical checks and physical stress tests I was pronounced "physically qualified" to travel to Antarctica's , highest, remotest and most unpredictable wilderness- the Central Trans-Antarctic Mountains



The functional yet ugly McMurdo base- the largest settlement in Antarctica

The US Antarctic Programme is based at McMurdo - a coastal settlement of about 250 staff that swells to over 1000 people in the short summer season when all the scientists are in residence. Because the sea is frozen for most of the year the main access is by air from Christchurch, New Zealand. This is where we were issued extreme cold weather clothing which had to be worn as we sat in the hold of an enormous Hercules transporter plane on our way to the ice. The Hercules landed on a temporary runway on the ice shelf near to the McMurdo base, using a fixed skid at the front rather than a wheel. The length of time that scientists are able to work during the summer season is normally around 12 weeks and is determined by the speed at which the sea ice breaks up. As the ice melts the runway is moved further offshore until it is no longer safe to land - by then all the scientists have to be back in Christchurch.



First glimpse of the volcanically active Mount Erebus from the ice runway at Mc Murdo

The first week in Mc Murdo involves learning basic survival skills at the "happy camper" snow school. We are taught how to build a snow shelter, drive a skidoo, deal with waste (human and otherwise), how to avoid frostbite and altitude sickness and all the time getting used to sleeping in perpetual daylight.



"Happy camper" digging a snow trench in which he had to sleep. Most spent an extremely cold and uncomfortable night mainly because they built them too wide and spacious.

With all our camp gear and food supplies for 2 months we were airlifted to CTAM (Central Trans-Antarctic Mountains), a remote base near Beardmore Glacier set up just for the 12 week season to help teams of earth scientists do fieldwork.



CTAM- the temporary base for scientists and support staff near Beardmore Glacier in Central Trans Antarctic Mountains.



My home at CTAM when I wasn't in the mountains.

From CTAM our research team of Dr Chris Sidor (Burke Museum, Seattle) and myself with University of Washington students Adam Huttenlocker and Brandon Peacock, was airlifted by a small Twin Otter fixed wing plane to Graphite Peak. Here we were offloaded in the middle of a windswept snow-covered plateau and told to wait till the helicopter arrived. Luckily I was wearing my snow boots so my feet stayed warm - Chris suffered badly with frozen feet before the helicopter came to drop us on a flat spot half way up Graphite Peak where we could pitch camp.

Helo coming into land at our camp site on Graphite Peak- the fossil locality is high up the mountain in the background. The nearby snow patches were our source of snow to melt for drinking water.



Our endurance tent- 3 of us camped for 3 weeks in this tent whilst on Graphite Peak and Gordon Valley. The wooden boxes contain frozen food.

For 8 long days we walked up the mountain looking for vertebrate fossils, excavating the interesting specimens with a portable rock saw, and logging sections. Beneath one of the *Lystrosaurus* specimens that we collected from here, we were amazed to find a complete skeleton of a very rare archosaur (dinosaur ancestor) called *Prolacerta*. This discovery happened on 2 January (my birthday) however whilst we sawed away at the new find, the snow began falling and soon a freezing wind forced us to abandon the dig and head back down the mountain. For the next 3 days bad weather confined us to the camp until conditions cleared enough for the helo to get us back to CTAM. After much negotiating and bargaining we were allowed an extra 6 hours helicopter time. Thus, against the odds, and at great expense, we managed to recover the entire *Prolacerta* fossil intact. This is a testimony to NSF's commitment to palaeontological research and Brandon is especially pleased because this will be a key fossil in his Ph.D. project.



Trying to start the frozen rock saw during the snow storm on Graphite Peak- on my 60th birthday- We were eventually forced to abandon the dig.



Prolacerta skeleton on Graphite peak- this is the piece that we had to leave behind when the weather closed in. Fortunately we managed to collect it a couple of weeks later.

Our second camp was set up in Gordon Valley- here we spent 6 days looking for fossils of Middle Triassic age (235my) at a site that had been collected back in 1990. Within hours I found the back end of a large amphibian skull sticking out of a cliff face. After 4 days continuous sawing at the rock we managed to get it out of the ground pretty much complete.



Adam with snotcicles on Graphite Peak.

The skull, which is about 75cm long, has a classic arrow-head shape and a distinctive highly ornamented surface sculpture on top. It looks like a narrow snouted version of *Parotosuchus* but we will have to wait until it is prepared to be sure. Whatever it turns out to be it will be a spectacular display specimen.



