

DIRECTOR'S REPORT FOR THE PERIOD

January–December 2007

NAME OF RESEARCH ENTITY:

Bernard Price Institute for Palaeontological Research

NAME OF DIRECTOR:

Professor BS Rubidge

With devolution of the administration of research entities to Faculties rather than the Research Office, a written annual report is no longer required by the University. However for our own records it is useful to document the activities of the BPI Palaeontology on an annual basis, as otherwise there is a real risk that important details of Institutional history will be lost sight of and disappear from memory.

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1	STAFF
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1.1 BPI Palaeontology Staff

1.1.1 Academic Staff in research entity on 31 December 2007

Designation	Name	Grade	R	G	D	Birth date	Retirement/ termination date	Comment (% appointment, etc)
Professor	Rubidge B.	NS05	W	M	-	1 Jun 1956	1 Jun 2016	BPIPAL 66% URC; 33% FOC
Reader	Bamford M.	NS06	W	F	-	25 Oct 1961	25 Oct 2021	BPIPAL 66% URC; 33% FOC
Reader	Berger L.	NS06	W	M	-	22 Dec 1965	22 Dec 2025	Science Faculty, 33%, URC paid 66%
Researcher	Yates, A	NS08	W	M	-	13 Mar 1972	13 Mar 2032	Replaced Alain Renaut URC paid
Researcher	Backwell, L	NS08	W	F		2 Sep. 1966	1 Oct 2025	Faculty 33%; URC 66 %

1.1.2 Support Staff in research entity on 31 December 2006

Position	Surname		R	G	D	Date of Birth	Retirement/ Termination Date	Comment
Curator	Zipfel, B.	AD06	W	M	-	23-March-64	2029	UNIVERSITY URC-FUNDED
Snr admin secretary	Tshavhumbwe, S.C.	SE11	B	F	-	14-June-1977	2037	BPI Pal
Snr admin secretary	Mainwaring, J.	SE11	W	F	-	27-Aug-1948	2008	BPI Pal
Principal Technician	McRae –Samuel, G	AD 08.4	W	M	-	15-Oct-54	2014	BPI PAL; URC-FUNDED
Technician Fossil Preparator	Nemavhundi, T.	AD13	B	M	-	13-July-76	2037	BPI PAL; URC-FUNDED
Technician Fossil Preparator	Jirah, S.	AD13	B	M	-	11-Jan-77	2038	BPI PAL; URC-FUNDED
Technician fossil preparatory	Dube, C.	AD12	B	M	-	25-May-65	2025	BPI PAL; URC-FUNDED
Technician fossil preparatory	Mukanela, P.	AD13	B	M	-	10-Nov-53	2013	BPI PAL; URC-FUNDED

Technician fossil preparatory	Sithole, J.	AD13	B	M	-	28-Oct-74	2034	BPI PAL; URC-FUNDED
Technician fossil preparatory	Tshabalala, S.	AD13	B	M	-	06-Apr-73	2033	BPI PAL; URC-FUNDED
Technician fossil preparatory	Ndlovu, G.	AD13	B	F		20-12-1966	2026	BPI PAL; URC-FUNDED
Cave Custodian, Makapansgat	Maluleke, J.	AD17	B	M	-	01-Jan -52	2012	BPI PAL; URC-FUNDED

1.1.3 Post-Doctoral Staff in research entity on 31December 2006

	Position	Initials	Surname	Title	G	Grouping	Country	Termination	Year
CP00	Post doc fellow	F	Abdala	Dr	M	BPI Pal	Argentina	30-June	2008
CP00	Post doc fellow	R	Govender	Ms	F	BPI Pal	SA	30-June	2008
CP00	Post doc Fellow	D	Stear	Dr	M	BPI Pal	Australia	10- Nov.	2008
CP00	Fix term contract res.	I	Mckay	Dr	M	BPI Pal	SA	31-March	2008

1.2 Changes in staff establishment in research entity during 2007

1.2.1 Academic Staff

Name	Grade	R	G	D	New appointment (give month)	Promotion (give date)	Retirement (give date)	Resignation (give date)
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1.2.2 Support Staff

Name	Grade	R	G	D	New appointment (give month)	Promotion (give date)	Retirement (give date)	Resignation (give date)
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1.2.3 Honorary Staff and Associates

Hon Research Associates:

Dr J M Maguire

Professor C Sidor

Dr A Keyser

Professor S Churchill

Professor P Unger

2 RESEARCH UNDERTAKEN DURING 2007

2.1 Current research projects and results achieved

2.1.1 Dr F Abdala

2.1.1.1 Description of the earliest theriocephalians from the Eodicynodon Assemblage Zone of South Africa by Abdala, Rubidge and Van den Heever. Currently in press in *Palaeontology*.

2.1.1.2 Description of the world's oldest cynodont. A cynodont fossil was recently discovered from the Tropidostoma Assemblage Zone of the Karoo Basin by Roger Smith. This is the oldest cynodont yet discovered, and is being described in collaboration with Jennifer Botha (National Museum), and Roger Smith (South African Museum). Paper published in 2007 in the *Zoological Journal of the Linnean Society*.

2.1.1.3 Re-description of *Platycraniellus elegans* including a phylogeny of cynodonts. Paper published in 2007 in the journal *Palaeontology*.

2.1.1.4 Description of Allotheriam-like teeth from the Cynognathus AZ. This important project which is being done in collaboration with H Mocke and J Hancox resulted in a paper published in 2007 in the *South African Journal of Science*.

2.1.1.5 Assessing the palaeobiology of South American cynodonts. This study is based largely on histology of limb bones from the microscopic study of limb bones and will be undertaken in collaboration with Professor Anusuya Chinsamy-Turan (University of Cape Town). A manuscript is currently submitted to the *South African Journal of Sciences*.

2.1.1.6 Cynodonts from the Omingonde Formation, Namibia. Several cynodonts from the Omingonde Formation are housed in the collections of the Geological Survey in Namibia. These specimens were described and are important as they provide the link between Anisian east and western faunas from Africa, South America and Antarctica. A manuscript (coauthored by Dr Roger Smith of the South African Museum) has been submitted to *Journal of Vertebrate Paleontology*.

2.1.1.7 Postcranial anatomy of cynodonts. A first draft of a manuscript describing postcranial element of *Tritylodon* from the Lower Jurassic of South Africa as being developed (coauthored by Dr Romala Govender).

2.1.2 Dr L Backwell

2.1.2.1 Early hominid bone tools.

A book chapter written in collaboration with Francesco d'Errico, entitled "*From*

Swartkrans to Arcy-sur-Cure. The use of bone tools in the Lower and Middle Palaeolithic” was published by the Museum of Archaeology in Madrid.

In December Backwell & d’Errico completed the first draft of a manuscript entitled ‘Early hominid bone tools from Drimolen, South Africa’, which is to be submitted for publication shortly. Work on this manuscript detracted from ongoing research on developing quantification of bone surface modifications and refining bone tool functional interpretations by means of interferometry.

2.1.2.2 Fossil hair.

Additional rock samples were sent to Robyn Pickering (University of Bern) for refining the age of hyaena coprolites that contain fossil hairs dated 177 - 257.5 k. A manuscript is currently being written in collaboration with Don Brothwell (University of York), Matthew Collins (University of York), David Martell (University of Portsmouth), Andrew Wilson (University of Bradford), Robyn Pickering (University of Bern) and Lee Berger (University of the Witwatersrand).

2.1.2.3 Wonderkrater peat mound excavation.

In the third field season to this site rhino, hippo, warthog, antelope and rodent remains were discovered, and additional Middle Stone Age lithics, bringing to 120 the number of flakes retrieved from a pit near the margin of the mound. Eighty MSA flakes and 25 cores were retrieved from a second small pit in the wet centre of the mound, from a 1.5 m thick sand layer. This likely represents an arid phase in South African history, when the mound was deflated, suggesting that the site represented a place of refuge for Middle Stone Age people. Six radiocarbon dates have recently been obtained for peat in the moist active part of the mound, showing that the mound aggrades approximately 1 m every 5800 years. This result, together with the MSA marker horizon, enables calibration of the stratigraphic sequences recorded in various excavated pits and previously drilled cores. This research is in collaboration with Zoe Henderson (National Museum), Terence McCarthy (Wits Geology), Stephan Woodborne (CSIR Pretoria), Louis Scott (University of the Free State), Lyn Wadley (Wits Archaeology), Raman Sukumar (Indian Institute for Science, Bangalore) and Magali Barré (University Bordeaux I and University of Québec, Canada).

2.1.2.4 Excavation of a large mammal mass death assemblage.

Data were collected at the Florisbad Research Station on a faunal sample from the topmost horizon of the bone bed that was excavated last year at Heelbo, Paul Roux. Excavations conducted during 2007 exposed the second and third horizons, revealing almost completely articulated skeletons in their death positions. Based on a number of taphonomic features - including catastrophic age profile and mixed stages of preservation - together with phytolith data, it is hypothesized that the animals died under drought conditions that lasted a thousand years (4 610 - 3610 BP). This research is made in collaboration with James Brink (Florisbad Research Station), Johann Neveling (Council for Geoscience, Pretoria), Fernando Abdala (BPI Palaeontology) and Lucy Pereira (PhD candidate, Palaeobotany).

2.1.2.5 Middle Stone Age bone tools from Sibudu cave.

A paper entitled “*Middle Stone Age bone tools from the Howiesons Poort layers, Sibudu Cave, South Africa*”, co-authored with Francesco d’Errico and Lyn Wadley, is in press with the *Journal of Archaeological Science*. Comparative analysis of bone points shows a reduction in size between the older Still Bay points from Blombos Cave and those from the Howiesons Poort (HP) dated ~61k, and between the HP and the Later Stone Age. We tentatively interpret this, together with the extreme symmetry recorded in the tip of the Sibudu Cave point, as a shift from the use of hand-delivered bone spear heads in the Still Bay to bow and bone arrow technology in the HP. If this is confirmed by future discoveries, the bone point from the HP layers at Sibudu Cave would push back the origin of bow and bone arrow technology by at least 20 000 years, substantiating arguments in favour of the hypothesis that crucial innovations took place during the Middle Stone Age (MSA) in Africa.

2.1.2.6 Rodent modification of bone.

Two time-controlled rodent gnawing experiments were conducted that involved feeding a range of different rodents different types of bones in varying states of preservation.

2.1.2.7 Termite modification of bone.

An ongoing time-controlled experiment was set up in the John Nash Nature Reserve in the Cradle of Humankind. Here different types of bones in different stages of preservation were inserted into seven mounds. The first batch, representing a six month winter period, was retrieved for analysis in September.

2.1.2.8 Stone tool modification of bone.

Butchering experiments were conducted in collaboration with Andrea Leenen (MSc candidate in Palaeontology, Wits) and a group of San hunters living in the Ghanzi District, Botswana. The aims of this research are to document the type and distribution of marks made by hunters using stone tools, create a comparative collection of complete large mammal skeletons modified by different raw materials, and pave the way for future ethnographic research concerning bone modification.

2.1.2.9 Taphonomic study of a modern eland carcass.

Taphonomic data were collected on an eland carcass, now in its third year of disarticulation, dispersal and burial. We were fortunate to acquire a second carcass during the same trip, namely a modern adult springbok. Besides increasing the sample size, it will provide comparative data on the preservation of different mammal size classes in a semi-arid environment. Collaborators include Fernando Abdala, James Brink, Lucy Pereira and Johann Neveling.

2.1.3 Professor M Bamford

2.1.3.1 Karoo Fossil Woods

No Karoo woods were collected this year.

