

PAL NEWS NUUS



Biannual newsletter of the Palaeontological Society of Southern Africa.
Halfjaarlikse Nuusbrief van die Paleontologiese Vereniging van Suider Afrika.

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CONTENTS

• From the Editor	pg 3
• Announcements from SAHRA	
Registration of collections	pg 4
Impact Assessments	pg 5
• Report from PSSA Tourism subcommittee	pg 6
• News from:	
Palaeobiological Research Group, UCT	pg 8
Billy de Klerk, Grahamstown	pg 10
BPI, Johannesburg	pg 12
Transvaal Museum, Pretoria	pg 36
Roger Smith, Cape Town	pg 37
Danakalia expedition - Roger Smith	pg 41
Council for Geoscience, Pretoria	pg 48
National Museum, Bloemfontein	pg 50
• Forthcoming, biennial PSSA-conference	pg 52
• PSSA E-mail addresses	pg 53

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Front cover: The Halloween-like, mystery figure on the cover page is actually a beautiful skull of a South African amphibian previously known as *Parotosuchus africanus*. Nowadays it is known by several other names and this very specimen now resides at Berkeley, California (US).

FROM THE EDITOR

Hallo everybody! Another year has flown by and it seems to have been a busy one for South African palaeontologists. Judging from this unusually thick edition Southern African palaeontology is in good condition with our members active on a number of local, national and international fronts. General awareness of palaeontology in our region seems to be on the increase and sustained efforts to have palaeontology included in the school curriculum may finally be bearing fruit. Progress have also been made by the Tourism Subcommittee of the PSSA who drafted a protocol on Palaeo-tourism in South Africa. Included in this editions are two important announcements by SAHRA that concerns palaeontologists and palaeontology.

It is also time again for the biennial meeting of the PSSA which will be held at Bloemfontein from 3-8 October this year. For all the important contact information have a look on page 52.

You may have noticed that PalNews experienced a gradual increase in the number of photographs submitted by contributors via the E-mail. This is great! Please send us some more! Where possible select photos that are light, simple (not to much detail) and clear as they have to be reproduced several times. Black and white photos are preferred and photos should be send separately from the text as the smaller the file is, the easier it is to handle.

All that remains now is for me to wish you all palaeontological success in 2002. Until next time....

Johann

CALL FOR REGISTRATION OF PRIVATE COLLECTIONS

SAHRA reminds the nation that all private collections of archaeological artefacts, fossils and meteorites need to be registered by April 2002

The National Heritage Resources Act (Act 25 of 1999, Section 35:7 & 8) states that *'any person in possession of any archaeological or palaeontological material or object or any meteorite which was acquired other than in terms of a permit ... must lodge with the responsible heritage resources authority lists of such objects and other information...'*

SAHRA would like to stress that while private collections need to be registered, they remain the property of the owners. The aim of the registration of these collections is to ensure that information about the past, contained within these collections, is not lost but recorded and managed for present and future generations. In the same way, collections housed in museums and universities are catalogued and listed, forming part of South Africa's national heritage.

What constitutes a collection?

- * All archaeological material or artefacts excavated or collected from sites that are 100 years or older, rock paintings & engravings.
- * Objects recovered from or associated with shipwrecks older than 60 years.
- * Objects from military sites older than 75 years.
- * All fossils & other palaeontological material including fossil footprints.
- * All meteorites.

Registration forms are available at SAHRA. Please contact Mrs Mary Leslie, Archaeologist, SAHRA, 111 Harrington Street, Cape Town, 8001. Tel: (021) 462-4502 Fax: (021) 462-4509

SAHRA IMPACT ASSESSMENTS

In terms of the new National Heritage Resources Act (1999, No.25) archaeological and palaeontological material is generally protected and may not be disturbed without a permit from SAHRA. In terms of the National Environmental Management Act (1998) an assessment of the impact of a development upon, not only the environmental but also upon cultural resources is required.

For this to be done effectively, professional archaeologists and palaeontologists are approached to assess the potential of heritage material in the project area and advise how best it can be protected once the development takes place. It is therefore important that SAHRA has a list of professionals in each field, and their respective contact details and areas of expertise so that they can circulate the list to contractors who do these assessments and provide a report. Anyone interested to get involved in this kind of contract work (and scoping analysis) should complete the following questionnaire and send the information to Billy de Klerk (Dr W.J. de Klerk, Albany Museum, Somerset Street, GRAHAMSTOWN, 6140 or B.deKlerk@ru.ac.za) as soon as possible.

Title and Name _____
Address _____
Tel: _____
Fax: _____
E-mail: _____
Institute: _____
Area of research speciality: _____

REPORT FROM THE TOURISM SUB-COMMITTEE FOR THE PSSA - NEWSLETTER

- PSSA seizes the tourism initiative -

A protocol setting out principles and guidelines for ethical palaeotourism in Southern Africa has been prepared by the PSSA's Tourism Sub-Committee, with the aim of formal government ratification after confirmation by the Association.

This will effectively protect fossil sites from uncontrolled access and damage, and will entrench scientific input into and participation in the palaeotourism industry.

The *Tourism Sub-Committee* was set up at the General Meeting of the PSSA on September 6, 2000, after concerns had been voiced by members about the potentially damaging effects of tourism on palaeosites. Scientists had encountered problems with farmers who had tried to exclude them from sites because they had been approached by tourist operators seeking exclusive access for tourists. Some sites had been damaged by uncontrolled access, and fossils marked for research had disappeared.

Professor Bruce Rubidge (BPI Palaeontology), Dr Gideon Groenewald (Clarens Dinosaur Hunting Expeditions), Ms Pippa Haarhoff (West Coast Fossil Park), Dr Colin Menter (Palaeoanthropological Unit for Research and Exploration) and Ms Marion Duncan (Time World) had been appointed to the sub-committee. They were charged with taking relevant action to control palaeotourism in a sustainable way, protect fossil sites, ensure PSSA participation in accrediting tour operators and tour guide training, and guarantee benefits to palaeontologists.

The first meeting of the sub-committee was held on April 6, at which Professor Rubidge was elected Chairman and Ms Duncan as Secretary. The meeting agreed that the optimal solution to address the fears of the

palaeontological community would be the drafting of a formal PSSA protocol for palaeotourism, that would take account of all relevant issues. Ms Duncan was appointed to research and draft the document.

The first draft was considered at the second meeting on November 29. Ms Duncan had undertaken considerable research into international tourism and heritage instruments, and had followed international conventions in producing a protocol based on six principles and incorporating detailed guidelines and codes of ethics. She had also obtained input from the tour and travel industry, the legal profession and the Constitutional Court.

The result, amended and recommended by the sub-committee, was distributed for comment to all members of the PSSA in January, 2002.



NEWS FROM:

PALAEOBIOLOGICAL RESEARCH GROUP, CAPE TOWN

The last four months have been really hectic for the palaeobiology team at UCT and the SA Museum in Cape Town. Anusuya Chinsamy-Turan has taken on new challenges as the Director of the Natural History Collections of the Iziko Museums of Cape Town and her students are incredibly busy writing up their work. Here's more in details at what we have been doing:

Anusuya Chinsamy-Turan - I am still trying to do research, as well as keep abreast of the responsibilities that go with my new position. On the research front, I was most fortunate to be able to attend the *ICVM-6* meeting in Jena, Germany in July 2001. At the meeting I presented two papers, one in the *Dinosaur Biology Symposium*, which I coordinated with Prof. Peter Dodson, and the other in the regular part of the meeting. The latter paper was on the collaborative project that Dr. Matthias Starck and I have been doing on the bone depositional rates of modern birds, and will shortly be published in the *Journal of Morphology*. During the meeting, Dr. Andrzej Elzanowski and I heard that our contribution to *Nature* on the evolution of growth patterns of early birds had just been published, and we were caught in a frenzy of interviews etc.

On the Directorship front, besides the "admin load", I am delighted that I am now in a position that can really promote and stimulate interest in Science education. I plan to put on a series of new exhibitions, which will increase the traffic in our museum, as well as, actively promote Science. On the 1 November we launched the first of our new exhibitions - *Go Bats!* This exciting exhibition deals with the fascinating world of bats, and how they have impacted on our culture. Our next exhibition will be about metals and minerals, *Mineral Mania*, and will be launched on the 1st February. This one has all the ingredients to be as big a success as *Go Bats!* And you bet we have new exciting palaeontology exhibitions lined up for later in 2002! Enjoy the upcoming holidays, and best wishes for

the New Year! I look forward to seeing most of you at the *Mesozoic Terrestrial Ecosystems Meeting* next year.

Jennifer Botha - I am currently in the process of writing up my PhD thesis. My work involves examination of the biology of several representatives of the Cynodontia. I am studying their postcrania, using bone histology, to deduce aspects about their growth and I am also examining their teeth, using isotope analysis, to determine the influence of climate variability on their growth. As I am sure many of you can remember that slightly crazy time ("Oh so close, but so very far" stage!), writing up a thesis can be all time-consuming. So I have not been focusing on much else.