Adam and Brandon fill in the missing body behind a large triangular-shaped amphibian skull- Middle Triassic of Gordon Valley Antarctica. The skull is lying ventral up.



Teeth in the lower jaw of a 235my old amphibian fossil.

Towards the end of my stay I joined up with Steve Hasiotis - the trace fossil expert looking for vertebrate burrows on Coalsack Bluff- a site that I had worked in 2003 when I unfortunately got stuck in a blizzard for 4 days. My aim was to find the earliest Early Triassic fossil by looking in the rock layer immediately above the last Permian coal bed- the marker for the P-T Boundary in this region. I searched the slopes for about 6 hours before finding a vertebrate burrow cast with scratch marks which gave us hope that their skeletons should also be around. An hour or so later I came across a small scattered skeleton with vertebrae, limbs and pelvis which - whatever it turns out to be - is the oldest tetrapod fossil from Antarctica. A fitting end to another very long, bitterly cold but ultimately rewarding day.

My most memorable moment in Antarctica was right at the end of the season when I had run out of helo time, and the science teams were packing up to depart. Bill Hammer (Augusta University) asked me to join their team working in the Jurassic rocks high up on Mt Kirkpatrick. Always keen to see new sites, I spent the day in thin air at 4000m, with -34degrees C air temperature and frozen snot all over my face and mittens. My job was to measure a rock section through their *Cryolophosaurus* dinosaur quarry and

throw some light onto how the bonebed accumulated there. Despite freezing winds, iced-up goggles and the fact that this area had been searched many times by some top dinosaur palaeontologists, I found the scattered skeleton of a small dinosaur, very similar in size and shape to *Heterodontosaurus*. The team were incredulous, and a little embarrassed, that only 50 metres away from the site they had been working on and off for the past 20 years I had found what they believe to be the oldest ornithischian dinosaur skeleton from Antarctica.



In extreme cold weather gear at my new dinosaur discovery



Close-up of one of the vertebrae from the new ornithischian dinosaur that I found on Mt Kirkpatrick. "Superglue" has been applied to keep the fossil bone surface intact whilst excavating.

The new dinosaur fossil, which is about 2m long, came out cleanly in 3 large blocks which were placed in a cargo net and then manually clipped onto the underside of a hovering helicopter. At this altitude the helicopter could not take-off from the ground with such a heavy load which is why it had to be "hot loaded" with the rotors at full revs and airborne.



"Hot loading" the new dinosaur fossil on Mt Kirkpatrick. A very risky procedure only to be performed by an experienced helo tech.

Molteno sphenophytes: Late Triassic biodiversity in southern Africa

So all in all a very good trip- favourable weather and excellent logistical and team support allowed me the luxury of 180 hours on outcrop during my 51 days in Antarctica (compare to 65hrs in 2003). This certainly contributed to my success in finding some very interesting fossils which now lie inside the 700kg of rock that is on its way to Seattle.

We now have to wait a year or two for the preparators to reveal the full significance of these finds, in the meantime I am spreading the word amongst the Capetonians with a popular slide show entitled "Dawn of the Age of Dinosaurs in Antarctica".



Adam, Bandon and myself waiting for our precious cargo of fossils to be loaded into the C130 before flying back to Mc Murdo

This will be our seventh volume (planned for publication in early-mid 2012) in the ongoing account of the fossil flora of the Late Triassic Molteno of South Africa. The first three volumes in the series (1983, 1985, 1989) were published through A.A. Balkema in Rotterdam, Holland, the following three (2003, 2007, 2008) in the *Strelitzia* monograph series of the South African National Biodiversity Institute (SANBI).

The aim of the middle volume in each of the trilogies was to see the Molteno flora in broader context: in the 'Prodromus' (1985), in southern African context; in the 'Brief History', in global context.

The Molteno collection on which this research is based was begun by ourselves in 1968 and now amounts to close on 30,000 curated slabs representing 100 assemblages from 69 localities (areas to 1 km diam.) around the extensive 400 by 200 km outcrop of the formation.

What emerges from these studies is that the Molteno appears to represent the peak of plant diversity - when considering all ranks from species and genus through families to orders and classes - since the colonisation of the continents back in the early Silurian some 425 million years ago. This is especially so for the gymnosperms. The peak of diversity came in the wake of the greatest of all global extinctions at the close of the Permian (251 mya); and it was during the radiation of new diversity that followed that both the dinosaurs and mammals emerged, and likewise, probably, the forerunners of the angiosperms.