2.1.3.2 Karoo palaeobotany:

The project, previously funded by the NSF (USA), in collaboration with Dr Conrad Labandiera of the Smithsonian Institution, Washington DC, USA, and Professor Bob Gastaldo of Colby College, Maine, USA, Dr Johann Neveling (Council for Geosciences) and Dr Rose Prevec (Rhodes University and Albany Museum), continued this year with funding from other sources. Labandiera and Prevec have had one session in the herbarium morphotyping leaves and counting insect damage types and Labandiera returned in August to work through the Burgersdorp Formation material. In June the Gastaldo, Prevec, Neveling and two American students returned to the Wapadsberg Pass for more mapping. The publication on the Clouston material was submitted to *Geology* but the editors wanted it shortened so we withdrew the paper and will submit it to *Review of Palaeobotany and Palynology* in early 2008. Gastaldo and Rolerson published a paper in *Palaeontology* 51, 215-229. A paper on the double wing fructification has been revised and accepted for publication (Prevec et al. in press).

2.1.3.3 Cretaceous and Tertiary Woods

The paper on the Vryburg and Mahura Muthla fossil woods is awaiting the input of Dr Ward who has now joined a private consulting company and has had no spare time. It will be submitted to the South African Journal of Geology later in 2008 when Dr Mike de Wit returns from the DRC.

2.1.3.4 Continued research at Olduvai Gorge. Professor Bamford received funding from PAST to join the rest of the OLAPP team for fieldwork in July-August 2007. We concentrated on Bed I at the FLK site and a paper for Nature is in preparation. Another phytolith paper is in press (Albert et al.) and one in progress. The grasslands paper is in press (Bamford et al.).

2.1.3.5 Professor Bamford visited Professor David Cantrill at his new post in Melbourne Australia, Royal Botanical Gardens in September 2007 and they made good progress on three papers resulting from their collaborative SIDA-NRF funded project. Two should be submitted for publication in early 2008.

2.1.3.6 Two chapters on the fossil woods, seeds and leaves (Bamford) and one on the modern vegetation (Andrews, Bamford, Njau and Leliyo) have been submitted for the monograph on the Laetoli geology and palaeontology to be edited by Professor Terry Harrison. This project has been completed and the chapters are under revision. A paper is also in press in the Journal of Human Evolution (Andrews and Bamford, in press).

2.1.3.7 In February, March and November 2006 Professors Charles Peters and Marion Bamford continued to build up a modern reference collection of plant materials (wood, leaves, seeds, pollen) for comparisons with Tertiary fossil materials as well as the study of the ecology of modern wetlands (Seekoeivlei). Several papers are in an advanced stage of writing up.

2.1.3.8 In June-July 2007 Professor Bamford again joined the Koobi Fora Field School in Kenya to teach the students plant ecology, to collect more fossil woods and reference material for research. Ms Lucille Pereira, PhD candidate at the BPI, joined Professor Bamford and began sampling for phytoliths from the Okote site (1.5 Ma) at FwJ14. Modern samples were collected for the reference collection for her project. Lucy presented her PhD preproposal to the department and submitted her MSc at the end of December. A paper for Science on the Upper Burgi site FxJ20 (1.95 Ma) is soon to be submitted and several others are in progress.. Team: Professors Jack Harris, David Braun, Jack McCoy, Brian Richnond, Carolyn Dillion, Emma Mbua, Purity Kiura, Emmanuel Ndiema and Mussalenda Kibunja and students (Rutgers University, New Jersey, USA and University of Nairobi).

2.1.3.9 For the Early Miocene Rusinga Island Flora project with funding from the Leakey Foundation, in collaboration with Professor Margaret Collinson (Royal Holloway University, UK) and Prof Peter Andrews (Natural History Museum, London), Professor Bamford visited the collections in Nairobi in June 2006, and in London in August. A paper on the taphonomy of the sites is in progress and several more are planned on the taxonomy of the seeds. The team is awaiting Dr Collinson's input for the final stages of the taphonomy paper. Meanwhile an NSF application led by Kieran McNulty has been submitted for more field work and an expansion of the project.

2.1.3.10 There has been some progress on the identification of the Ndongondwane charcoal from the Tugela Valley, KwaZulu Natal, with Professor Haskel Greenfield (University of Manitoba, Winnipeg, Canada) and Professor Bamford has spent a lot of time making an identification key from modern reference material.

2.1.3.11 The project, comparing the angiosperm floras of South America and southern Africa, in collaboration with Dr Alba Zamuner, (University of La Plata, Argentina) and Prof Tania Dutra, (Unisinos, Brazil) using funding from the Wits University Council Overseas Fellowship, has begun with a trip to Argentina in February and to Brazil in December 2006. Two papers are in progress on the Argentinian material. Fossil woods were collected by Dutra from Antarctica but have not yet been received by Professor Bamford for identification. Due to the illness of Alba Zamuner little progress has been made this year.

2.1.4 Professor L R Berger

During the course of 2007, Professor Berger continued his research into new fossils from Palau, Micronesia and conducted a number of exploratory expeditions to various countries in Africa. The production of science documentaries for National Geographic Television continued with the first segments due to air in early 2008. His work on Plio-Pleistocene taphonomy in relation to early African hominins continued and he focused on work with his post-doctoral student Dr Brian Kuhn on aspects of cave accumulation. He also continued to focus on the taphonomy of the Taung Child and Taung site, the anatomy and comparative morphology of Plio-Pleistocene aged

hominins, and the fauna and archaeology of early hominin-bearing sites on the Witwatersrand. He has become active as an editor of the new online encyclopedia Citizendium – www.en.citizendium.org – and serves on the executive committee with co-founder of Wikipedia – Dr Larry Sanger.

- 2.1.4.1 Work on the taphonomy of the Taung child is a continuation of research and resulted in collaborative research with Dr Scott McGraw of Ohio State has been accepted into the South African Journal of Science.
- 2.1.4.2 Continuing work on the fossil fauna and archaeology from Cradle of Humankind sites resulted in two publications and several papers will appear in 2008.
- 2.1.4.3 A collaborative paper on the morphology of fossil saber-toothed cats from the Coopers site was published.
- 2.1.4.4 Published research on the origins of footwear with Dr Bernhard Zipfel.
- 2.1.4.5 Following the discovery of abundant fossil hominins in the Western Pacific, Professor Berger conducted two more expeditions to a remote archipelago to study this find. Publication of the findings will appear in early 2008.
- 2.1.4.6 Fossil excavations continued at two sites in the Cradle of Humankind – Gladysvale and Coopers (with Christine Steininger) where abundant fauna including hominins continue to be recovered.
- 2.1.4.7 Continued exploratory trips to Zimbabwe to explore the potential of early hominin bearing sites in that country and is planning an expedition in 2009.
- 2.1.4.8 Professor Berger worked on a series of science documentaries which will air in 2008.
- 2.1.4.9 Continued research in collaboration with Dr L Backwell and international collaborators is being undertaken on fossil hairs from the Gladysvale site – South Africa.
- 2.1.4.10 Continued the ongoing research with Dr Backwell on cut marks human remains and possible cannibalism from sites in southern Africa.
- 2.1.4.11 Continued collaborative studies of the fossil Theropithecus fossils from the Coopers cave South Africa.
- 2.1.4.12 Continued exploration for Early Mammal fossils in the Cretaceous and Early Palaeogene of Northern South Africa with S Churchill and E Hamilton
- 2.1.4.13 Continued collaborative research on new stone tools from the Plovers Lake II site – South Africa and a manuscript is in preparation

2.1.4.14 Continued collaborative research on new stone tools from the Coopers site – South Africa and a manuscript is in preparation.

2.1.4.15 Published two popular books on the Kruger National Park - Prime Kruger and Exploring Kruger.

2.1.5 Dr R Govender

2.1.5.1 Functional Analysis of the Postcranial Skeleton of *Tapinocaninus pamela* Rubidge (Synapsida: Therapsida) by Govender, Rubidge and Renaut. This manuscript is currently being reviewed by the authors. This study describes what is probably the most basal tapinocephalid from the Eodicynodon Assemblage Zone of South Africa and takes a look at the functional anatomy of *Tapinocaninus*. It is expected to be published in 2008.

2.1.5.2 Re-evaluation of the postcranial skeleton of the Triassic Dicynodont *Kannemeyeria simocephalus* from the Cynognathus Assemblage Zone (subzone B) of South Africa by Govender, Hancox and Yates. *Kannemeyeria* is probably one of the best known Triassic dicynodonts from South Africa and has recently come under the spotlight after an analysis of the cranial morphology resulted in the recognition of only two species therefore study of the postcranial skeleton of *Kannemeyeria simocephalus* from South Africa was undertaken. A paper is currently in press in *Palaeontologia africana*.

2.1.5.3 Variation in dicynodont morphology in the Cynognathus Assemblage Zone (subzone B) of South Africa and the implications for Triassic dicynodont taxonomy by Govender and Yates. As result of the analysis of the postcranial anatomy of *Kannemeyeria simocephalus*, a second postcranial morphotype was recognized. At this time there has been no positively associated cranial material therefore it has been designated Morphotype B. Its inclusion in a phylogenetic analysis of the Triassic dicynodonts, based on our current knowledge, has produced some interesting results. The authors expect to submit this manuscript for publication by the end of January 2008.

2.1.5.4 The Postcranial Anatomy of the Namibian Triassic Dicynodont *Dolichuranus primaevus* Keyser 1973 Govender and Yates. The study of *Kannemeyeria simocephalus* created an interest in other Triassic dicynodonts from Africa in particular *Dolichuranus* from Namibia. Its postcranial anatomy has not been studied previously. A manuscript has been submitted to *Palaeontologia africana*.

2.1.5.5 Comparative functional Analysis of the postcranial morphotypes *K. simocephalus* and Morphotype B from the Cynognathus Assemblage Zone (subzone B) of South Africa by Govender. This manuscript is currently being sent off for review. It focuses on the functional anatomy of *Kannemeyeria simocephalus*, Morphotype B and *Dolichuranus* examining how they differ from each other and what are the implications of these difference. This manuscript is expected to be published in

2008.

2.1.5.6 The postcranial skeleton of the Lower Jurassic *Tritylodon longaevus* from the southern African Karoo by Govender and Abdala. This is an analysis of postcranial skeleton of *Tritylodon* material from South Africa. The study describes the material from South Africa and then compares it with that of *Oligokyphus* and *Kayentatherium*. The manuscript is in the early stages of preparation, but the authors expect this study to be submitted for publication this year.

2.1.5.7 Comparison of *Aulacephalodon baini* and ‘*Aulacephalodon peavoti*’ and their relationship to each other by Govender will be submitted by the end of January 2008. This paper was undertaken after it was realized that the only published description of a species of *Aulacephalodon* had been referred to another taxon, viz. *Rhachiocephalus*. It was of interest to determine what if any were the fundamental differences between the two species.

2.1.5.8 The presence of well preserved foot bones that can be assigned to the Permian dicynodont *Aulacephalodon* has raised interest in applying the morphology to trackways associated with this particular dicynodont to determine if, as in dinosaur studies, one can glean information about the body size, weight and locomotion of this dicynodont. This manuscript is in the initial stages of preparation and will be finished later in 2008.

2.1.6 Professor B S Rubidge

2.1.6.1 Litho- and Biostratigraphy of the Lower Beaufort around the basin:

During March 2007 a two week field excursion was undertaken to localities in the lower Beaufort in the Klipplaat district together with Charlton Dube and Sifelani Jirah (BPI), Billy de Klerk and Rose Prevec (Albany Museum), and Doug Erwin (Smithsonian). The purpose of this trip was to find biozone defining fossils in close proximity to volcanic ashes order to determine the age of the relevant biozone. Several fossils of the *Pristerognathus* and *Tropidostoma* Assemblage Zone were collected, as well as volcanic ashes which have been sent to Sam Bowring (MIT) for Zircon dating. A draft manuscript has been written up, but finalization is dependent on final dates from Bowring.