Tamara Franz-Odenaal - I have been fairly busy in the last 6 months, attending conferences and rounding up the experimental work of my PhD. I attended two conferences - one local and one international. The local *SASQUA* (Southern African Society for Quaternary Research) conference was held in Saldanha Bay from 9-11 July. The conference was well attended by local Quaternarists and a few international guests were also present. The first and second day's programme covered coastal dune, marine, strand line and terrestrial environments. The final session had a look at radiocarbon dating, fossil proxies and faunal adaptations. There was a break from talks on the second day, when we went on an excursion to look at quaternary deposits of the West Coast Fossil Park (Langebaanweg) and the West Coast National Park. I gave a presentation on some of my latest results on the pathologies in the sivatheres from Langebaanweg, which earned me the best student presentation prize!

The second conference I attended was immediately after *SASQUA* and was the 6th *International Congress on Vertebrate Morphology* held in Jena, Germany. *ICVM-6* was a wonderful meeting with five parallel sessions over five days. The talks covered a wide range of subjects from developmental biology to feathered dinosaurs. Delegates from 45 different countries attended. I presented a more detailed talk on my latest results and received some very valuable comments afterwards.

On a less serious note, I also wrote a popular article on my work that went online in June on the Science in Africa website. My research on the palaeopathologies of the sivatheres at Langebaanweg was also covered on e-TV in July.

Sanghamitra Ray - The study on the bone microstructure of the Permian dicynodont *Diictodon* is well underway. The laborious process of thin section making is almost complete. Currently I am busy discovering the fascinating world of bone cells and vascular canals! I have also begun working with Anusuya and Jennifer on the bone histology of some gorgonopsid and therocephalian taxa. I am concentrating on completion of all the analyses and writing it up as my two year postdoc at UCT ends next July. My paper on the Permian dicynodonts from India has been published in the September issue of *Palaeontological Research* (vol. 5, no. 3, p. 177-191) and another paper on the stratigraphic architecture and depositional controls of a Lower Gondwana succession from India, has been accepted for publication in *Sedimentary Geology*. I have also submitted a paper with Anusuya on the functional anatomy of *Diictodon* to *Palaeontology*.

BILLY DE KLERK, ALBANY MUSEUM, GRAHAMSTOWN

As I missed the "Pal News" boat in mid year permit me to report on activities over all of 2001. News from the Albany Museum is that we are back on our feet, financially speaking, after a number of rather torrid years scraping the bottom of the barrel. We are still understaffed and consequently new display development is slow. Mrs Gill Maylam completed the large painting of a reconstructed *Cynognathus* Assemblage Zone of the upper Beaufort in the Karoo. This quite superb landscape has been mounted in our Palaeontology Gallery and shows what the fauna, flora and landscape looked like during those times. Many thanks to those colleagues, especially at the BPI, for commenting on aspects of the reconstruction, both of the animals and the plants, during the early planning stages of the

project. Gills next project will be a large painting of the *Cistecephalus* Assemblage Zone and a Molteno landscape which she will start early this year.

Over the past year it has been nice to have Dr Frank Holzfoerster on the staff at the Geology Dept at Rhodes University and it will be sad to see him leave for Germany early in 2002. Frank and I supervised two BSc(Hons) students who were working on a project in the Kirkwood district aimed at documenting the stratigraphy and sedimentology of the Kirkwood Formation at the strato-type locality (Kirkwood Cliffs) and at the Umlambo exposures near Dunbrody (8km to the east). Two descriptive logs were prepared by the students at each locality with the main focus being on the palaeosols and massive sandstone units in the succession. During the May field season we were joined by Drs Marion Bamford, Bernard Gomez and PhD student Rose Adendorff from the BPI for a spell of fossil plant hunting in the Kirkwood - rather elusive! Marion and I also took the opportunity of planning an interesting route for the forthcoming pre-conference field trip in the lower Cretaceous Algoa and Gamtoos basin for the *MTE Conference* that will take place in Cape Town in July 2002. Should be an interesting and entertaining field trip.

My work on the Sante Sana palaeosurface in the central Karoo, with it's associated vertebrate (dicynodont) trackways, has been completed and apart from the paper, a series of A0 colour posters of this superb trace fossil site were prepared and distributed to the property owners at Sante Sana, the Wellwood fossil collection and to the Ganora (Nieu Bethesda) Karoo fossil trail facility. Two large fibre glass surface casts of the trackways, with accompanying explanation posters, have been mounted in the Rhodes University Geology Dept. and at the Albany Museum. Additional good news is that the management of Sante Sana have commissioned the sculpture of a full-size large dicynodont animal (2m long) to stand in the trackway on the property. An artist, Mr Jan Nell of the Rhodes Fine Art Dept, has started with this project and once the positive is completed a couple of fibre glass duplicates will be made for display purposes as well -

one to stand in the Karoo veld and the other to be displayed in the Museums Palaeontology Gallery.

That's all from the Eastern Cape!

I look forward to seeing you all at PSSA Bloemfontein!

BERNARD PRICE INSTITUTE FOR PALAEOONTOLOGICAL RESEARCH

The BPI has experienced considerable developments these last months and the staff and students of BPI (Pal) and the palaeoanthropology unit (PURE) have been involved in several field trips, field-schools, international conferences and collaborative projects. Dr Bernard Gomez, a specialist in cuticular studies of Cretaceous floras joined the BPI as a post-doctoral researcher from Lyon, France. He joined Dr Marion Bamford and Dr Rose Adendorff on a fruitful fieldtrip to the Kirkwood Cretaceous deposits in May. Accompanied by Dr Billy de Klerk from Albany Museum they discovered several new plant fossil sites. Marion studied the Cretaceous floras in the Kirkwood area for her Masters degree. The recent trip was undertaken with the aim of revisiting the sites described in her thesis in order to make fresh collections and to find cuticular material for Bernard. Continuing their groundbreaking work on South African Permian macrofloras, Dr Rose Adendorff, Ray Renaut and Dr John Rigby (Queensland University of Technology, Brisbane, Australia) visited the Natal Museum, and brought to light an exciting new fossil locality in the Estcourt area. Meanwhile Rose has launched research into the rare and fascinating Permian fern *Liknospetalon*, as well as a re-examination and description of several taxa of large Permian seeds from the famous Vereeniging locality. Research on the glossopterid fruit genera was spurred on by a visit from renowned palaeobotanist Dr Steve McLoughlin from Melbourne University, Australia. He kindly dedicated two weeks of his time towards this research, with the aim of producing two collaborative papers on the subject. One of the field trips undertaken was to the familiar stomping grounds of Lawley, but this time to have an in-

tensive look at the geology (with the assistance of **Johann Neveling**) of this invaluable Permian site.

Dr Marion Bamford, working with Dr **Charles Peters**, professor of palaeoanthropology from the University of Georgia, Atlanta, USA, collected and identified sedges and grasses in the wetlands at Seekoeivlei as part of their modern comparative research for the East African hominid and vegetation projects. She also joined the research team of Dr **Terry Harrison**, New York State University, at Laetoli. This team has been collecting the hominids and fauna from the area for about six years and Marion was asked to work on the fossil woods. They collected over 250 specimens, which are now being sectioned and identified at the BPI. From there Marion went to Olduvai to work with Dr **Rob Blumenschine**, Rutgers University, New Brunswick, USA, and the OLAPP team. They collected fossil woods, sedges and other plant fragments and also collected plants from several different modern environments for comparative studies.

In November Marion visited the Musée Royal de l'Afrique Centrale, Tervuren, Belgium to check her fossil wood identifications with the modern wood collections housed there, this research is funded as part of a Leakey Foundation Grant which has been awarded to her. Marion is also supervising the final stages of **Andrea Sandersen's** PhD thesis on the palynology of the Cretaceous offshore deposits of the West Coast. Andrea recently visited Bloemfontein and has had several fruitful consultations with Prof Louis Scott.

An Italian geology student, **Federica Vitali**, from Università Degli Studi di Pavia, spent 5 months at the BPI conducting research towards a Masters-equivalent degree. Her study involved measuring and describing the stratigraphic section of the lowermost Beaufort in the area near Prince Albert Road, Western Cape, under the supervision of Prof. Rubidge, and the assistance of **Charlton Dube** from the BPI. She spent a total of 4 weeks in the field in the Jansenville and Prince Albert areas, during which time Federica managed to measure about 1 300 metres of sediments and found

a number of plant and vertebrate fossils. As part of her introduction to the Karoo, Federica joined Prof. Bruce Rubidge's field-trip to Jansenville, accompanied by Dr Chris Sidor from the Smithsonian Institute, USA, Dr Billy De Klerk, John Nyaphuli (National Museum, Bloemfontein) and Dr Alain Renaut from the BPI.