The Molteno horsetails (sphenophytes), true to the diversity of the overall flora, are rich, compellingly rich. We say this with the endearing term 'goofies' irresistibly in mind. Meaning something like intransigent, the word (or rather its meaning here) was coined by Conrad Labandeira (see below), who has for the past decade been

regularly visiting and studying the plant-insect interactions in the Molteno. After considerable back and forth, we have settled on recognising 8 genera and 23 vegetative species (often dominant elements of the flora, from 59 of the 100 assemblages), along with 5 genera and 12 species of strobili (extremely rare elements of the flora, from 13 assemblages).

The emphasis throughout is on untangling as best as one can the natural diversity that occurred back in the Molteno floodplain biome--with a strong emphasis on extensive sampling from numerous localities, and on the affiliation of organs. We include two colour sections in the volume: the first with rendered sketches of the sites yielding types and/or strobilus specimens (and their interpreted habitats); the second, of 50 plates, covering the fertile specimens and their supposed affiliates.

Over the next few years, we plan to complete the write-up of the flora. This will include volumes on the rich diversity of insects found at some half of the plant sites (with palaeoentomology colleagues); and on the role of the insects in the ecology of the seven recognised habitats characterising the biome (by Conrad Labandeira from the Smithsonian in Washington).

Last year (2010), our collection went on what we have come to refer to as the 'Molteno Great Trek'. Now well over double the size, it has found its way back to its place of origin at the Bernard Price Institute for Palaeontology at the Witwatersrand University in Johannesburg. This 75 km journey down the highway from Pretoria to Johannesburg was not without its tribulations. Happily, however, the Molteno plants (and accompanying insects) are now safe and sound under the watchful care of Prof Marion Bamford (plants, Deputy Director) and Prof Bruce Rubidge (animals, Director) of the BPI. And they await a flow of research visitors from around the globe. We offer our sincerest thanks to BPI for taking the Molteno collection under its wing; and we thank all those at SANBI over the previous decades who encouraged its growth and supported its research.

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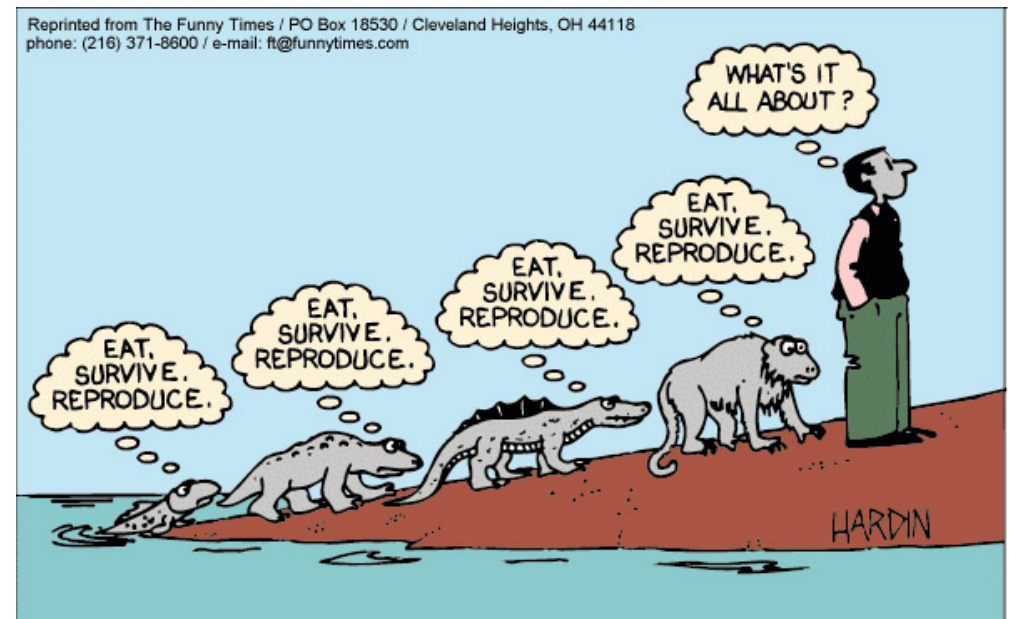
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