In May Michiel De Kock (University of Johannesburg) again accompanied Rubidge to farms in the Klipplaat district to obtain additional samples for palaeomagnetic dating purposes.

Richard Mason completed his MSc dissertation of the bio- and lithostratigraphy fo the Beaufort-Ecca contact in the Albany area under the supervision of Bruce Rubidge and John Hancox. Rubidge has written up two papers from this thesis and these are in the final stages of modification before submission for publication.

2.1.6.2 Palaeosurface on the Ecca-Beaufort contact in the Estcourt district. No further progress was made with this project in 2006.

- 2.1.6.3 Description of the postcranial skeleton of *Tapinocaninus*, a new primitive tapinocephaline dinocephalian. Bruce Rubidge has been preparing this skeleton since 1984, and Romala Govender described the specimen for her MSc which was successfully submitted at the beginning of 2002. Govender R, Rubidge B & Renaut A have submitted a paper on the axial skeleton for publication. Extensive changes were requested by the reviewers and the authors are attending to these modifications.
- 2.1.6.4 Taxonomic revision of the Dinocephalia (with Dr J A van den Heever, University of Stellenbosch) (ongoing project). The Dinocephalia are a large and important group of basal synapsids known only from southern Africa, China and Russia. This revision is a long-term project which will take a lifetime to complete, as the animals are large and take a long time to prepare. Taxonomic revision of the Anteosauridae. Rubidge and van den Heever completed the description of the cranium, and are awaiting the statistical input from Niel Fourie.
- 2.1.6.5 Taxonomic revision of the "Biaromosuchia". The "Biaromosuchia" are considered to be the most primitive therapsid taxon. Rubidge has completed a manuscript on the cranial morphology of *Hipposaurus* and the diagrams have been finalized. He is now awaiting the phylogenetic analysis which will be undertaken by Dr Chris Sidor who is the co-author in the project.
- 2.1.6.6 Description of new dicynodonts from the lower Beaufort Group. A double-tusked skull of the basal dicynodont *Eodicynodon* was collected in the lowermost Beaufort by Charlton Dube in the Prince Albert Road area. Honours student, Zubair Jinnah, described the skull as part of his honours project and decided that this was *Eodicynodon oosthuizeni*. As this is stratigraphically the highest occurring specimen of the genus, in 2007 a paper on the biostratigraphic implications of this find was published by Jinnah and Rubidge.
- 2.1.6.7 Postcranial anatomy of therocephalian therapsids. This project is an extension of the PhD project of Heidi Fourie (Transvaal Museum) who completed her thesis under the supervision of Professor Rubidge. Heidi Fourie and Bruce Rubidge published a paper on the postcranium of *Regisaurus* in *Palaeontologia africana*.
- 2.1.6.8 The bio- and lithostratigraphy of the Permo-Triassic boundary in the northern part of the Karoo Basin. Anthony Rutherford has taken a long time to complete this project as he has a full-time job, but he has now almost completed writing up his MSc on the bio- and lithostratigraphy of the middle Beaufort in the Thaba Nchu area. He has been doing this on a part-time basis since 2004 under the joint supervision of Dr John Hancox and Prof Bruce Rubidge.
- 2.1.6.9 Database of Karoo fossil localities: Ms Merrill Nicolas successfully completed her PhD thesis. Draft copies three papers by Nicolas and Rubidge have been written and are currently being revised.

2.1.6.10 Sedimentology and stratigraphy of the Molteno Formation. John Hancox completed his PhD thesis in 1988 but the stratigraphy of the Burgersdorp and Molteno Formations has still not been published. Bruce Rubidge has written up a manuscript on the subject for publication and is being corrected by Hancox.

2.1.7 Dr D Steart

2.1.7.1 Dr David Steart, URC postdoctoral fellow working with Professor Bamford, arrived at the BPI Palaeontology from University of Victoria, Australia in November 2007. His research is to work on leaf physiognomy and climate. This will entail collecting leaves from various sites in South Africa with known climate regimes to add to the international database. The SA data will be used to interpret the fossil climate from several sites. In the short time that he has been here David has commenced the selection of field sites from which to collect leaf specimens. Any site selected must be within 1km of climate station with at least 30 years of temperature and rain data and have relatively undisturbed vegetation. This has necessitated a detailed analysis of the South Africa Weather Service (SAWS) data base of climate stations to identify those that meet the 30 years or more rainfall and temperature requirement. A number of sites have been found, as well as numerous errors in the SAWS station history data base which has necessitated an ongoing effort to identify those locations which do in fact have 30 years of continuous data. When suitable climate stations have been identified, Google Earth has been used to examine the site locality and generally assess the quality of the vegetation. Ultimately between 20 and 30 sites are required.

2.1.8 Dr A Yates

2.1.8.1 The origin and early evolution of the dinosaurian titans: New evidence of early sauropod history from South Africa. This National Geographic Funded Project was initiated during 2004 in collaboration with Drs Matt Bonnan (University of Western Illinois), Johann Neveling (Council for Geoscience) and John Hancox. Although national geographic funds are now exhausted, three weeks of fieldwork were conducted in April with special award money from URC in recognition of a higher NRF rating. Field work was carried out at Heelbo Farms in the Rozendal district with the aim to continue with excavation of a new species of sauropodomorph dinosaur that was discovered previously. This field trip was very successful, with the following significant results: Close to 80% of the skeleton and skull of the new species of sauropodomorph was recovered and further bone bed sites at the same level were discovered hundreds of metres away, producing a more complicated taphonomic scenario for the site (a possible mass death bed). Matt Bonnan visited the BPI in May to finalise the analysis of the fossils recovered by this project. An announcement paper describing the new dinosaur fauna, its geological context and palaeoenvironmental implications is now ready for submission. Several other papers ranging from the geology and taphonomy of the sites to the osteology and functional anatomy of the new taxa are in preparation.

2.1.8.2 A new ornithischian dinosaur from the Early Jurassic South Africa. A short three-day field trip was conducted in March. This resulted in the recovery of significant remains (an incomplete skull and postcranial skeleton) of an ornithischian dinosaur. This material was compared with other ornithischian material in the NHM, London and found to represent a new species of the genus *Lesothosaurus*. It also clarifies the confused taxonomy of older BPI ornithischian specimens and adds support to the case for the recently described *Stormbergia* as a valid and distinct taxon. A paper in collaboration with Drs Paul Barrett and Richard Butler is in preparation.

2.1.8.3 The evolution of pneumaticity in basal sauropods. The evolution of an avian-style air-sac system in dinosaurs is a controversial topic. While preparing the new Heelbo material and relooking at the *Antetonitrus* type specimen uncovered new evidence for the timing and location of skeletal pneumatization in the sauropod lineage. A paper is in preparation in collaboration with Drs Matt Bonnan and Matt Wedel.

2.1.8.4 The evolution of endemic cypraeid (Mollusca: Gastropoda) lineages in southern Australia. A study trip to the South Australian Museum was conducted in November to study fossil cypraeid material that had largely been collected by Dr Yates prior to his move to South Africa. One paper on early neogene cypraeids from South Australia has been submitted and another documenting Australia's oldest (Palaeogene) cypraeids is ready for submission.

2.1.9 Dr B Zipfel

2.1.9.1 A comparative analysis of pathological variation of the human forefoot in recent and pre-pastoral Holocene people was completed in collaboration with Professor Lee Berger (Wits). The findings were published in *The Foot* journal and the results suggested that an ancient unshod lifestyle resulted in less pedal pathology than a contemporary lifestyle that included the wearing of footwear. The study was made public in a press release that attracted interest both locally and abroad.

2.1.9.2 The analysis of the size and shape in a foot bone (first metatarsal KRM 6113B) from Klasies River main site as a method of estimating sex in MSA skeletons was completed in collaboration with Dr. Robert Kidd (University of Western Sydney). Although it was found that multivariate morphometric analyses could not conclusively discriminate the isolated fossil on the basis of sex, the results do suggest that the previously published sexing of the individual on the basis of size only, is unreliable. A paper has been accepted for publication by *Palaeontologia africana* and is currently in press.

2.1.9.3 A description of the hominin fifth metatarsal StW 114/115 with Dr Robert Kidd (University of Western Sydney). This description of the comparative morphology of this specimen will be completed early in 2008 and a manuscript submitted for publication.

2.1.9.4 In collaboration with Dr. Ruggero D'Anastasio (State University "G. d'Annunzio"), Professor Jacopo Moggi-Cecchi (University of Florence) and Dr. Luigi Capaso (State University "G. d'Annunzio"), lytic lesions on lumbar vertebrae 4 and 5 were examined in StW 431 *A. africanus*. Radiographic, macroscopic and microscopic examinations suggest that this may have been caused by Brucellosis. Should this prove to be the case, this would be the first evidence of such an infection in an australopithecine. It is anticipated that these results will be published during 2008.

3 PUBLICATIONS

3.1 Published articles

3.1.1 **Category 2 – Chapters in Books**

Bamford, M.K. 2007. Fossil plants from the Cradle of Humankind. In: Bonner, P., Esterhuysen, A., Jenkins, T., (eds), *A Search for Origins, Science, History and South Africa's 'Cradle of Humankind'*. Wits University Press, Johannesburg. pp. 91-101.
ISBN: 978-1-86814-418-1

Rozzi, FR & **Lacruz, R.** 2007. Histological study of an upper incisor and molar of a Bonobo (*Pan paniscus*) individual” Authors: In: Bailey, S. & Hublin, J.J (eds) *Dental Palaeoanthropology*, Springer, Berlin. Pp. 161- 174.

Bromage, T.G., **Lacruz, R.S.**, Perez-Ochoa, A., & Boyde, A.
2007. Portable confocal scanning optical microscopy of *Australopithecus africanus* enamel microstructure. In: Bailey, S. & Hublin, J.J. (eds) *Dental Palaeoanthropology*, Springer, Berlin. Pp:193- 209.

3.1.2 **Category 3 – Published Conference Proceedings**

Blackbeard, M. and **Yates, A. M.** 2007. The taphonomy of an Early Jurassic dinosaur bone-bed in the northern Free State, South Africa. 67th annual meeting of the Society of Vertebrate Paleontology, Austin

d'Errico, F. & **Backwell, L.R.** 2007. De Swartkrans a Arcy-sur-Cure. El uso de instrumentos oseos en el Paleolítico Inferior y Medio. In. Enrique Baquedano (Editor), *El Universo Neanderthal I*, pp. 101- 143. Museo Arqueológico regional Fundación Duques de Soria. ISBN: 978-84-95803-56-6

Yates, A. M., M. F. Bonnan, J. Neveling and P. J. Hancox. 2007. A New Diverse Dinosaur Assemblage from the Early Jurassic of South Africa. 67th annual meeting of the Society of Vertebrate Paleontology, Austin

Zipfel, B. and Berger, LR. 2007 Footwear, environment and the advent of forefoot pathology.

The South African Podiatry Association. 6th Biennial Conference, Johannesburg. *Abstracts*: 22. ISBN: 978-0-620-38757-6

Zipfel, B. 2007 The Pima – Amerindian pathfinders for health. The South African Podiatry Association. 6th Biennial Conference, Johannesburg. *Abstracts*: 26. ISBN: 978-0-620-38757-6

Zipfel, B. 2007 The Pima – Amerindian pathfinders for health. The South African Podiatry Association. 6th Biennial Conference, Johannesburg. *Abstracts*: 26.

Zipfel, B. and Thompson, A. 2007 A comparison of metatarsal pathological variation between habitually shod and unshod people from South Africa. 19th World Congress of Podiatry, 26-28 May, Copenhagen, *Book of Abstracts*, 54-55. ISBN: 978-87-991895-0-2:

Zipfel, B. and Kidd, R.S. 2007 Patterns of variation in the human metatarsus: a morphometric analysis Anatomical Society of Southern Africa. 37th Annual Conference, 22-25 April, Magaliesberg [Hosted by the University of Johannesburg]. *Conference Proceedings*: 37.