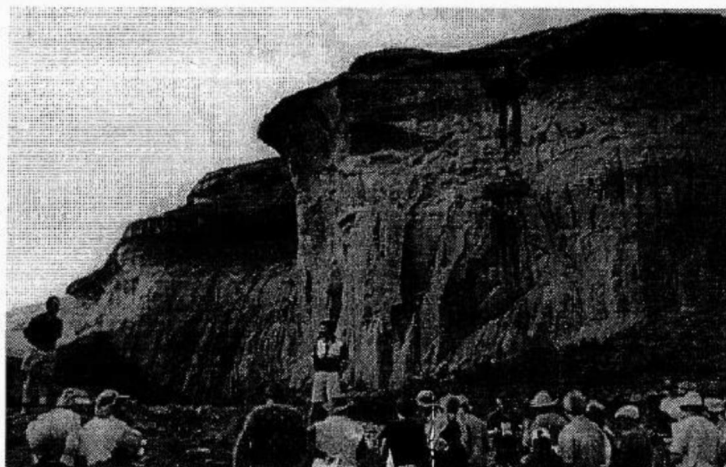
Dr Alain Renaut was awarded his PhD last April, and started producing a number of publications on the findings of his thesis. He recently visited the South African Museum, Cape Town, with Masters student Romala Govender, where they continued important research into Permian therapsid vertebrates, the dinocephalians and gorgonopsians. Apart from working on several Triassic dicynodont taxa, Alain has initiated a large project on the taxonomy, phylogeny, palaeobiology and ecology of the gorgonopsians. It is a long-term project and has already attracted the attention of European collaborators.

Prof Bruce Rubidge continues his fossil searches along the Ecca-Beaufort boundary around the country. In February Bruce accompanied Dr Ian Stanistreet and Dr Harald Stollhofer (University of Wuerzburg) to Namibia, where they have several students working on a variety of projects. They searched for fossils along the Skeleton Coast, but with limited success, and then moved to the Karoo deposits along the Orange River where Mario Wener is doing his PhD. Bruce followed the Jansenville trip by undertaking his annual "Free State" excursion together with Dr Johann Welman (National Museum) and Johan Loock (University of the Free State), but this time they worked further north in the Jagersfontein area. Fossil collecting in this part of the world for biostratigraphic purposes is very difficult as suitable outcrops are spread out and limited to only a few dolerite-capped hills. In October Dr John Hancox (Geology Department, WITS) and Bruce spent a few days looking at the same contact in the Estcourt area in KwaZulu-Natal.

During June Bruce, John Hancox and Johann Neveling were the only South Africans to attend the *North American Palaeontological Convention*

(NAPC), hosted by the University of California in Berkeley. Ken Angielczyk from this University organised a very worthwhile daylong symposium on Non-mammalian Synapsid Palaeobiology. One of the excitements of the California "experience" was the "Russian Dinosaur Exhibition" which was on display at Sacramento. This exhibit included several complete skeletons and skulls of basal Russian therapsids, including dinocephalians. Through the kind favours of the organisers and the exhibitors we were permitted to open the display cases and study the specimens.

Productive spin-offs of this conference trip to the USA was a most enjoyable week-long visit to the Smithsonian Institute in Washington where Bruce and Chris Sidor wrote up a paper describing a new biarmosuchid (a primitive mammal-like reptile) from South Africa which Bruce has been preparing up. Here he was also able to study beautifully preserved pelycosaur material. However the highlight of this study tour was to be able to research the postcranial material of the dinocephalian *Moschops* which is housed at the American Museum of Natural History in New York.



Bruce Rubidge & John Hancox explaining the geological & palaeontological wonders of the Elliot and Clarens Formations at Golden Gate.

Following the highly successful conference on "*The four billion year history of Earth and Life*" John Hancox and Bruce ran a weekend geological and palaeontological excursion during October to the Karoo rocks of the eastern Free State. 35 most enthusiastic delegates attended this short trip.

Dr Ross Damiani actively continues his work on the anatomy, biostratigraphy and phylogeny of Mesozoic amphibians from the Beaufort Group of the Karoo, partially in collaboration with Bruce Rubidge, John Hancox and Johann Neveling. The most exciting results of this work have been the description of several new species of amphibians including two new species of the exceptionally rare, round-headed Brachyopidae. Ross has also been collaborating with Drs Sean Modesto (Toronto), Michel Laurin (Paris), Andrew Milner (London) and Adam Yates (Bristol) on various fossil amphibian projects, and recently led a field-trip into the Karoo as part a National Geographic funded project looking at the evolution and biogeography of Early Triassic tetrapods from South Africa. Ross was also invited by the Conference organizers to give the keynote address at the 6th *Herpetological Association of Africa* conference in Stellenbosch in September.

In January of 2001 Darryl de Ruiter submitted his PhD thesis, and after some waiting and sweating it was finally accepted by the Faculty of Science. He graduated in November. Darryl recently joined up with Matt Sponheimer and Thure Cerling of the University of Utah in a study of isotopic analyses of diet of extinct and extant animals in South Africa. A palaeontological aspect involves sampling fossils from several of the Plio-Pleistocene hominid sites, while a modern aspect involves travelling to the Kruger Park to collect samples from modern animals. Although a difficult project, we expect the results to be illuminating.

Rodrigo Lacruz has completed the preliminary identification of over 5000 fossils from the Gladysvale site as part of his Masters and entered this data into a 3-D CAD system for analysis. Joe Nigro has submitted his

Masters to the University of Arkansas. His Masters has produced the first interactive 3-D model of a South African fossil-bearing cave. **Christine Steininger** is in the final stages of her Masters on the Coopers hominid remains and will be going on to study in England for her PhD. **Bernhard Zipfel** has submitted his Masters proposal to the University to examine the foot morphology of Pleistocene and early Holocene humans. **Dr Jacopo Moggi-Cecchi** has now returned to Italy after a one-year stay in the labs. **Dr Andre Keyser** continues to run the Drimolen excavation and is working steadily on describing the many dozens of new hominids from this rich site. **Colin Menter** who is also busy finishing his PhD on the arm bones of early hominids assists him.

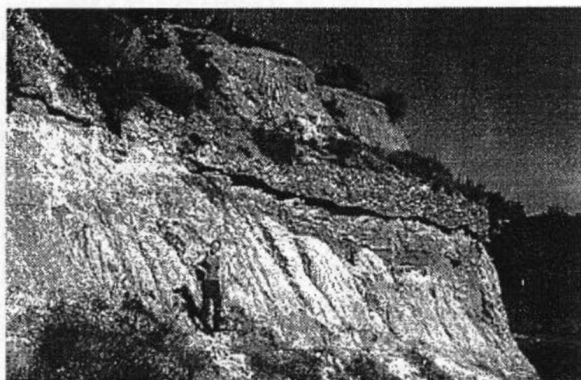
Dr Lee Berger has been completing a project based on the atlas'ing of all known Plio-Pleistocene sites in South Africa, begun in 1997 under the auspices of the National Geographic Society. This work has shown that Southern Africa has as extensive and rich fluvial deposits, rivalling those of East Africa in extent. These sites cover time periods ranging from Miocene to Pleistocene and offer an entirely new area of potential fossil discovery. Lee is also working on a new book project to be published in 2002 by Struik.

Lucinda Backwell is in her second year of her PhD, much of which has been taken up with a literature review for her thesis entitled "Early hominid bone tool Industries". She has recently returned from a research trip to Kenya with one of her supervisors, **Dr. Francesco d'Errico** of the University of Bordeaux. They worked around the clock to gather the information required not only for the PhD thesis, but also for a journal publication scheduled for next year. The East African fossil record documents evidence of accumulating agents and bone modifying processes quite different from those observed in South Africa, so it was an invaluable learning experience for them both. This past year she received the *S₂A₃ Medal*, presented by the South African Association for the Advancement of Science for the most distinguished Masters degree in the Faculty of Science for 2000. She was also a recipient of the Ernest Oppenheimer Memorial Trust grant.

Dr Paul Seldon (UK) visited the BPI in March to study the Orapa insects and presented a fascinating and wonderful seminar on fossil spiders. In July Drs Dennis Brothers and Alex Rasnitsin also visited to work on Orapa insects with Dr Ian McKay.

News from the BPI Palaeo-Herbarium

A postdoctoral fellow, Dr Bernard Gomez, arrived in February for a year's research on the Lower Cretaceous flora of South Africa. He is from the University of Lyon, France and is a specialist on plant cuticle and did his doctorate on the flora and taphonomy of three Lower Cretaceous sites in northern Spain. After he sorted through the material we have at the BPI we did some fieldwork in Kirkwood, Algoa Basin, in May with Dr Billy de Klerk. The vegetation has grown considerably since doing fieldwork in the mid 1980s so we could not find the rich cuticle locality. With Billy's help, however, we found several new sites and collected some good material. Bernard is working through this. We also found fossil amber which does not contain plant or animal inclusions, but is the earliest record of amber in Africa. Billy showed us the site where he found "Kirky", and nearby we found more theropod teeth to add to his collection. The cuticular studies show that the flora is more diverse than was apparent from the macroplants.



*Dr Rose Adendorff
fossil-hunting at
Kirkwood.*

Field Work in East Africa - Marion Bamford: I joined the research team of Terry Harrison, New York State University, in July at Laetoli. I am working on the woods of the site, but other researchers will eventually work on the different animal groups once the old collections have been retrieved, sorted and catalogued by one of Terry's PhD students, Denise Su. Peter Andrews joined us in the field and he is going to work on the small mammals. On their last day in the field they found a hominid skull so there was great excitement.