Zipfel, B. and Kidd, R.S. 2007 Skeletal evidence for pedal first ray divergence in modern humans: Atavistic or acquired? The Australasian Society for Human Biology 20th Annual Conference, Melbourne. Royal Melbourne Institute of Technology (RMIT) University City Campus, 2006. *Homo: Journal of Comparative Human Biology*. **58**: 265

3.1.3 Category 4 – Academic Journal Articles

Abdala, F., 2007. Redescription of *Platycraniellus elegans* (Therapsida, Cynodontia) from the Lower Triassic of South Africa, and the cladistic relationships of Eutheriodonts. *Palaeontology* 50, 591-618.

Abdala, F., Damiani, R., Yates, A., Neveling, J., 2007. A non-mammalian cynodont from the Upper Triassic of South Africa: a therapsid Lazarus taxon? *Palaeontologia africana* 43, 17-23.

Abdala, F., **Mocke, H.**, **Hancox, P.J.**, 2007. Lower Triassic postcanine teeth with allotherian-like crowns. *South African Journal of Science* 103, 245-247.

Botha, J., **Abdala, F.**, Smith, R., 2007. The oldest cynodont: new clues on the origin and early diversification of the Cynodontia. *Zoological Journal of the Linnean Society* 149, 477-492.

Bonnan, M.F., Yates, A.M., 2007. A new description of the forelimb of the basal sauropodomorph *Melanorosaurus*: implications for the evolution of pronation, manus shape and quadrupedalism in sauropod dinosaurs. *Special Papers in Palaeontology* 77, 157-168.

Coates, M.I., **Gess, R.W.**, 2007. A new reconstruction of *Onychoselache traquairi*, comments on early chondrichthyan pectoral girdles and hybodontiform phylogeny. *Palaeontology* 50(6), 1421-1446.

Damiani, R., **Vasconcelos, C.**, **Renaut, A.**, **Hancox, J.**, **Yates, A.** 2007. *Dolichuranus primaevus*

(Therapsida: Anomodontia) from the middle Triassic of Namibia and its phylogenetic relationships. *Palaeontology* 50(6), 1531-1546.

Fourie, H., Rubidge, B.S., 2007. The postcranial skeletal anatomy of the therocephalian *Regisaurus* (Therapsida: Regisauridae) and its utilization for biostratigraphic correlation. *Palaeontologia africana* 43, 1-16.

Galton, P.M., **Yates, A.M.**, Kermack, D., 2007. *Pantyraco* n. gen. for *Thecodontosaurus caducus* Yates, 2003, a basal sauropodomorph dinosaur from the Upper Triassic or Lower Jurassic of South Wales, UK. *Neues Jahrbuch für Geologie und Paläontologie* 243, 119-125.

Hartstone-Rose, A., de Ruiter, D.J., **Berger, L.R.**, Churchill, S.E., 2007. A saber-tooth felid from Coopers Cave (Gauteng, South Africa) and its implication for *Meganteron* (Felidae: Machairodontinae) taxonomy. *Palaeontologia africana* 43, 99-108.

Jinnah, Z.A., **Rubidge, B.S.**, 2007. A double-tusked dicynodont and its biostratigraphic significance. *South African Journal of Science* 103, 51-53.

Lacruz, R.S. 2007. Enamel microstructure of the hominid KB 5223 from Kromdraai. *American Journal of Physical Anthropology* 132, 175- 182.

Lockwood, C.A., Menter, C.G., **Moggi-Cecchi, J., Keyser, A.W.**, 2007. Extended male growth in a fossil hominin species. *Science* 318, 1443-1446.

McCrae, C., Potze, S., 2007. A fresh look at chemical fossil extraction. *Palaeontologia africana*, 43, 115-116.

Pickering, R., Hancox, P.J., Lee-Thorp, J.A., Grün, R., Mortimer, G.E., McCulloch, M., **Berger, L.R.**, 2007. Stratigraphy, U-Th chronology and paleoenvironments at Gladysvale Cave: insights into the climatic control of South African hominin-bearing cave deposits. *Journal of Human Evolution* 53, 603-619.

Sosa Lacruz, R., 2007. Enamel microstructure from the hominid KB 5223 from Kromdraai, South Africa. *American Journal of Physical Anthropology* 132, 175-182.

Yates, A.M., 2007. The first complete skull of the Triassic dinosaur *Melanorosaurus* Haughton (Sauropodomorpha: Anchisauria). *Special Papers in Palaeontology* 77, 93- 55.

3.1.4 Category 4A – Academic Journal articles in non-accredited Journals

Abadala, F., Malabarba, M.C., 2007. Enamel microstructure in *Exaeretodon*, a Late Triassic South American traversodontid (Therapsida: Cynodontia). *Revista Brasileira de Paleontologia* 10, 71-78.

Brophy, J.K., de Ruiter, D.J., Lewis, P.J., Churchill, S.E., **Berger, L.R.**, 2006. Preliminary

investigation of the new Middle Stone Age site of Plovers Lake, South Africa. *Current Research in the Pleistocene* 23, 41-43.

Yates, A.M., 2007. Solving a dinosaurian puzzle: the identity of *Aliwalia rex* Galton. *Historical Biology* 19, 93-123.

Zipfel, B., Berger, L.R., 2007. Shod versus unshod: the emergence of forefoot pathology in modern humans? *The Foot* 17, 205-213.

3.1.5 Category 8 – Editorships

Bamford, M.K. - Editor - *Palaeontologia africana*
Backwell, L.R. - Associate Editor - *Palaeontologia africana*
Rubidge, B.S. - Associate Editor - *Palaeontologia africana*
- Associate Editor - African Natural History
- Associate Editor - Researches of the National Museum
Yates, A.M. - Associate Editor - *Palaeontologia africana*

3.2 Other Publications – no subsidy

Hilton-Barber, B., **Berger, L.R.**, 2007. The Prime Origins Guide to Exploring Kruger. Prime Origins (Pty) Ltd, Cape Town. 334pp. ISBN: 978-0-620-39228-0 2nd edition.

Yates, A. M. 2007. Dinosaurs – Reptiles that lived life in the fast lane. *Easy Science* supplement to *Minimag* 13 (1) 20-23.

4 ARTICLES IN PRESS

* Articles which have appeared in print subsequent to submission of articles to Wits Publications

4.1 Category 2:

4.1.1 Submission type: Chapters in books

Andrews, P.J., **Bamford, M.K.**, Njau, F-E., Leliyo, G. (accepted) The ecology of vegetation in the Endulen-Laetoli area in northern Tanzania. In Harrison T. (Ed). *Paleontology and Geology of Laetoli, Tanzania: Human Evolution in context*. Vol I. Springer, Dordrecht.

Bamford, M.K. (under revision). Fossil wood. In: Harrison T. (Ed). *Paleontology and Geology of Laetoli, Tanzania: Human Evolution in context*. Vol I. Springer, Dordrecht.

Bamford M.K. (under revision) Fossil seeds and leaves. In: Harrison T. (Ed). *Paleontology and Geology of Laetoli, Tanzania: Human Evolution in context*. Vol I. Springer, Dordrecht.

4.2 **Category 4:**

4.2.1 Submission type: Academic Journal articles DE Submissible

Abdala, F, Rubidge, B.S., van den Heever, The oldest therapsidians (Therapsida, Eutheriodonta) and the early diversification of Therapsida. *Palaeontology*.

Albert, R.M., **Bamford, M.K.**, Cabanes, D., 2007. Palaeoecological significance of palms at Olduvai Gorge, Tanzania, based on phytolith remains. *Quaternary International*
DOI: 10.1016/j.quaint.2007.06.008

Andrews, P., **Bamford, M.** 2007. Past and present vegetation ecology of Laetoli, Tanzania. *Journal of Human Evolution* DOI: 10.1016/j.jhevol.2007.05.012

Backwell, L.R., d'Errico, F., Wadley, L. Middle Stone Age bone tools from the Howiesons Poort layers, Sibudu Cave, South Africa. *Journal of Archaeological Science*.

Bamford, M.K., Stanistreet, I.R., Stollhofen, H. and Albert, R.M. 2007. Late Pliocene grassland from Olduvai Gorge, Tanzania. *Palaeogeography, Palaeoclimatology, Palaeoecology*. DOI: 10.1016/j.palaeo.2007.09.003

Botha, J., **Abdala, F.** A new cynodont record from the *Tropidostoma* Assemblage Zone of Beaufort Group: implications for the early evolution of cynodonts in South Africa. *Palaeontologia africana*.

Cisneros, J.C. (in press) Phylogenetic relationships of procolophonid parareptiles with remarks on the geological record. *Journal of Systematic Palaeontology*. DOI: 10.1017/S1477201907002350

Cisneros, J.C. (in press) Taxonomic status of the reptile genus Procolophon from the Gondwanan Triassic, *Palaeontologia africana*.

Govender, R., Hancox, P.J., Yates, A. (in press) Re-evaluation of the post-cranial skeleton of the Triassic dicynodont *Kannemeyeria simocephalus* from the *Cynognathus* Assemblage Zone (Subzone B) of South Africa. *Palaeontologia africana* 43.

Govender, R., Yates, A.M., (under revision) Postcranial anatomy of *Dolichurus* *Palaeontologia africana* 43

Lacruz, R., Rozzi, FR. & Bromage, TG. Linear enamel hypoplasia, weaning and age at death in the Taung child. *South African Journal of Science*.

Philippe, M., **Bamford, M.K.**, 2007. A key to morphogenera used for Mesozoic conifer-like woods. *Review of Palaeobotany and Palynology* DOI: 10.1016/j.revpalbo.2007.09.004

Prevec, R., McLoughlin, S., **Bamford, M.K.** Novel double wing morphology revealed in a South African ovuliferous glossopterid fructification. *Review of Palaeobotany and Palynology*.

Yates, A. M. 2007 (in press). A second specimen of *Blikanasaurus* (Dinosauria: Sauropoda)

and the biostratigraphy of the lower Elliot Formation. *Palaeontologia africana*. 43

Zipfel, B. and Kidd, RS. 2007 (in press). Shape and size in a human foot bone from Klasies River main site, South Africa. *Palaeontologia africana*. 43.

4.2.2 Staff and students of the BPI Palaeontology participated in the following conferences.

Berger, LR:

June 2007: Young Presidents Organization – Tanzania, Johannesburg, Kruger
Paper: **Berger, LR.** *Welcome Home- the origins of humankind in Africa*

July 2007: The South African Podiatry Association. 6th Biennial Conference, Johannesburg. 6- 8 July.

Paper: **Zipfel, B.** and **Berger, LR.** *Footwear, environment and the advent of forefoot pathology.*

Presented a paper with Dr. Bernhard Zipfel at the South African Biennial Podiatry Association entitled: Zipfel and **Berger** 2007 Footwear, environment and the advent of forefoot pathology. The South African Podiatry Association. 6th Biennial Conference.

April 2007: 17th Biennial Congress of SASQUA, Howick, 11-13 April 2007.

Paper: **Bamford, M.K.**, Braun, D., Harris, J.W.K. *Palaeoenvironmental reconstruction based on fossil woods from the Upper Burgi Formation, Koobi Fora, Kenya.*

Blackbeard, M:

October 2007: 67th Annual Meeting of the Society of Vertebrate Paleontology, Austin, Texas Oct. 17-20, 2007

Poster: Blackbeard, M. and **Yates, A. M.** 2007. *The taphonomy of an Early Jurassic dinosaur bone-bed in the northern Free State, South Africa.*

McKay, I:

April 2007: 2nd International Earth Science Olympiad Conference Venue: Chosun University, Kwangju Metropolitan Area, Korea, 12-13 April.

Paper: **McKay, I.J.** 2007. *Assessing gifted students in Earth science through the performance tests of the 1st IESO from the South African perspective.*

July 2007: Teacher Renewal for Urban Science Teaching (TRUST) for Life Sciences Summer Institute at AMNH on Biodiversity and Evolution. American Museum of Natural History. 30 July- 10 August 2007.

Paper: **Mc Kay, I.J.** 2007. *Teaching Evolution in the Cradle of Humankind.*

Gess, R:

April 2007: CAVEPS Conference, Museum of Victoria, Melbourne, Australia, 6 – 18 April 2007

Paper: **Gess, R.** 2007, *Chondrichthyan fossils from the Famennian of South Africa.*

Rubidge, B.S:

June 2007: Participation at Workshop of Geoparks, Geological and Mining Conservation and Tourism development in South Africa.

Paper: **Rubidge, B.S.**, de Klerk, W.J. and McKay, I. *South Africa's fossil heritage: tourism winner or minefield?*

September 2007: Problems in Western Gondwana Geology – South America-Africa Correlations: du Toit revisited.

Paper: **Rubidge, B.S.** “*Karoo tetrapod biostratigraphy: relevance to understanding Gondwanan development.*”

Yates, A.M:

October 2007: 67th Annual Meeting of the Society of Vertebrate Paleontology, Austin, Texas Oct. 17-20, 2007

Paper: **Yates, A. M.**, M. F. Bonnan, J. Neveling and P. J. Hancox. 2007. *A New Diverse Dinosaur Assemblage from the Early Jurassic of South Africa.*

Poster: Blackbeard, M. and **Yates, A. M.** 2007. *The taphonomy of an Early Jurassic dinosaur bone-bed in the northern Free State, South Africa.*

Zipfel B:

April 2007 Anatomical Society of Southern Africa. 37th Annual Conference, 22-25 April

Paper: **Zipfel, B** and Kidd, R.S. *Patterns of variation in the human metatarsus: a morphometric analysis.*

May 2007: The 19th World Congress of Podiatry, Copenhagen, 26-28 May.

Paper: **Zipfel, B.** and Thompson, A. *A comparison of metatarsal pathological variation between habitually shod and unshod people from South Africa.*

July 2007: The South African Podiatry Association. 6th Biennial Conference, Johannesburg. 6- 8 July.

Paper: **Zipfel, B.** *The Pima – Amerindian pathfinders for health.*

Zipfel, B. and Berger, L.R. *Footwear, environment and the advent of forefoot pathology.*

November 2007 12th Biennial Congress of the South African Sports Medicine Association, Pretoria, 14 – 16 November.

Paper: **Zipfel, B.** *A review of the anthropological origins of human running.*

5 VISITS TO OTHER INSTITUTIONS

The staff of the Institute have visited various institutes for the purpose of collaboration and/or loan of material:

Dr F Abdala

Colección Paleontología de Vertebrados Lillo, Universidad Nacional de Tucuman, Argentina.
McGregor Museum, Kimberley.

South African Museum, Cape Town.

Dr L Backwell

Institut de Préhistoire et de Géologie du Quaternaire, University of Bordeaux I, France.
Transvaal Museum, Pretoria.
Museum Africa, Johannesburg.
National Museum, Florisbad Research Station, Bloemfontein.
Quaternary Dating and Research Unit, CSIR, Pretoria.

Professor M Bamford

National Museum, Nairobi, Kenya
Arusha Natural History Museum, Tanzania
SANBI, Pretoria
Herbarium of the Royal Botanical Gardens, Melbourne, Australia

Professor L Berger

The National Museum, Belau
Ngorongoro Research Centre, Tanzania
Georgia Southern University
Olduvai Gorge, Tanzania
National Museum of Zimbabwe
Georgia Southern University
The Transvaal Museum
National Geographic Society, Washington D.C.

Professor B Rubidge

Albany Museum, Grahamstown.
South African Museum, Cape Town
Biology Department, Stellenbosch University
National Museum, Bloemfontein
Rubidge Collection, Graaff-Reinet
Transvaal Museum, Pretoria
Institute of Vertebrate Palaeontology and Palaeoanthropology Beijing, China

Dr A Yates

Natural History Museum, London, October 2007
South Australian Museum, Adelaide, November 2007

Dr B Zipfel

Transvaal Museum, Pretoria
Institute for Vertebrate Palaeontology and Palaeoanthropology, Beijing, China

6 VISITING SCIENTISTS

From Africa

Jennifer Botha	National Museum Bloemfontien
Elise Butler	National Museum Bloemfontien
Michael Zondo	Bulawayo Museum, Zimbabwe
Heidi Fourie	Transvaal Museum
Denis Brothers	University KwaZulu Natal, Pietermaritzburg
Johan Welman	Biology Department, Pretoria University
Sylvia van Zyl	Bayworld Port Elizabeth Museum Complex
Jenny Bennie	Bayworld Port Elizabeth Museum Complex
Gillian Watson	Bayworld Port Elizabeth Museum Complex
Dorothy Pitman	Bayworld Port Elizabeth Museum Complex
Charmaine Wynne	Bayworld Port Elizabeth Museum Complex
Jenni Fabbri	Nelson Mandela Metropolitan Art Gallery, Port Elizabeth
Barry Fabian	University of the Witwatersrand
Johan Neveling	Council for Geosciences, Pretoria
Herbert Klinger	Iziko Museum, Cape Town
Mike Johnson	Council for Geosciences, Pretoria
James Brink	National Museum, Bloemfontein
Francis Thackeray	Transvaal Museum, Pretoria
Frank Neumann	University of the Free State, Plant Sciences
Billy de Klerk	Albany Museum, Grahamstown
Antony Cooper	CSIR, Built Environment, Pretoria
Rose Prevec	Rhodes University, Grahamstown
Anusuya Chinsamy-Turan	UCT, Cape Town
Berhane Asfaw	RURS, Addis Ababa, Ethiopia

From the Americas

William J Silvia	University of Kentucky, USA
Claudia Marsicano	Universidad de Buenos Aires, Argentina
Douglas H Erwin	National Museum of Natural History Washington DC, USA
Christian A Sidor	Burke Museum, University of Washington, Seattle , USA
Matthew F Bonnan	Department of Biology Western Illinois University
Sean Modesto	Cape Breton University , Canada
Kittinger Clark	Colby College, Waterville, ME
Robert A Gastado	Colby College, Waterville, ME
Andrea Arcucci	University Mac.de San Luis, Argentina
Christian Kammerer	University of Chicago, Illinois, USA
Ian Tattersall	American Museum of Natural History, NYC, USA
Jason H Luz	University of Pittsburg, PA, USA
Malcolm L Smead	University of Southern California,
Tafline Crawford	Washington University, St Louis, USA
Mario Luis Assine	UNESP San Paolo State University, Brazil
Elle Heckman	Los Angelous, USA
Julie Stein	University of Washington, Burke Museum, Seattle, USA
Stan Chienicoff	University of Washington, Burke Museum, Seattle, USA
Jack Fraysitts	University of Washington, Burke Museum, Seattle, USA

Jean Fraysitts University of Washington, Burke Museum, Seattle, USA
 Liz Nesbith University of Washington, Burke Museum, Seattle, USA
 Kym Aughtoy University of Washington, Burke Museum, Seattle, USA
 Ellen Furguson University of Washington, Burke Museum, Seattle, USA
 Helen Sommers University of Washington, Burke Museum, Seattle, USA
 Pat Thorpe University of Washington, Burke Museum, Seattle, USA
 Anais Vinant PO Box 2004 Seattle WA 98111, USA
 Doug McTavish University of Washington, Burke Museum, Seattle, USA
 Thelma McTavish University of Washington, Burke Museum, Seattle, USA
 Peter V Makovicky Field Museum of Natural History, Chicago IL, USA
 Jack R Frost US Coast Guard Office of Search and Rescue, Washington DC, USA
 Elizabeth Rega Western University, Pomona California, USA

Laura R Rush Western University, Pomona California, USA
 Paul Sereno University of Chicago, US
 Conrad Labandeira Dept of PaleoBiology, Smithsonian, Washington
 Sam Grey Colby College, Dept Geology Waterville ME USA
 Charles Peters University of Georgia, Athens, USA
 Jackson Njau Rutgers University, New Brunswick,

From Australia

Marianne Ryan University of Western Sidney

From Europe

Alexander P Rosnitsyn Palaeontological Institute, Russian Academy of Science, Moscow, Russia
 Christine Herther TW Goethe University, Frankfurt, Germany
 Hanah O'Regan Liverpool John Moores University, UK
 Michael Benton Department of Earth Sciences, University of Bristol, UK
 Alf Latham SACE Liverpool University, UK
 Kevin L Kuykendal Department of Archaeology – University of Sheffield, UK
 Nonhlanhla Dlamini University of York, Department of Archaeology, UK
 Jorg Baumgartner Liteslstetter, Konstanz, Germany
 Hannelore Liteslstetter, Konstanz, Germany
 Baumgartner

From Asia

Professor Wu Xizhi IVPP (Palaeoanthropologist) Beijing, China
 Professor Gao Xin IVPP, Deputy Director ((Palaeolithic specialty) Beijing, China
 Dr Lui Wu IVPP (Palaeoanthropologist) Beijing, China IVPP
 Dr Zhang Zhaoqun IVPP (Neosene Mammal specialty) Beijing, China
 Zhang Yi IVPP (Administration) Beijing, China

7 LECTURING AND STUDENTS

7.1 Postgraduate Students

7.1.1 PhD Students

CISNEROS, J. 0401735V. (Full-time, first registration June 2003, Graduated June 2007) “*The Triassic parareptile Procolophon: Cranial anatomy, variation, biostratigraphy and biogeographic distribution*”
Supervisors: B.S Rubidge, R. Damiani

FRANKLIN, R. 0400154Y (Full time; first registered July 2003. MSc upgrade see below). “*The recognition, frequency and taxonomic association of pathologies from the Plio-Pleistocene Aged sites of Coopers D, Witwatersrand, South Africa*”
Supervisors: L.R. Berger, L. Backwell

GESS, R. 0606640M (Part time, first registration January 2006) “*A taxonomic, biogeographic, biostratigraphic and palaeoecological synthesis of the Famennian Witpoort Formation of South Africa (Cape Supergroup, Witteberg Group)*”
Supervisors: B.S. Rubidge, M. Coates.

LACRUZ, R.S. 0100005A (first registered January 2003, graduated June 2007) “*The analysis of growth markings in enamel tissue of Plio-Pleistocene hominids of Africa*”.
Supervisor: L.R. Berger, F. Rossi, T. Bromage.

NICOLAS, M. 9206454P. (Full time, first registration November 2002, graduated June 2007) “*An assessment of vertebrate biodiversity changes through the Permo-Triassic Beaufort Group (Karoo Supergroup) of South Africa and its significance in terms of biological basin development, hiatus periods and extinction events.*”
Supervisor: B.S. Rubidge

POLE, S. 9804717K (Full time, first registered January 2005 “*Development and validation of non-invasive chemical methods for cleaning of palaeontological specimens*”.
Supervisors: E. Cukrowska, L Backwell.

SANDERSEN, A. 9204455A (Full-time, first registration 1998, graduated June 2007) “*A later Cretaceous biostratigraphy based on palynomorphs derived from southern African sediments*”.
Supervisor: P.J. Hancox, L. Scott.

STEININGER, C. 9813350E (first registered 2003) “*The emergence of early Homo and the extinction of Paranthropus robustus: environmental and faunal change in the Blaauwbankspruit of South Africa*”. Supervisor: L. Berger, N. van der Merwe, P. Unger.