From Laetoli I went to Olduvai, only some 45m away but very different sedimentologically and botanically. Laetoli is on the high plateau and has deep cotton soils with the distinctive vegetation, including *Acacia drepanolobium*. The fossil sites are mostly surface exposures. Olduvai is down on the edge of the Serengeti plains and the fossil exposures are in the steep gorge cuttings. I joined the OLAPP team for my second season there. Rob Blumenshine, Rutgers University, and team have been working there since 1989 and have built up a huge database of fossils, artefacts, mapping details and geology. The team consists of archaeologists, anthropologists, geologists, geochemists, palaeontologists and surveyors all working towards an understanding of the environment and predictive model for locating the hominids and their living sites. I collected fossil woods, sedges and other plant fragments from Lowermost Bed II, which had a wetter climate with a palaeo-lake. We also collected plants from several different modern environments for comparative studies. Such sites were the Ol'Balbal depression, Olduvai River and Delta, Lake Masek and Ndutu, Grumeti and Ngorongoro Crater. We are also doing modern comparative studies from sites in South Africa, Zimbabwe, Zambia and Kenya. It is quite obvious that this is a long-term project.

Palaeobotanical Projects - Rose Adendorff: Thanks to the help of Steve McLoughlin, significant progress is being made in the re-evaluation of ovulate glossopterid fructifications, which are important Permian floral

status is therefore crucial to further investigations. With Steve's help, several new taxa have been erected, and others have been cemented. At the time of Steve's visit, we had assembled at the BPI what was probably the largest single collection of South African glossopterid fructifications under one roof. Apart from our own collections they include loans from various institutions, viz. the Vereeniging Museum, the Natal Museum in Pietermaritzburg, the South African Council for Geosciences and the National Botanical Institute in Pretoria.

In the past, a number of large seeds have been described from the Permian deposits at Vereeniging. With the collaborative efforts of John Rigby, these seeds are currently being carefully re-described, illustrated and assigned to formal taxa.

Liknospetalon is an enigmatic and extremely rare pteridophyte genus from the Permian of South Africa. The genus is currently under review in the light of new evidence provided by specimens recently collected from the Lawley locality. A new species has been described, and reconstructions of the fern have been drawn to support the amended generic diagnosis.

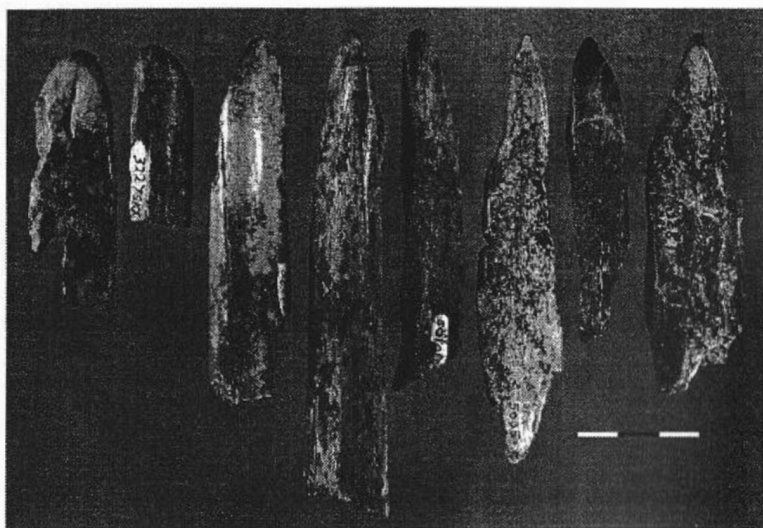
News from the Palaeoanthropological Unit for Research and

A collaborative research endeavour between the Department of Geology and PURE has begun and will result in a comprehensive geological study of the World Heritage site area and the fossil caves within. This project is receiving substantial support from the government.

Hominid Bone Tool Research - Lucinda Backwell: East African Tools - I feel that the purported bone tools of Mary Leakey are extremely interesting in that they are enormous, having all been made from hippo, elephant or giraffe long bones. Unlike the South African early hominid bone tool culture known from Swartkrans, Sterkfontein and Drimolen, the East African bone tools appear not to have been used in any digging activities. They are all quite clearly shaped through knapping with stone tools, resulting in a handaxe-like morphology. Curiously, they have little, if any evidence of a wear pattern, which begs the question why? In an attempt to elucidate the function(s) of the tools, I will use an experimental approach in combination with various comparative microscopic techniques.

I have produced three publications this past year from my study of the Swartkrans bone tools, including in the *Proceedings of the National Academy of Science*, *The South African Journal of Science* and *Pour La Science*. A

paper entitled "Possible evidence of bone tool



Swartkrans bone tools

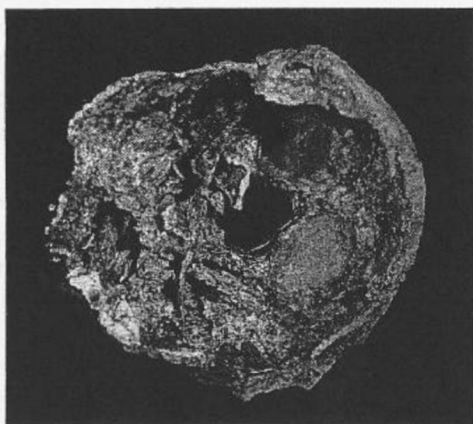
Swartkrans and Sterkfontein Research - Darryl De Ruiter: During the course of data collection for my PhD, I recovered several dozen hominid fossils from the sites of Swartkrans and Sterkfontein. The first of these papers was accepted for publication in the *Journal of Human Evolution* in December. Our first major discovery was made possible by the fact that the new fossils provide duplication of elements. We noticed that there were two distinct morphs visible in the fossils, and that we were probably dealing with two different species. In the past it has been particularly difficult to assign post-cranial remains to species at Swartkrans, since two types of hominid are known from the cave based on dental remains. However, since we now had two distinct types of post-crania, one which looked very much like *Homo*, and one which looked more like a chimpanzee, we hypothesized that the *Homo*-like specimens looked that way because they were *Homo*, and that the chimpanzee-like specimens probably represented *Paranthropus*.

The second discovery we made followed from the first. The body size dimorphism seen in the *Homo* post-cranial remains was significantly greater than that seen in the *Paranthropus* remains. In other words, males of *Homo* were much larger than females, while males of *Paranthropus* were not so much larger than females. This discovery will have important ramifications for interpretations of the behaviour of *Homo*, since body size dimorphism in primates is linked to social structure. We expect some of the obligatory controversy to accompany this announcement.

Following from my doctoral thesis, I am embarking on a new research project aimed at examining the palaeodemography of the hominids in the World Heritage Area from a regional perspective. I will examine the relative abundance of hominids and other macromammals from several sites in the area, including Swartkrans, Kromdraai and Coopers. All of these sites are Plio-Pleistocene in age, and all have produced representatives of *Paranthropus*. The hypothesis to be tested is: when the faunal assemblages from other terminal Pliocene/early Pleistocene sites in the Sterkfontein Valley are examined as coherent units, the relative abundance of hominids will be as low as, or lower than, the relative abundance computed at Swartkrans, indicating hominids were consistently rare animals in their palaeocommunity. This will have important ramifications for interpreting the behaviour of the hominids, their interactions with other animals in the palaeoenvironment, and the position of the hominids in the palaeocommunity.

In April I travelled to Kansas City, Missouri, to attend the 70th Annual Meeting of the American Association of Physical Anthropologists, presenting a poster entitled, "The first-ever described intact cranial base of *Paranthropus robustus*". The meetings were well attended, and several potential international research collaborations were realized. One involves a critical re-examination of the fossil *Cercopithecoids* from the hominid-bearing sites in South Africa, another the description of the endocast of SKW 18, the *Paranthropus* skull I announced at the meetings.

Several major projects were completed during Jacopo Moggi-Cecchi's stay,



SKW 18 *dorsal view*

the most important being the completion of the descriptions of all of the dental remains from Sterkfontein in collaboration with Dr Fred Grine of Stony Brook, New York. This project, which was begun in 1997, will finally describe almost 80% of the undescribed Sterkfontein collection. It is expected in print in 2002.

Atlas'ing of Southern African Plio-Pleistocene Sites - Lee Berger:
 Begun in 1997 under the auspices of the National Geographic Society, the field exploration teams of PURE travelled over 100 000 km preliminarily surveying erosional areas and promising geological structures in an area encompassing approximately 8 000 000 square kilometres. Approximately 117 fossil bearing sites were discovered during the course of this work. To place these results in perspective there were, prior to this survey, only some 63 recorded fossil sites in the time period under study in Botswana and South Africa. Thus the new survey has practically tripled the number of reported sites in the region in this time period. This work is intended to be published by *National Geographic* and will open up new research opportunities to researchers worldwide.