MSc Students

BOSHOFF, P. 0215541R. (First registered Feb 2003; full time). “*Fossil coprolites in the Plio-Pleistocene aged cave deposits of South Africa*”

Supervisor: L.R. Berger

DE KLERK, B. 0109596R (First registered Feb 2006; graduated June 2007, *cum laude*) “*An osteological documentation of hybrid wildebeest and its bearing on black wildebeest evolution*”.

Supervisors: J. Brink, L. Backwell.

FRANKLIN, R. 0400154Y (Full time; first registered July 2003, upgraded to PhD having submitted MSc dissertation). “*The recognition, frequency and taxonomic association of pathologies from the Plio-Pleistocene Aged sites of Coopers D, Witwatersrand, South Africa*”

Supervisors: L.R. Berger, L. Backwell

MASON, R. 9813350E (Full time; first registered January 2004, graduated June 2007) “*A stratigraphic and biostratigraphic synthesis of the Ecca-Beaufort contact in the Eastern Cape Province, South Africa*”.

Supervisors: B.S. Rubidge, P.J. Hancox.

LEENEN, A. 9104636R (First registered January 2007; full time) “*Taphonomic contribution of large mammal butchering experiments to understanding the fossil record*”.

Supervisor: L. Backwell.

MOTHUPI, T. 0201116P (First registered Feb 2006; full time) “*Taphonomy of the fauna from Plovers Lake Cave: the flowstone-bounded unit*”.

Supervisors: L. Backwell, L.R. Berger.

PEREIRA, L.M. 8902910F (First registered Feb 2005; Submitted Dec. 2007).

“*Restoring context and identity to mummified remains from South Africa: Uncovering hidden information.*”

Supervisors: L.R. Berger; M. Steyn

RENAUT, R. 9405793 (Full time, first registered Feb 1999; part time since 1996). “*The morphology and physiology of the Permian sphenophytes of South Africa and the implications to taxonomy and biostratigraphy*”.

Supervisor: M.K. Bamford.

RUTHERFORD, A.B. 86061628/X (first registered 2002, part time). “*A multi-disciplinary sedimentological, stratigraphic and palaeoenvironmental appraisal of the Permian and Triassic Karoo strata in the vicinity of Thaba Nchu, in the Free State.*”

Supervisors: P.J. Hancox, B.S. Rubidge.

VASCONCELOS, C. 9807828T (first registered Feb 2003; full time) “*Proposal of a*

neotype for Massospondylus carinatus Owen (Dinosauria, Sauropodomorpha): the postcranial morphology and implications for prosauropod phylogeny”

Supervisors: M.A. Raath, A. Yates

VILAKAZI, N. 0000721N (First registered Feb 2006; full time) “*An osteological comparison between bontebok, Damaliscus pygargus pygargus, and bleskok, Damaliscus pygargus phillipsi and its bearing on the evolution of bontebok”*.”

Supervisors: J. Brink, L. Backwell.

7.1.2 BSc Honours students

The following four students successfully completed their BSc Honours degrees during 2007:

Arthur Baloyi (02113627D)

Natasha Barbolini (0500169K)

Shahzaadee Karodia (0409114W)

Luke Norton (0612917V)

Gary Trower (0712250X)

7.1.3 Undergraduate students

As in the past, the staff of the BPI Palaeontology have been involved in teaching undergraduate courses in the schools of Geosciences and APES (Animal, Plant and Environmental Sciences).

COURSE	STUDENTS	LECTURERS
Geology 1: Geol 104	105	B S Rubidge, L.Backwell
Geology II: Geol 204	58	B S Rubidge, M Bamford
Palaeontology & Palaeoecology APES 301T	23	M.Bamford, L.Backwell, A. Yates
Form and Function APES 201E	33	A Yates

8 OUTREACH PROGRAMME

8.1 Outreach Programme

2007 was another busy year for the School of Geosciences outreach programme. Dr Mc Kay is in charge of the schools programme for both the origins centre and the Kitching Gallery.

8.1.1 Learners programme

More than 4000 school children and teachers passed through the doors of the Kitching Gallery. This was the first time that the annual number of visitors to the museum exceeded 3000. The

reason for the increased volume of visitors was that joint tours of the rock art and palaeontology museums were offered and the rock art museum guides were used to assist with tours in the palaeontology museum. In the future it is hoped that the outreach programmes between the two museums will become even more integrated. Ultimately the Kitching Gallery hopes to attract more 10000 school children a year.

8.1.2 Teachers programme

In new development Ian McKay coordinated and presented workshops to approximately 90 Department of Education Life Science subject advisors. Academic staff of the BPI also assisted by giving courses relevant to their particular expertise. All the South African Provinces were covered with the exception of the Western Cape. The reason for this sudden interest in evolution is that evolution and the fossil record are being incorporated into the South African school curriculum for the first time in 2008 and Life Science teachers nationwide will be required to receive training in how to teach this new topic.

8.1.3 Teaching of evolution

Ian McKay attended and participated in a course on teaching evolution presented at the American Natural History Museum in New York and also spent a week in South Korea. The aim of the second trip was to provide input into the design of the first International Earth Science Olympiad. In 2008, Ian is hoping to organise a South African team for the second International Earth Sciences Olympiad which will be held in the Phillipines.

8.1.4 Kitching Fossil Exploration Centre

In 2005 the BPI (in collaboration with the Albany Museum) set up the *Kitching Fossil Exploration Centre* in Nieu Bethesda in the Eastern Cape. A section 21 Company was established to facilitate the business. Since its inception this facility has received ever increasing visitor numbers and has been able to operate independently as a business without receiving subsidy. Through the formative stages the KFEC was managed by the Owl House Foundation, but in November 2007 the KFEC appointed its own part-time manager to oversee the finances and day to day running of the business. During the year 13 010 people visited the Centre.

This “experiment” into palaeotourism in the Karoo region of South Africa has received much media acclaim. Dr McKay, together with staff from the BPI, continued training of guides at the Kitching Fossil Exploration Centre.

8.1.5 African Origins Month

Ian McKay was again successful in raising R30 000 from SAASTA for African Origins Month Activities and organized a two-day palaeontology excursion for Geology students in October. This incorporated a visit to the Albany Museum in Grahamstown which was led by Billy de Klerk, and a field excursion to Nieu Bethesda area which was led by Ian McKay and Bruce Rubidge and incorporated the Kitching Fossil Exploration Centre.

8.1.6 Yebo Gogga

The BPI Palaeontology and the School of Geosciences yet again participated in the very successful annual Yebo Gogga event which is organised for the public by the School of Animal Plant and Environmental Sciences. This annual event lasts for a week, attracts thousands of visitors, and is an important PRO event of the University.

8.1.7 Field guide training

The Field guide training programme in Palaeoanthropology started in 2006 by Professor Lee Berger for the Field Guides Association of South Africa is continuing and still graduates a number of students each year.

9 CURATION OF COLLECTIONS

9.1 General

The year 2007 saw the new Curator, Bernhard Zipfel take up the position vacated by Dr. Mike Raath on his retirement. Dr Zipfel found the files on the Curator's computer in excellent order and easy to navigate, as well as very helpful instruction manuals and documents left by Dr Raath. This "succession planning" paid off in which the new curator had no serious problems in becoming accustomed to the tasks at hand. In addition, Dr Mike Raath visited the BPI on two occasions of several days each to spend time with Dr Zipfel. During this time, many questions were answered as well as some "hands on" training took place.

The year began with the usual influx of palaeoanthropologists wishing to visit the hominid fossil collections. Access to radiographic facilities became a problem in which the Johannesburg academic hospital management, as well as the Donald Gordon Centre were unable to accommodate visitors requiring x-rayed or CT of fossils. An interim arrangement was made with the Helen Joseph Hospital, the staff of which were a great help for visiting researchers.

Apart from these visitors, there was a steady stream of other overseas visitors to the collections both at the Medical School and at the BPI throughout the year, although the numbers were significantly fewer than prior to 2006.

In the 2006 curators report, one of the first priorities noted was that a properly recorded inventory of the entire collection in the Wedge basement should be compiled. This was started in 2007 for which student assistance was sought. This process will be completed by the end of 2008.

Some additional funding was obtained from the Paul and Stella Loewenstein Educational trust from which a number of computers were bought to be placed in the various collections. The funding is also intended for building a new storage box for the Taung Child, a display case for an almost complete *Massospondylus* skeleton and a display case for the palaeobotany display.

9.2 Karoo Vertebrate Collection

A significant addition to the collection was made by Dr Adam Yates and his team from their rich bone-bed locality on the farm 'Heelbo' in the Free State. This locality is yielding an unexpectedly unique dinosaur assemblage which is very different from other Elliot Formation localities. Most of this material will have been entered onto the Karoo database by the middle of 2008.

Another significant addition to the collection was a further series of samples from the bone-bed

on the farm 'Driefontein' in the Free State, meticulously collected over several years by Dr John Hancox. The cataloguing of this collection still poses a significant challenge, some progress in cataloguing has been made and it is hoped that the process will be completed during 2008.

9.3 Fossil Plant and Insect Collection

Growth on the palaeobotanical side has again mainly been in terms of fossil wood collected by or submitted to Professor Bamford. 400 pieces of wood from various localities have been added to the collection from Koobi For a, Kenya, as well as modern plants from South Africa and Kenya. The collection of silicified plants from Olduvai Gorge and Charcoal from Wonderwerk Cave have been loaned to professor Bamford for research

Rose Adendorff and Conrad Labandeira continued the morpho-typing of the leaves and insect damage from the old and new collections of the *Glossopteris* flora to add to their large database and have completed the Burgersdorp and Lady Frere collections.

Marion Bamford employed a student for the year to continue sorting and cataloguing the new additions to the modern seed, wood and pollen collections and to begin data entry of the palynology literature reference collection. Ms Pereira has collected over 200 samples for phytoliths from Kenya as well as modern plant material

9.4 Cenozoic Fossil Mammals

Material from several sites in the Cradle of Humankind World Heritage Site continued to enter the collection store at The Wedge as a result of ongoing excavations at those sites.

9.5 Reprint Collection

Additions to the BPI Reprint Collection were the kind donations of Dr Mike Raath's entire reprint collection, including an extensive electronic database and the reprints of Dr André Keyser.

10 PROPOSED RESEARCH PROGRAMME 2006

10.1 Dr F Abdala

10.1.1 Assessing the palaeobiology of South American cynodonts.

This study is based largely on histology of limb bones from the microscopic study of limb bones and will be undertaken in collaboration with Prof Anusuya Chinsamy-Turan (University of Cape Town). Manuscript submitted. Completion: 2008

10.1.2 Cynodonts from the Omingonde Formation, Namibia.

Several cynodonts from the Omingonde Formations are housed in the collections of the Geological Survey in Namibia. These specimens will be described and are important as they provide the link between Anisian east and western faunas from

Africa. Manuscript submitted. Completion: 2008

10.1.3 Postcranial anatomy of cynodonts.

Several complete skeletons of the cynodonts *Procynosuchus*, *Galesaurus*, *Thrinaxodon* and *Tritylodon* are present in museum collections in South Africa. As the postcranium of cynodonts has not received much attention in recent years, Dr Abdala aims to provide a detailed morphological and functional description of the postcranial anatomy of these genera. A first draft of postcranium of *Tritylodon* (coauthored by Dr. R. Govender) is being finished now and this first contribution will be submitted during this year. Completion: 2008

10.1.4 Alpha-taxonomy of the Therocephalia.

This taxon of therapsids forms an important component of the fauna of the Beaufort Group. The taxonomy of this group is in need of revision and Dr Abdala aims to address this. After the first step, with the description of the earliest therocephalian of the world with B Rubidge and J Van den Heever, he will continue with early therocephalians from the *Tapinocephalus* AZ (with B Rubidge, C Kammerer and J Van den Heever). He also is working in a second draft on the alpha taxonomy of the *Bauriidae* (with J van den Heever, J and B Rubidge). It is expected to finish the latter paper in the course of this year. Completion: 2008

10.1.5 Redescription of the cynodont *Cistecynodon parvus* from the *Cynognathus* AZ.

This project is developed together with J Hopson and it is expected a first draft in the current year. Completion: 2009

10.1.6 Description of new cynodont materials from South America.

A series of ongoing projects are in development with researches from Argentina and Brazil. Among others, the description of the first record of *Diademodon* in South America (with A Martinelli and Dr M de la Fuente), the first record of *Probainognathus* in the Brazilian Triassic (with Dr M Bento Soares) and the description of new traversodontid cynodonts from southern Brazil (with Dr A M Ribeiro). At least three of these projects are expected to be finished and submitted in the course of this year. Completion: Ongoing

10.2 Dr L Backwell

10.2.1 Early hominid bone tool function.

Results of the surface roughness research conducted in collaboration with Francesco d'Errico will hopefully be analysed and written up in 2008. Completion: 2009.