The Most Complete Dinocephalian - Bruce Rubidge

On Wednesday 12 September 1984 while on one of my many fossil collecting trips to the rocks of the Ecca-Beaufort contact, John Nyaphuli of the National Museum, Bloemfontein, discovered a piece of *in situ* dinocephalian bone on a farm in the Prince Albert district. We debated the merits of excavating this piece of rather insignificant looking bone,

as it is a time consuming and labour intensive process. Conscience prevailed and we started excavating the Saturday morning. Our efforts were rewarded with the rare discovery of a complete 0.5m long dinocephalian skull. But the fossil bone still continued into the rock substrata, so we continued excavating and by mid-day we had discovered a second skull. This one the same size and as complete as the first. After weeks of excavating over several years up to 1990 all the bone was finally removed from the field.

Since 1984 our fossil preparators have been carefully and painstakingly removing the rock surrounding the precious bones, and now, 17 years later, they have revealed two dinocephalian skeletons lying side-by-side. The one is rather fragmentary but the other is almost complete.

Dinocephalians are a group of very primitive mammal-like reptiles (Therapsids) known only from South Africa, Zimbabwe, and Russia and just recently from Brazil and China as well. With an average body size in excess of 2.5m they were the oldest really large land-living vertebrates.

Research on our Prince Albert specimen revealed that it was a new type of dinocephalian, with its closest relative known only from Russia. Accordingly with it was named *Tapinocaninus pamela*, but as this is a mouthful he is known by the more informal name of Fred and his mate is Frieda. Artist Marvin Carstens made life sized animatronic models of these two animals. These have been exhibited around the country and in fact have become synonymous with the BPI Palaeontology.

During 2000 Romala Govender started researching the skeletons of Fred and Frieda towards her MSc dissertation and her research has revealed the very primitive nature of the skeleton, some very unusual morphology, and also the fact that apart from missing the hands and feet, the skeleton is complete.

The only other complete skeletons of tapinocephalid dinocephalians, both



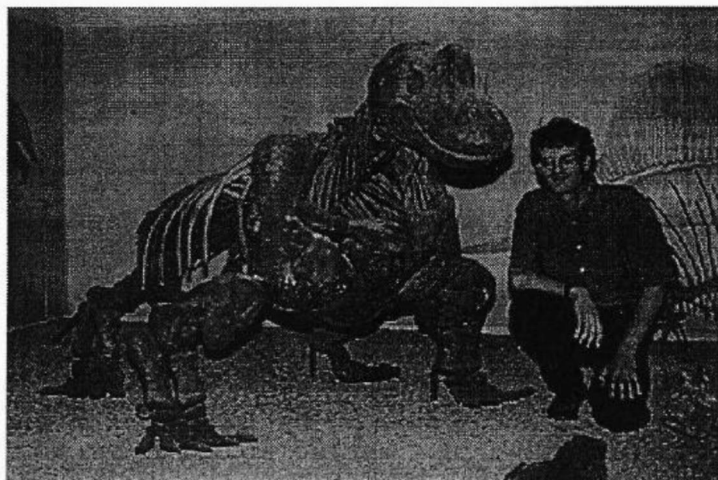
originally from South Africa, are housed in Germany and the USA. A few years ago I was able to study the specimen of *Keratocephalus* at the Institute for Geology and Palaeontology at Tübingen University. You can imagine the disappointment when I realised that most of this skeleton is in fact re-constructed in plaster of Paris. This year I had the opportunity to research the specimen at the American Museum of Natural History in New York.

"Fred" and John Nyaphuli

In 1910 Robert Broom sold a large collection of Karoo fossils to the American Museum. Amongst them were 7 or 8 skulls and skeletons of the dinocephalian *Moschops* from the Laingsburg area. These were subsequently well described by the American palaeontologist W.J. Gregory in 1926, and the most complete specimen was mounted and put on display. Through the kind hospitality of Mark Norell and Chris Collins of the Paleontology Department of the American Museum I was given access to the display case. For two days I too formed part of the exhibits of the American Museum. What a delight it was to be able to research this remarkable specimen at last, but the excitement was even greater when I realised that the skeleton of *Tapinocaninus* is even more complete.

Fred is therefore, apart from being the oldest known land-living reptile from Gondwana, the most complete skeleton of a tapinocephalid

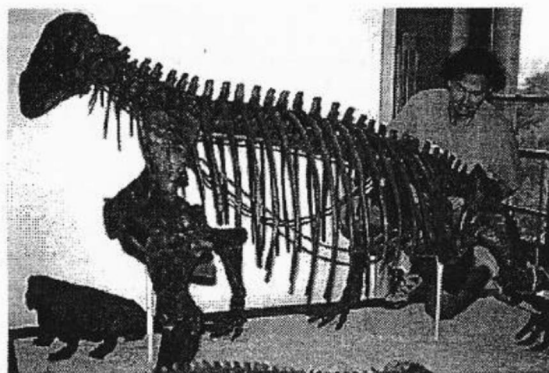
dinocephalian known. The seventeen years spent working on this skeleton have certainly reaped rich rewards, Romala Govender is completing her dissertation and we are eagerly awaiting the scientific description of this internationally important specimen.



*Skeleton of Keratocephalus from the University of Tübingen
with palaeontologist Michael Maisch*

News from the Postgraduate Fellows

Bernard Gomez: Although only arriving 9 months ago, this has been a very productive research period. From the point of view of the publications, my scientific production has been considerably increased: (1) one paper is now published, (2) two manuscripts are in press, (3) four are submitted, two of the latter coming from my work on the Lower Cretaceous Kirkwood Formation (South Africa), (4) two submitted in December, and (5) one talk and one poster have been presented at European conferences. Otherwise, four other manuscripts are in preparation, one of them described a new *Brachyphyllum* species from the Lower Cretaceous Kirkwood Fm. I expect to push forward my studies on the South African Lower Cretaceous ferns



The most complete Moschops specimen in the American Museum of Natural History. Palaeontologist Chris Sidor stands in the background.

using morphometric analysis with the help of Dr Véronique Daviero-Gomez (who just happens to be my wife) who will join me between the 3rd of December and the 4th of January through a collaborative NRF/CNRS project. In this respect, the numerous fern specimens collected during fieldwork last April will probably be very useful. I will leave the BPI on the 31 January 2002, but I look forward to continued collaborations.

Ross Damiani: As a postdoctoral fellow from Australia, I am now into my 3rd year at the BPI researching the anatomy, biostratigraphy and phylogeny of Mesozoic amphibians from the Beaufort Group of the Karoo. This work has led to the description of a number of new species of fossil amphibians, the most exciting of which have been two new species of the exceptionally rare, round-headed Brachyopidae. One of these formed part of my Honours student Ashleigh Pitcher's thesis project. In terms of biodiversity the Mesozoic amphibian fauna from the Karoo now appears to be the richest in the world. In addition, this work has also led to a refinement in the biostratigraphic subdivision of the *Cynognathus* Assemblage Zone, the uppermost biozone of the Beaufort Group.

I have also been collaborating with a number of foreign scientists on various research projects. Together with Sean Modesto, a paper was published in the *Proceedings of the Royal Society of London B* and re-

ceived international media attention. The paper described a new species of small reptile from the Karoo and its implications for reptile survivorship across the Permo-Triassic boundary, where the most severe mass extinction in life history is thought to have occurred.

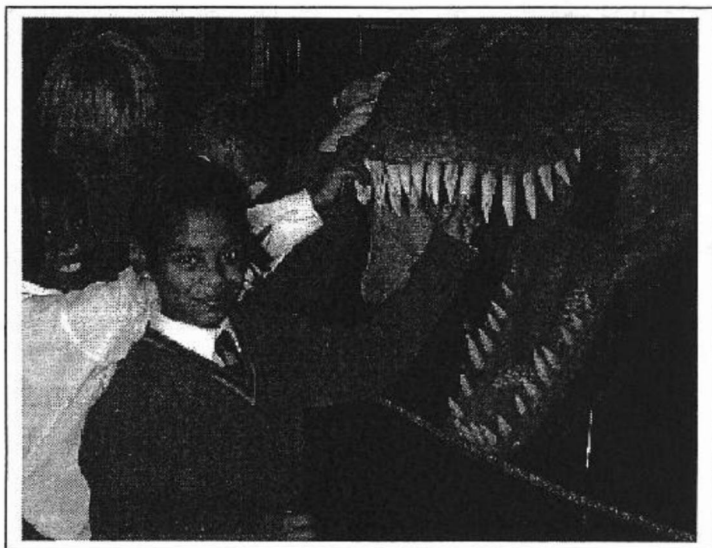
Earlier this year I led a team consisting of Adam Yates, Sean Modesto, Johann Neveling, Charlton Dube and Frans Tshabalala on a field trip into the Karoo as part of a National Geographic funded project looking at the evolution and biogeography of Early Triassic tetrapods from South Africa. A significant amount of material was collected including complete skulls of the rare reptiles *Prolacerta* and possibly *Owenetta*, but the bulk of the material still awaits preparation. A second trip is planned for early 2002.

News from the Education Officer of the School of Geosciences, WITS - Ian McKay

I - Palaeomuseums Action Programmes (PAP) pique learner's curiosity

After a very busy and exciting year for the School of Geosciences Outreach Programme and we are glad to announce that a total of 1405 learners passed through the portals of the Kitching Gallery and Bleloch Geology Museum of the Wits School of Geosciences. Fossils, dinosaurs, and prehistoric life are topics of great fascination to all learners and actually a great introduction to science in general. I reckon that a kid hooked on dinosaurs can easily be hooked onto science and in this country (which is generally starved of scientists and engineers) that is an important thing. Hopefully, of course, many of the learners passing through our museum will decide to become palaeontologists one day.

During 2002 we will be working on new displays for the Kitching Gallery and new improved activities for the learners. 2002 is also the year of the **Earth Summit**, which could be a colossal affair and will hopefully attract many learners to Wits's supporting programmes. We have initiated the development of activities around the theme of sustainable development and could maybe lead to more sustainable palaeontology- who knows?



Grandma! What big teeth you have!

II - Old Bones and Chalkboards: Supporting Palaeontology in the New School Curriculum

I am sure that you are aware that the South African school curriculum has changed into something called Curriculum 2005 (C2005) and "Outcomes Based Education". You may also know that there has been a great deal of debate about exactly what should go into this new curriculum and that C2005 is presently being reviewed. Only recently, a set of "Revised National Curriculum Statements" emerged from the review process and were released for public comment. The results of the public comment are rumoured to have been critical and on Nov 13 Minister Ashmal had a public parliamentary hearing to take the debate on the revised curriculum statements further. If you watched television news you would have seen demonstrators outside the houses of Parliament stating what they feel is an 'anti-Christian' stance in the revised

m.

This article does not address weighty matters like the fate of Christianity in South African education system. What it does do is try and explain very briefly what an 'outcomes-based' education system is, what the review process has been all about and of course - dear to the hearts of all palaeontologists - what about the earth sciences and palaeontology in the new education system?

What exactly is an outcomes based education system?

In the past the syllabus prescribed all the things that the teacher had to teach during a year. In other words the syllabus prescribed what **inputs** needed to be made into the learners. At the end of the year learners would write an exam, the best learners would get the highest marks and the worst would get the lowest marks. If nobody got high marks then everybody's marks might be increased by a few percent until the required mark distribution was reached.

In an outcomes based system (similar systems have been experimented with in many other countries like New Zealand, Australia and Scotland) the curriculum does not prescribe what needs to be taught to learners. Instead it prescribes what sort of things learners should be able to do once they have been educated. This system does not prescribe what **inputs** the teachers need to make into the education system. Instead it prescribes what type of learners the system should **output**. It assumes that a professional teacher will be able to present a specially tailored learning programme that will best assist their unique learners to achieve the outcomes required by the curriculum. Assessment in this case is centered on trying to find out whether learners can do what they are supposed to do - as is required by the required outcomes; it has nothing to do with learners being fitted on a hypothetical normal curve.

You can see that, in **theory**, an outcome-based system sounds better than the traditional system. The question is how is it working out in practice in South Africa? To understand that, you need to know just a little bit about C2005. South Africa's outcomes based education system (including the ter-

tiary education) is guided by 12 critical outcomes. In other words all **educated citizens** should be able to:

- * Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made.
- * Work effectively with others as members of a team, group, organisation, community
- * Organise and manage oneself and one's activities responsibly and effectively
- * Collect, analyse, organise and critically evaluate information
- * Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation
- * Use science and technology effectively and critically showing responsibility towards the environment and health of others
- * Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
- * Reflect on and explore a variety of strategies to learn more effectively.
- * Participate as a responsible citizen in local, national and global communities.
- * Be culturally and aesthetically sensitive across a range of social contexts.
- * Explore education and career opportunities.
- * Develop entrepreneurial opportunities.

At school level in C2005 the all learning has been divided into **8 learning areas**. These are:

- * Language, Literacy and Communication
- * Human and Social Sciences
- * Technology
- * Mathematical Literacy, Mathematics and Mathematical Sciences
- * Natural Sciences
- * Arts and Culture
- * Economics and Management Science
- * Life Orientation

As earth scientists we are most interested in the Natural Sciences and possibly Human and Social Sciences (where Geography resides). The "Specific Outcomes" for the **Natural Sciences** (those outcomes which all natural science learners should be able to achieve) are defined as -
Learners should be able to:

- * Use process skills to investigate phenomena related to the Natural Sciences

- * Demonstrate an understanding of concepts and principles, and acquired knowledge in the Natural Sciences
- * Apply scientific knowledge and skills to problems in innovative ways
- * Demonstrate an understanding of how scientific knowledge and skills contribute to the management, development and utilisation of natural and other resources.
- * Demonstrate knowledge of and understanding of the relationship between science and culture.
- * Demonstrate an understanding of the changing and contested nature of knowledge in the Natural Sciences.
- * Demonstrate knowledge and understanding of ethical issues, bias inequities related to the Natural Sciences.
- * Demonstrate an understanding of the interaction between the Natural Sciences and socio-economic development.

Quite complicated isn't it? At the end of each year a teacher would have to report, for each learner, on the learner's achievement for each of the Specific Outcomes (SO's). Given that there are 9 SO's for science and 66 SO's for all learning areas a report card can rapidly become a quagmire. Not only that: Curriculum 2005 includes all sorts of other complicated terminology, that won't be mentioned here, which further confuses matters. Suffice to say that the Natural Sciences has four themes, namely Life and Living (old Biology), Energy and Change (old Physics), Matter and Materials (old Chemistry) and - good news for palaeontologists - Planet Earth and Beyond (the Earth Sciences)

Not surprisingly people complained that all the terminology and outcomes made C2005 very unwieldy to implement. Also, although the outcomes were prescribed to teachers, they were given very little guidance with what content should be taught in what grade. The result was that the decision was made to review C2005.

Near the beginning of 2001 committees of volunteers were constituted for each learning area. It was the job of these volunteers to produce a "Revised Curriculum Statement" for each learning area. As was mentioned earlier in this article the draft versions of these statements were released

for public review at the end of August.

In some ways these new statements are a big improvement. The Natural Sciences retained its four themes (Planet Earth and Beyond, etc.) and is guided by three outcomes instead of 9. Also, Palaeontology is mentioned for the first time explicitly! For example - a **Grade 6** learner is considered competent when they can:

* *"explain that fossils are evidence of the view that plants & animals were different in the past & that the earth is very old."*

* *"examines photo's of fossils & tries to identify features."*

Also in **Grade 7** learners are considered competent when they can give

* *"an account of the important role that South Africa plays in research into human origins" (palaeoanthropology)*

On the other hand the revised statements also have real problems. For example, earth science topics are covered in both the Social Sciences (Geography) and the Natural Sciences without any coordination between the two learning areas. Also *Planet Earth and Beyond* is covered in an incomplete and fragmented fashion, and not linked to other Natural Science strands. For example one could look at the earth sciences topic *"Our fossil heritage"* in the context of the biology topic *"The diversity of life"*. That way one could approach both topics in a better and more holistic fashion and possibly reduce the amount of time in the year required to deal with these topics.

In order to bring these problems to the attention of the National Department of Education, Wits School of Geosciences, Wits School of Geography, Archaeology and the Environmental Science, the Geological Society of South Africa, and earth science Educators from other universities collaborated to produce an Earth Science 'response' to the new curriculum statements. In the response, in addition to mentioning the above problems, we also suggested that there should be a greater coverage of palaeontology in the new curriculum.

Here are our proposals.

*** In the Foundation Phase (Grade R to Grade 3)**

- There were many animals and plants alive a long time ago that are not alive today. Dinosaurs are examples of these.

*** In the Intermediate Phase (Grade 4 to Grade 6)**

- Dinosaurs are animals that lived a long time ago. There were a variety of these animals and it is possible to deduce how they lived by looking at their teeth and other parts of their body. We know that dinosaurs existed because we find the preserved remains of these animals as fossils imbedded in rocks. We actually get many different types of fossil plants and shells, and trace fossils such as dung and footprints.

- The dinosaurs disappeared a long time ago because major changes occurred in their living conditions. A large meteorite hitting the earth possibly caused this.

*** In the Senior Phase (Grade 7 to Grade 9)**

- Fossils are the remnants of life that lived a long time ago when different life forms or traces of life became buried and turned to rock. South Africa has an incredibly rich fossil heritage, which includes the ancestors of mammals (mammal-like reptiles or Therapsids), some early dinosaurs and the ancestors of humans. These animals and plants were found in specific time periods a long time ago and were the ancestors of the different types of animals and plants that we know today. Some "living fossils" are still found in SA today.

- Fossil fuels such as coal and oil are the remains of plants and animals that have been buried and fossilized under higher pressures.

Will our submission make the slightest difference to the new curriculum? Nobody knows, but we certainly hope so. We hope at least that earth scientists have made themselves known to the Department of Education, and that maybe they will be consulted when the final draft of the revised curriculum statement is assembled.

If you are interested in commenting on the place of Palaeontology in the new curriculum then please contact Ian McKay at 011-717-6665.