10.2.2 Early hominid bone tools from Drimolen.

A manuscript prepared in collaboration with Francesco d'Errico will be submitted for publication early in the year. Completion: 2008.

10.2.3 Middle Pleistocene fossil hair.

Collaborators on the project (Don Brothwell, Matthew Collins, David Martill, Robyn Pickering and Lee Berger) are expected to provide their contributions soon. A manuscript will be submitted for publication by the end of this year. Completion: 2008.

10.2.4 Taphonomy of human remains from Plovers Lake cave.

Time permitting, a manuscript will be submitted for publication later this year. Collaborators include Tebogo Mothupi, Steve Churchill and Lee Berger. Completion: 2008/9.

10.2.5 Rodent modification of bone.

A first draft manuscript on the results of experiments conducted last year will be written in collaboration with Francesco d'Errico. Scanning electron microscope data need to be collected. Completion 2009

10.2.6 Stone tool modification of bone.

Cutmarks on large mammal bones will be moulded and microscopically analysed using optical and scanning electron microscopy. Completion: 2010

10.2.7 Reappraisal of the oldest evidence of cutmarks on hominid remains.

Results will be published in collaboration with Francesco d'Errico once the rodent modification of bone paper is complete. Completion: 2010.

10.2.8 Wonderkrater peat mound excavation.

An announcement paper on the site should be written by mid-year. A fourth field trip is planned for 2008 and focus will shift from geology to analysis of organic and lithic material at the site. Collaborators include Zoë Henderson, Terence McCarthy, Stephan Woodborne, Louis Scott, Lyn Wadley, Chrissie Sievers, Lloyd Rossouw and Raman Sukumar. Completion: Ongoing, but announcement paper in 2008.

10.2.9 Excavation of a large mammal mass death assemblage.

A fourth field season of excavations is planned for mid-year. An announcement paper on the site is in progress. Collaborators include James Brink, Johann Neveling, Lloyd Rossouw and Lucy Pereira. Completion: Ongoing

10.2.10 Modern eland carcass taphonomy.

Study of the carcass will resume during excavation of the Heelbo site later this year. Collaborators include Fernando Abdala, James Brink, Lucy Pereira and Johann Neveling. Completion: Ongoing.

10.2.11 Modern springbok carcass taphonomy.

Study of the carcass will resume during excavation of the Heelbo site later this year. Collaborators include Fernando Abdala, James Brink, Lucy Pereira and Johann Neveling. Completion: Ongoing.

- 10.2.12 Taphonomy of Plio-Pleistocene Cooper's D faunal assemblage.
Chemical cleaning of the fossils is ongoing, which has delayed study of the material. Collaborators include Darryl de Ruiter, Ewa Cukrowska, Steven Pole, Christine Steininger and Lee Berger. Completion: 2010.
- 10.2.13 Middle Stone Age worked bone from Sibudu cave.
A first draft manuscript on intentionally modified bones from the site will be written in collaboration with Francesco d'Errico later this year. Completion: 2009.
- 10.2.14 Termite modification of bone experiment.
A sample of bones will be removed at the end of summer. Completion: 2010.
- 10.3 Professor M K Bamford
- 10.3.1 Karoo Fossil Woods
Professor Bamford will continue adding to the Karoo wood database to check for any new taxa, refine the biostratigraphy of the woods and modify as necessary. Completion: ongoing.
- 10.3.2 Karoo palaeobotany:
Collecting and analysing the plant material (leaf imprints, insect damage, pollen and woods) above and below the P-Tr boundary will be continued and another large site paper from this work will be written. This project will be expanded to include Early Permian floras as well. Collaborators: Dr Conrad Labandiera (Department of Paleobiology, Smithsonian Institution, Washington DC, USA) Prof Bob Gastaldo (Head of school of Geology, Colby College, Maine, USA; and students), Dr Johann Neveling (Council for Geosciences) and Dr Rose Prevec (Rhodes University and Albany Museum) and Professor Marion Bamford
Completion: ongoing.
- 10.3.3 Cretaceous and Tertiary Woods
- 10.3.3.1 The paper on the Vryburg and Mahura Muthla fossil woods will be submitted to the South African Journal of Geology in 2008 when Professor John Ward has time and Dr Mike de Wit returns from the DRC. Completion: ongoing
- 10.3.3.2 Continued research at Olduvai Gorge. We have applied for an extension of funding from the Wenner-Gren foundation for a small team to continue with fieldwork in July-August 2008. More collecting of macroplants and phytoliths is planned to further the research already published as the project has extended into Bed I where several in situ marshlands have been uncovered. New material will be described and more field work is planned for 2008. Completion: ongoing.
- 10.3.3.3 Identification of West Coast offshore and onshore woods, in collaboration with De Beers Marine geologists Ian Stevenson, and Lourens Myburgh and Namdeb's Jurgen Jacobs, continues and any interesting finds will be published. Completion: ongoing.

- 10.3.3.4 This is the final year of the Biodiversity in Southern Africa, SIDA-NRF project with Dr David Cantrill and Dr Hervé Sauquet. Three papers are well underway and will be submitted in early 2008. We hope to continue this project but will seek new funding. Completion: end 2008.
- 10.3.3.5 Continue to build up a modern reference collection of plant materials (wood, leaves, seeds, pollen) with Professor Charles Peters for comparisons with Tertiary fossil materials as well as study the ecology of modern wetlands (Seekoeivlei, Nylsvley, Okavango Delta, Ol'Balbal Depression, Lakes Makat, Eyasi, Masek and Ndutu. Collaboration with botanists and archaeologists. Project funded by PAST. The writing of papers is proving to be very slow because Peters keeps extending the project. Completion: ongoing.
- 10.3.3.6 More field work is planned at Koobi Fora sites in June to extend the stratigraphic range. We have applied to the Wenner Gren Foundation and NSF for funding for field work and to expand the number of sites. Team: Professor Jack Harris, David Braun, Jack McCoy, Brian Richmond, Naomi Levin, Purity Kiura, Emma Mbuu, Mussalenda Kibunjia and student from Rutgers University, New Jersey, USA. Lucy Pereira will continue her PhD study on phytoliths from Koobi Fora and in January we will go to the laboratory of Rosa Albert in Barcelona to learn a new method of phytolith extraction. Another project is planned (awaiting outcome of NSF funding re-application) for the Holocene sites with Profs Jack Harris and Gail Ashley. Field work will be combined with the June Plio-Pleistocene project. Completion: ongoing.
- 10.3.3.7 Professor Bamford has visited the collections in Nairobi in June and in London in August for the Early Miocene Rusinga Island Flora project with funding from the Leakey Foundation, in collaboration with Professor Margaret Collinson (Royal Holloway University, UK) and Prof Peter Andrews, (Natural History, London). The paper on the taphonomy of the sites will be submitted. The Leakey funding was insufficient to complete the planned project but alternative funds are being sought to continue with the fossil seed identifications. Completion: mid 2008. Second phase awaiting outcome of NSF funding application.
- 10.3.3.8 The identification of the Ndongondwane charcoal from the Tugela Valley, KwaZulu Natal, with Professor Haskel Greenfield (University of Manitoba, Winnipeg, Canada) will continue and they plan to submit one of several papers for publication this year. Completion: ongoing.
- 10.3.3.9 The project comparing the angiosperm floras of South America and southern Africa with Dr Alba Zamuner, (University of La Plata, Argentina) and Professor Tania Dutra, (UNISINOS, Brazil) using funding from the Wits University Council Overseas Fellowship, will continue this year with the publication of several papers as well as the fossil database. Professor Bamford will expand the project include fossil collected by Tania Dutra from Antarctica and also work with Professor Marguot Guerra Sommer on Early and Late Cretaceous

fossil woods from the Botucatu Formation and Bauru Group in the Paraná Basin.
Completion: 1 year funding but ongoing research.

10.3.3.10 The Laetoli project is complete and the review and publication of the book chapters are awaited.

10.3.3.11 Description of fossil leaves from Lukeino, Kenya with Professors Martin Pickford and Brigitte Senut. Completion: end 2008.

10.3.3.12 Identification of Charcoal from Wonderwerk Cave with Professors Liora Horwitz and Michael Chazen. Completion: ongoing.

10.3.3.13 Dr David Steart, post doc student from the University of Victoria, Australia, arrived in November to work on leaf physiognomy and climate. He will collect leaves from various sites in South Africa with known climate regimes to add to the international database. We will use the SA data to interpret the fossil climate from several sites.

10.4 Professor L R Berger

10.4.1 Continued research in the taphonomic signatures of birds of prey on bone including the recovery of additional material from the Taung site, South Africa.
Completion: ongoing research.

10.4.2 Continued collaborative work on fossil hair from hyaena coprolites.
Fossil hair has been recovered from 250 000 year old hyaena coprolites from Gladysvale as noted in Dr Backwell's report above. Completion: 2008

10.4.3 Collaborative work on cannibalism with Dr L Backwell.
Completion: 2008

10.4.4 Ongoing field work at the sites of Coopers, Plovers Lake and Gladysvale continuing the recovery of micro- and macro- animal remains and archaeological remains from these important sites.
Completion: ongoing research

10.4.5 Specific research into early hominin postcranial morphology with the goal of understanding body proportions and modes and tempos of human evolution in the late Pliocene.
Completion: ongoing research

10.4.6 A continued programme of dating the early hominin sites of South Africa utilizing new and independent methods of radiometric dating.
Completion: ongoing research

10.4.7 Completion of plans for a fossil expedition to Zimbabwe in 2009.
Completion: ongoing research

10.4.8 Continued research on fossil humans in Micronesia. 2 expeditions planned for 2008 and publication of initial findings.
Completion: ongoing research

10.4.9 Studies of the whole anatomy of fossil rodents from South Africa with C McRae.
Completion: 2008

10.4.10 Undertake studies of Plio-Pleistocene reptiles supervising a PhD. with Dr A Yates.

10.5 Dr R Govender

10.5.1 Functional Analysis of the Postcranial Skeleton of *Tapinocaninus pamela* Rubidge (Synapsida: Therapsida) by Govender, Rubidge and Renault.
This manuscript is currently being reviewed. This study describes what is the probably the most basal tapinocephalid from the *Eodicynodon* Assemblage Zone of South Africa and takes a look at the functional anatomy of *Tapinocaninus*. It is expected to be published in 2008.

10.5.2 Variation in dicynodont morphology in the *Cynognathus* Assemblage Zone (subzone B) of South Africa and the implications for Triassic dicynodont taxonomy by Govender and Yates.