BPI report compiled by Alain Renaut

NEWS FROM THE TRANSVAAL MUSEUM:

I (Heidi Fourie) am looking forward to my PhD graduation ceremony on the 28th of November 2001. In the meanwhile I am working on a publication resulting from my thesis. The Karoo vertebrate collection housed at the Transvaal Museum are being computerised in ACCESS. At the same time the collection is checked and labeled. Luckily this collection is not too big. The hominid fossils in the vault are looking forward to getting new trays in which they will fit snugly. Our acid preparation laboratory has been renovated and it just needs a new coat of paint, Stephany is eager to get it painted in a nice lilac colour.

During 2001 Francis Thackeray, attended the 16th *International Symposium on Morphological Sciences* in July and presented a paper entitled "Who's closer to whom? Comparisons between SK 847 and other African Pleistocene hominid fossils". His research on material from Kromdraai is continuing.

Recent Publications:

- * Thackeray, J.F., de Ruiter, D.J., Berger, L.R. and van der Merwe, N.J. 2001. Hominid fossils from Kromdraai: a revised list of specimens discovered since 1938. *Annals of the Transvaal Museum* 38, 43-56.
- * Thackeray, J.F. and van Leuven-Smith, T. Implications of crown height measurements of alcelaphine molars from Kromdraai A, South Africa. *Annals of the Transvaal Museum* 38, 9-12.
- * Thackeray, J.F. Mrs Ples from Sterkfontein: Small male or large female? *South African Archaeological Bulletin*.

Articles on heritage awareness:

- * Mrs Ples: Our Distant Relative. www.nfi.org.za/palaeo/mrsples.htm
- * Thackeray, J.F. 2001. Mrs Ples and our distant relatives. www.sciencein africa.co.za/2001/may/ples.htm
- * Thackeray, J.F. 2001. The Millennium Sundial and a "Walk through Time". www.nfi.org.za/palaeo/millennium_sundial.htm

* Thackeray, J.F. 2001. Robben Island and past climatic changes.
www.neuronet.co.za/robben.html

ROGER SMITH - SOUTH AFRICAN MUSEUM KAROO
PALAEONTOLOGY LAB, IZIKO MUSEUMS OF CAPE TOWN

This has been a full and productive year despite the rather unsettling "restructuring" that is taking place within the museum. For me, the highlight of the year was a month-long trip to the Danakil Depression of Eritrea in search of fossil hominids. The year in brief:

January/February is Summer School time at the S A Museum and, as usual, I was kept busy with a "Reading the Rocks" course for members of the public comprising evening lectures on the geology of Table Mountain and fossils of the Western Cape. This was followed up with 2 one-day geological field excursions around the Peninsula . Pippa Haarhoff, Ed February and I



While their owners sleep, nervous little dogs
prepare for their day.

also ran the "Cedarberg Retreat" again this year. This is a very popular 4-day weekend trip to the northern Cedarberg mountains where 35 members of the public get a full on natural history experience- geology, fossils, astronomy, dendrochronology, ornithology, anthropology and campfire gastronomy.

March was palaeontologically notable for a 2-week field trip that Hedi, Paul, Georgina and I took to Walplaas, near Aberdeen. We went back to the locality where last year we had excavated a large *Odontocyclops* skeleton and a rare *Proburnetia* skull, a taxon previously known only from Russia. This time we found another perfect *Odontocyclops* skull with some of its anterior skeleton and a bunch of gorgonopsians. Bruce Rubidge and I are currently describing the new *Proburnetia* specimen. Georgina and Annelise are preparing the *Odontocyclops* specimens.

In May Georgina, Hedi and I took 30 Friends of the Museum on a weeklong Karoo fossil excursion based in the Karoo National Park at Beaufort West. We came back with a another specimen of "paired" *Diictodon* skeletons lying intercurled. Corwin Sullivan and Robert Reisz are most interested in these specimens as they are trying to prove sexual dimorphism in this taxon.

June was taken up with excavating another 6 cubic metres of the Early Pliocene *Sivatherium* bone bed at the West Coast Fossil Park. This time, we were helped out by George Illiopolus, a student of Arthur Cruickshank's at University of Leicester, who is doing a PhD on similar fossils in Greece. Despite his vegetarianism, his interest in taphonomy meant that we had lots to talk about over beers and braaivleis at the Park's recently renovated researcher's accommodation.

In August I presented a paper and a poster at the *Fluvial Sedimentology* conference in Lincoln, Nebraska. During my stay I visited the Nebraska State Museum and had a chance to study a collection of mechanically prepared bone-bearing coprolites from the Oligocene White River Group

Permian therapsid coprolites from the Beaufort Group. I also got to visit the Ashfall fossil beds- a waterhole accumulation of rhinos, horses, camels, turtles and birds that perished catastrophically in a volcanic dust cloud around 10 million years ago. Apart from the taphonomic aspects of loads of superb fully-articulated, uncompressed skeletons preserved in the ash (with their stomach contents and coprolites), the architectural and educational aspects of the Visitor Centre and Site Museum gave me lots of good ideas to pass on to Pippa at the West Coast Fossil Park. I also made acquaintance with Prof. Mike Voorhies who is one of the pioneers of vertebrate taphonomy. On my way home I took the opportunity to visit the Eden Biome Project in St Austell, Cornwall. Set in an abandoned clay pit, two huge geodesic domes house fully-vegetated tropical and savanna biomes. With the ecological importance of plant life as the anchor theme to the project, it has proven successful both as a scientific research facility and a major tourist attraction. And, it is one of the few "Millenium Projects" to have escaped severe criticism by the British public.

October was spent in Eritrea on a new venture for me: searching for fossil hominids in Danakalia. This trip was very eventful and I needed more space than the news section would allow, so hopefully the editor has included this as a separate report (*Read more about this fieldtrip on page 40 - Ed*).

November sees Annelise and I back out to the Permo-Triassic boundary with another American party that includes my co-worker Prof. Peter Ward (Univ. Washington) and a palaeosol expert, Dr Greg Retallack (Univ. Oregon). Greg wants to sample the boundary section for palaeosol nodules, palynomorphs and spores. Peter hopes to find "Bucky Balls" and I want to find more of an enigmatic (and new, according to Bruce Rubidge) ?biarmosuchid skull that I collected last year at the Bethulie section.

Recent Publications:

* SMITH, R.M.H. and SWART, R., (in press) Arid Zone Sedimentary environments and vertebrate Taphonomy in a Mid-Triassic Rift Valley: the

Omingonde Formation of Central Namibia. *PALAIOS*.

* SMITH, RMH. and WARD, P.D., (in press) Pattern of Vertebrate Extinctions across an Event Bed at the Permian/Triassic Boundary in the Main Karoo Basin of South Africa. *Geology*.

* MODESTO, S. P., and SMITH R. M. H. (2001) A new Late Permian captorhinid reptile: a first record from the South African Karoo. *Journal of Vertebrate Paleontology*, 21(3), 404-409.

* WARD, P.D., MONTGOMERY, D.R., SMITH, RMH., (2000) Altered river morphology in South Africa related to the Permian Triassic extinction. *Science*, 289, 1740-1743.

* MACLEOD, G.K., SMITH, RMH., KOCH, P.L., WARD, P.D., (2000) Timing of mammal-like reptile extinctions across the Permian Triassic boundary in South Africa. *Geology*, 28, 227-230.

* SMITH, RMH (2000) Sedimentology and taphonomy of Late Permian vertebrate fossil localities in southwestern Madagascar. *Palaeontologia Africana*, 36, 25-41.



"Uh, uh, uh—I wouldn't do that, Thorg.
I know how to use this thing."

THE SEARCH FOR HUMAN ORIGINS IN DANAKALIA

Report on field trip to Eritrea 4 Oct-5 Nov 2001 - Roger Smith

I have just returned from a very special place- a place that the Lonely Planet Guide describes as, "One of the most inhospitable regions on Earth, it has staked its claim as nature's frying pan- in the Danakil Depression (up to 120metres below sea level), the heat can reach 57 degrees C and rain is an extinct species".

For Earth scientists the Danakil region of Eritrea is special because it is an on-land expression of a mid-oceanic ridge- something that is normally hidden beneath the deep sea. It is a region of intense volcanic activity along a series of parallel faults where the Earth's crust is being pulled apart by heat energy generated in the core. Frequent eruptions add new rock to the ocean floor- a process known as "sea-floor spreading" and this in turn moves the continents around the globe. In this case, either side of the Red Sea, Africa and Middle East are being forced apart at a rate of about 2 centimetres/year. This is the driving force of continental drift and on Earth, the only other place that this phenomenon can be witnessed, without diving gear, is Iceland.

For palaeontologists interested in the origins of modern humans Danakalia is special because it is at the junction of three rift valleys that may have been used by early man as migration routes- the so-called "hominid corridors"- into and out of Africa. So if you were looking for a place where the ranges of early hominid species were forced to overlap- this is it.