As result of the analysis of the postcranial anatomy of *Kannemeyeria simocephalus*, a second postcranial morphotype was recognized. At this time there has been no positively associated cranial material therefore it has been designated Morphotype B. Its inclusion in a phylogenetic analysis of the Triassic dicynodonts, based on our current knowledge, has produced some interesting results. This project remains ongoing in the hope that fieldwork in known localities may yield cranial material positively associated with postcranial skeletal material.

10.5.3 The postcranial skeleton of the Lower Jurassic *Tritylodon longaevus* from the southern African Karoo by Govender and Abdala.

This is an analysis of postcranial skeleton of *Tritylodon* material from South Africa. The study describes the material from South Africa and then compares it with that of *Oligokyphus* and *Kayentatherium*. The manuscript is in the early stages of review, however, the authors expect this study to be submitted for publication this year.

10.5.4 The presence of well preserved foot bones that can be assigned to the Permian dicynodont *Aulacephalodon* has raised interest in applying the morphology to trackways associated with this particular dicynodont to determine if as in dinosaur studies one can glean information about the body size, weight and locomotion of this dicynodont.

This manuscript is in the initial stages of preparation and will be finished later this year when it will be submitted for publication.

10.6 Professor B S Rubidge

- 10.6.1 Litho- and Biostratigraphy of the Lower Beaufort around the Karoo basin:
Eastern Cape – although much bio and lithostratigraphic field work has been undertaken to the Lower Beaufort in recent years more collecting is needed in order to understand the biodiversity and subsequently the biostratigraphy of the Lower Beaufort. Completion: Ongoing
- 10.6.2 KwaZulu-Natal – Fieldwork has been completed, and Billy de Klerk is currently trying to enhance the track way site with computer modeling.
Completion: Ongoing 2007.
- 10.6.3 Description of the postcranial skeleton of *Tapinocaninus*, a new primitive tapinocephaline dinocephalian.
A draft manuscript in collaboration with Govender, and Renault has been written up for the vertebral column, and another will provide a description of the girdles.
Completion: June 2008.
- 10.6.4 Taxonomic revision of the Dinocephalia (with Dr J A van den Heever, University of Stellenbosch) (ongoing project).
The Dinocephalia are a large and important group of synapsids known only from southern Africa, China and Russia. This revision is a long-term project which will take a lifetime to complete, as the animals are large and take a long time to prepare. In 2008 Ms Saniye Atayman, a student from Turkey, will be doing her PhD on the tapinocephalidae
- 10.6.5 Taxonomic revision of the Anteosauridae. Completion June 2008.
- 10.6.6 Taxonomic revision of the Tapinocephalidae. Completion 2010
- 10.6.7 Taxonomic revision of the "Biarmosuchia".
The "Biarmosuchia" are considered to be the most primitive therapsid taxon. Fossils of this group have been found in the Permian rocks of only South Africa and Russia. In order to understand the ancestry of the therapsids from the pelycosaurs. During 2006 a re description of the cranial morphology of *Hipposaurus* was written by Professor Rubidge, but the final draft will be completed in collaboration with Professor Chris Sidor when he visits the BPI in April 2007. Completion: June 2008
- 10.6.8 A taxonomic and cladistic re-assessment of Triassic dicynodonts.
This project is in collaboration with Dr P J Hancox (Geology) and involves studying fossils from different countries including China, Germany and the UK.
Completion: Ongoing.
- 10.6.9 Postcranial anatomy of therocephalian therapsids.
This project is an extension of the PhD project of Heidi Fourie (Transvaal Museum) who completed her thesis under the supervision of Professor Rubidge. Fourie and

Rubidge have written a draft manuscript on the postcranium of *Glanosuchus* and are in the process of finalising this. Completion: 2008

10.6.10 The bio- and lithostratigraphy of the Permo-Triassic boundary in the northern part of the Karoo Basin.

Anthony Rutherford is in the final stages of completing his MSc on the bio- and lithostratigraphy of the middle Beaufort in the Thaba Nchu area. He has been doing this on a part-time basis since 2004 under the joint supervision of Dr John Hancox and Professor Bruce Rubidge. Completion: June 2008

10.6.11 Database of Karoo fossil localities

For her PhD thesis Ms Merrill Nicolas has embarked on the very large task of compiling a GIS database of all fossils housed in South African Institutions with data on their localities. This project, under the supervision of Professor Bruce Rubidge, will have important implications for understanding and enhancing biogeography, biodiversity and biostratigraphy of continental faunas of the Permian and Triassic periods. Three papers are being prepared from this project. Completion: June 2008.

10.7 Dr D Steart

10.7.1 Modern Leaf Physiognomy and Climate.

10.7.1.1 Field trip to Nyslevely and Karee Kranz. Collect leaves from undisturbed vegetation, identify taxa, measure leaves and enter into data base. Dates Feb/Mar 2008.

10.7.1.2 Field trip to Knysna (dependant on PAST funding). Collect leaves from undisturbed vegetation, identify taxa, measure leaves and enter into data base. Date: April 2008.

10.7.1.3 KwaZulu Natal field trip (dependant on funding from the department). Collect leaves from undisturbed vegetation, identify taxa, measure leaves and enter into data base. Dates October 2008.

10.7.2 Physiognomy of Orapa fossils:

Measure the leaves in the Orapa collection and enter into the data base and interpret the climate. Date: June-Aug.

10.8 Dr A Yates

10.8.1 Southern Elliot Dinosaur Project.

A large expedition co-lead by myself and Dr. Oliver Rauhut and funded by the German Federal Government will be held in March 2008. We aim to re-open investigations on the dinosaur faunas at the southern end of the Elliot Formation exposure (Herschel, Barkly East and Lady Grey districts) where many holotypes have historically been found.

10.8.2 Finalisation of the paper describing the new ornithischian dinosaur and revising the taxonomy of southern African 'fabrosaurs'. In collaboration with Drs Barrett and Butler

10.8.3 Finalisation of the sauropod pneumaticity paper in collaboration with Drs Wedel and Bonnan.

10.8.4 Collaboration with Prof. Chinsamy-Turan on the bone histology of basal sauropods from South Africa.

10.8.5 Collaboration with Dr. Stevens and Natasha Barbolini on the neck kinematics of *Massospondylus*.

10.8.6 Submission of the announcement paper of the Heelbo dinosaur project to an high impact journal

10.9 Dr B Zipfel

10.9.1 A description of the hominin fifth metatarsal StW 114/115 with Dr. Robert Kidd (University of Western Sydney). Specimen will be completed early in 2008 and a manuscript submitted for publication. Completion: 2008

10.9.2 A description of evidence of hallux limitus in a hominin (SKX 1750) from Swartkrans,

In collaboration with Ryan Franklin, extant humans and apes will be examined for the presence of a dorsal exostosis of the first metatarsal for comparison with a similar condition in the fossil. The presence of such an exostosis in humans, but not apes, would serve as another trait of habitual bipedalism. A manuscript for publication will be submitted during 2008. Completion: 2008

10.9.3 The significance of the human first metatarsal lateral basal articular facet. This may be an important marker for habitual bipedalism in non-human hominins. A manuscript is in preparation and will be submitted for publication in 2008. Collaboration with Dr Robert Kidd, University of Western Sydney. Completion: 2008

10.9.4 A description of an anomalous hominin talus (SKX 50043) from Swartkrans in collaboration with Dr R S Kidd from the University of Western Sydney.

The specimen will be subjected to a multivariate analysis including humans and apes in order to examine the functional affinities of the fossil. Completion: ongoing

10.9.5 In collaboration with Professor Lee Berger, a partial hominin tibia (StW 396) from Sterkfontein will be described.

A manuscript for publication will be submitted during 2008. Completion: 2008

10.9.6 In collaboration with Jeremy DeSilva, University of Michigan, the hypothesis that

the OH8 individual (*Homo habilis*) from Bed I, Olduvai Gorge, was a juvenile will be questioned.

DeSilva and Zipfel believe that this individual was an adult; the skeletal evidence in terms of patterns of proximal and distal growth plate fusions of the metatarsus in juvenile humans and apes will be noted and compared to that of the OH8 foot bones. Completion: 2008

10.9.7 In collaboration with Dr. Ruggero D'Anastasio (State University "G. d'Annunzio"), Professor Jacopo Moggi-Cecchi (University of Florence) and Dr. Luigi Capaso (State University "G. d'Annunzio") a description of lytic lesions on lumbar vertebrae 4 and 5 in StW 431 A. *africanus* consistent with *Brucellosis abortus* infection will be completed. Completion: 2008

The super dedicated staff of the BPI have once again had a very active year. In addition to the very active outreach programme which is co-ordinated by Dr Ian McKay, undergraduate and postgraduate teaching, the small academic staff complement of the BPI were responsible for the publication of 3 chapters in books and 17 category four articles (DE recognized) in 2005. This attests to the enormous dedication and passion of every member of the academic staff toward carrying out research. BPI staff have been active in both undergraduate and postgraduate teaching, and during 2006, of the ten MSc students registered two graduated, and of eight PhD students four graduated.

In line with the recommendations of the review of the School of Geosciences undertaken in 2003, Bruce Rubidge and Trefor Jenkins again put in a proposal to the Department of Science and Technology (DST) to support the more than R3 000 000 required to maintain the collections and the excavation and preparation of fossil on an annual basis for both the BPI and IHE. In response to this application the DST allocated R 2 000 000.00 towards the maintenance of our collections as a National Facility during 2006.

The DST launched its African Origins Programme by advertising grants at three different levels. The BPI was awarded one of the major grants of R 1 960 000 over a three year period (2008-2010) for a research proposal which incorporates researchers from the BPI, Albany Museum, South African Museum, National Museum and Council for Geosciences

Fundraising and planning for the new Palaeontology Centre (incorporating the BPI Palaeontology and the IHE) has continued with Mr Francis Gerard as project manager. This new facility will house palaeontological and palaeoanthropological research and museum facilities. We aim to raise R65 000 000, and so far R20 000 000 has been raised

During the reporting period volume 42 of *Palaeontologia Africana* was compiled under an editorial panel led by Marion Bamford (Editor) with Lucinda Backwell, Bruce Rubidge and Adam Yates as Associate Editors. This journal continues to enjoy a good reputation and a steady number of papers relating to the palaeontology of Africa are being submitted by authors

from many countries outside South Africa. I am grateful to Professor Bamford for the many hours of dedicated hours she and her editorial team unselfishly put toward the production of this journal..

Professor Marion Bamford inducted as a Fellow of the Royal Society of SA in August and was awarded the School of Geosciences award for Service excellence for 2007. During 2007 the semester award for fossil preparation was awarded to Charlton Dube for the first semester and Hosea Nemavhundi for the second. In the second part of the year Bruce Rubidge took 3 months of his long overdue sabbatical in order to finish off some long overdue research projects.

The research activities of the BPI have again been generously supported to the value of R757 000 by PAST. The diverse and productive research programme of the Institute would not have been possible without the financial assistance of this remarkable Trust and I wish to record my gratitude for their support.

This report details the varied research activities undertaken by the BPI during 2006, but by its nature such a report does not highlight the very great role that the technical staff of the Institute have played during the year. Without the dedicated work of our technicians Rhod Macrae-Samuel, Charlton Dube, Joseph Sithole, Pepson Makunela, Gladys Ndlovu, Samuel Tshabalala, Sifelani Jirah and Hosea Nemavhundi research and maintenance of the collections would not be possible. Ms Constance Tshavhumbwe took maternity leave from October, and we are grateful to Mrs Jill Mainwaring for the extremely diligent and dedicated way in which she has taken over during the absence of Ms Tshavhumbwe. When compiling an annual report one becomes aware of how much has been achieved over the past twelve month period. This has been possible only because of the enormous dedication of all the staff of the Institute which never ceases to amaze me. I am indebted to them all for their loyal support and hard work.

Bruce Rubidge
DIRECTOR