I was invited to by Professor **Randall Susman**, a palaeoanthropologist from Stony Brook University of New York, to join an expedition to learn more about the habitats and lifestyles of humans that lived in the Danakil rift valley around 1 million years ago. My brief as "control geologist" was to be responsible for leading the field crew to potential collecting grounds and recording the stratigraphy and sedimentology of all the fossils that we came across so as to reconstruct their palaeoenvironments. We met for the first

time in Asmara, the capital of Eritrea, and spent the first 4 days putting together a field crew, changing dollars into Nakfa, hiring a camp cook, buying supplies and talking to the local geologists about possible sites. On Friday the 12th October we set off in 2 fully loaded 4x4's heading for the Danakil. The first night we slept under the stars on a recent lava flow from a volcano on the shores of the Red Sea. That night, with all the talk of volcanic eruptions, Randall dreamt that the ground beneath his mattress was getting hotter and hotter- he did not know that on entering the Danakil Depression his dream was to become reality.

Leaving the Red Sea and its cool breeze, we drove inland along the western escarpment of the Danakil rift. The road became a track and the track became a sandtrap. The temperature rose and the wind dropped and Randall began to suffer- his thermostat was set in a New York winter and his body began to malfunction. We pitched camp near a village called Buia, in a sandy dry riverbed under a tree. This was to be our home for the next 2 weeks.

The travelling team was made up of Randall, Abraham, Yoseph, Futsum, Mengeste, Tiggi and myself. We hired Mohammed, a local Afar tribesman as camp guard, snake hunter and goat butcher. Abraham, an artist and ethnographer at the National Museum of Eritrea, and Futsum, one of our drivers, had both spent half their lives as soldiers (or "fighters" as they prefer to be called) in the Eritrean army. They were used to camping and they had been in this area a couple of years ago when it was occupied by Ethiopian forces. Futsum had lots of scary tales to tell and made sure that we knew how to behave to minimize the risk of stepping on a landmine. We were camped within the UN controlled Temporary Security Zone and our "host" peacekeepers were Indian.

Yoseph, an archaeology student at the University of Asmara, and Mengiste, our second driver, were too young to have been fighters. Tiggi, a 19 year-old Tigrinyan girl trained in "cooking and embroidery" was hired as cook. She was clearly not expecting such a spartan camp - but she



perked up when she saw her newly fitted kitchen; 2 holes that we dug in the riverbank and lined with flat stones- one for the hearth and the other for the water drum.

The outcrops that we had come to collect in were within easy walking distance of the camp but in the Danakil heat there is no such thing as easy walking. In fact Randall had difficulty just standing. We walked the slopes from 06h30 till 11h30 each day before seeking a shady spot to snooze and rehydrate. The combination of low angle sun hitting the body full-on, high humidity and lack of wind caused water to literally flow out of our pores. It was when we stopped sweating that problems really started. Randall began suffering from dehydration and heatstroke and after 3 days he had to be driven back to Asmara for medical attention.

For 3 days we searched the cliffs of siltstone and claystone with limited success before we came across the first fossil rich-locality. Numerous loose broken bones lay scattered on the surface of a white weathering claystone.

A couple of hours later we had amassed a diverse collection of aquatic and terrestrial vertebrates. They comprised vertebrae and skulls of fish, turtle carapace plates, bird bones, hippo vertebrae and teeth (including a complete lower jaw of a juvenile hippo), pig teeth, numerous small bovid teeth and jaws and several crocodile jaws. Larger bones of rhino and elephant lay in blocks of sandstone that had fallen from the overlying bed. While recording a sedimentological log of the site, I found several well-fashioned hand axes (Archeulian type) embedded at the contact between the claystone and the sandstone. Over the next week we worked our way along the same stratigraphic interval and found 6 more sites, each displaying the same association of stone tools with large skeletons of rhino or elephant. At site 7, I picked up a loose bone that was definitely different from anything we had found to date. I knew it would raise some interest when I handed it, without comment, to Randall that evening. After several minutes going through a mental checklist of characters he calmly pronounced that he was not a gambling man- but he would bet 1000 Nakfa that the bone was the distal femur of a hominid. A distinctive



"So let's go over it again: You're about a mile up, you see something dying below you, you circle until it's dead, and down you go. Lenny, you stick close to your brothers and do what they do."

flattened portion of the knee joint and the non-vertical shaft are diagnostic adaptations to bipedalism.

The 4 fossil collectors drank at least 20 litres of water each day and on a few occasions we had to stop searching when our water ran out. Because our ability to work depended on water, Mengeste the "water-filter" man, became the most vital team member. Each day he turned a barrel-full of goat piss into potable water by pumping it through a fancy American ceramic and activated charcoal filter. We then added some "Genuine American Iced Tea with Lemon" powder to make it taste better.

Tiggi prepared food for the camp every morning and evening. Having no refrigerator meant that we only ate meat every third or fourth day when Mohammed was asked to slaughter a goat. The goat would be killed at camp just before dawn, immediately Tiggi diced the liver, kidneys and testicles and fried them with peri-peri for our breakfast. That evening we would have a meat feast- 3 different meat stews with rice and carrots and a type of bread that looked like pizza base cooked on a flat iron plate. This was sometimes followed by a coffee ceremony- also performed by Tiggi- which is the ritualised roasting, pounding, brewing and drinking of 6 small cups of strong sweet Ethiopian coffee. The ceremony lasts an hour and is a time for relaxation and conversation, eating popcorn and burning frankincense, and it is considered very rude to leave before the end.

On our day-off we went to the river to wash bodies and clothes and allow us an opportunity to chat to fully-veiled women filling their donkey's specially designed back pack "bladders" with water. Afterwards we went to the village to sit in the shade and drink cokes with the Afar menfolk and their camels. Bottled Coca-Cola is the only item on sale in Buia- kept ever so slightly cool under a wet sack. The dwellings are made of reeds and grass stuffed into a framework of branches, only the schoolhouse is built of brick.

None of the villages have any form of sewage system- residents do their ablutions on the outskirts of the village usually under cover of darkness.

This can be hazardous especially as there are still plenty of unexploded landmines around the villages. Trenches lined with low stone walls were dug by both armies during the war. Before being abandoned, they were invariably booby-trapped with mines so although they look like purpose-built latrines, they are strictly no go areas.

On our way back to Asmara we stopped overnight at the Red Sea port of Massawa. This town was extensively shelled and bombed as recently as 1999, and many of the beautiful old buildings still have holed roofs and shrapnel-pitted plaster. There are however parts that have been tastefully rebuilt. The harbour looks arabic with dhows and arched windows and carved wooden doorways. I have vivid memories of that steamy night in old Massawa, sitting with the team at a pavement café, eating fresh Red Sea shrimps with peri-peri sauce and toasting with my first cold beer, twenty-one of the hottest days of my life.

Back in Asmara at the National Museum, the 131 fossils and 11 stone tools that we had collected were glued, cleaned, identified and individually labelled before going into storage. A couple of years ago the Museum was evicted from its original building to make a palace for the president. The collections are being temporarily housed in a disused convent. All the windows have stained glass and there are no spotlights, plug sockets or storage cabinets for that matter. It really is quite a depressing building, however, the enthusiasm and abject optimism of the handful of people

One of our final tasks was to make a mould of the ?hominid femur to take back to Stony Brook for the experts at to examine. This we did with the help of a dentist in Asmara who had supplies of moulding compound used for making dentures. We were also fortunate enough to find a radiography department at the local hospital that had an X-ray machine able to penetrate the solid rock matrix and give us an indication of the internal structure of the bone. The interest shown by both the dentist and the radiographer was such that they made their patients wait whilst the technicians attended to our needs and then refused any payment for their services.

I am now back in Cape Town and waiting to hear what the anthropologists and anatomists at Stony Brook think about our hominid fossil. Whatever their verdict, we have shown the Danakil area has potentially important fossils to help us find out where and when our species originated. Hopefully, in the next few years, the National Science Foundation will support a further application for funds to conduct more widespread prospecting and possibly excavation at one of the Danakil hominid sites.



COUNCIL FOR GEOSCIENCE, PRETORIA

Hallo all ye bel folk. I (Patrick Bender) trust everyone's second half of





After the conference Johann spent a few days working on the fossil collection housed at the *University of California* (Berkeley) and then visited the *Museum of Comparative Zoology* at Harvard. On the return

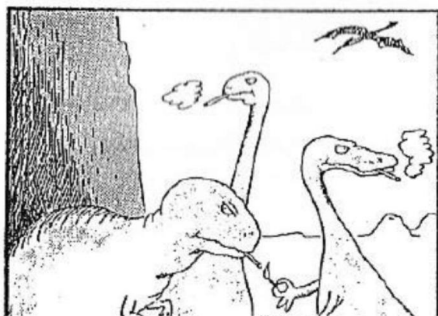
from California he spent some days at the *Natural*

and Abel Dichakane spent a week in April 2001 at Cornelia completing the present excavation and taking ESR samples with Rainer Grün and Kirsten Ward. We intend to take samples for palaeomagnetic dating at Cornelia-Uitzoek with the help of John Hancox towards the end of November.



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Reminder:

*Deadline for contributions for the next issue of
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