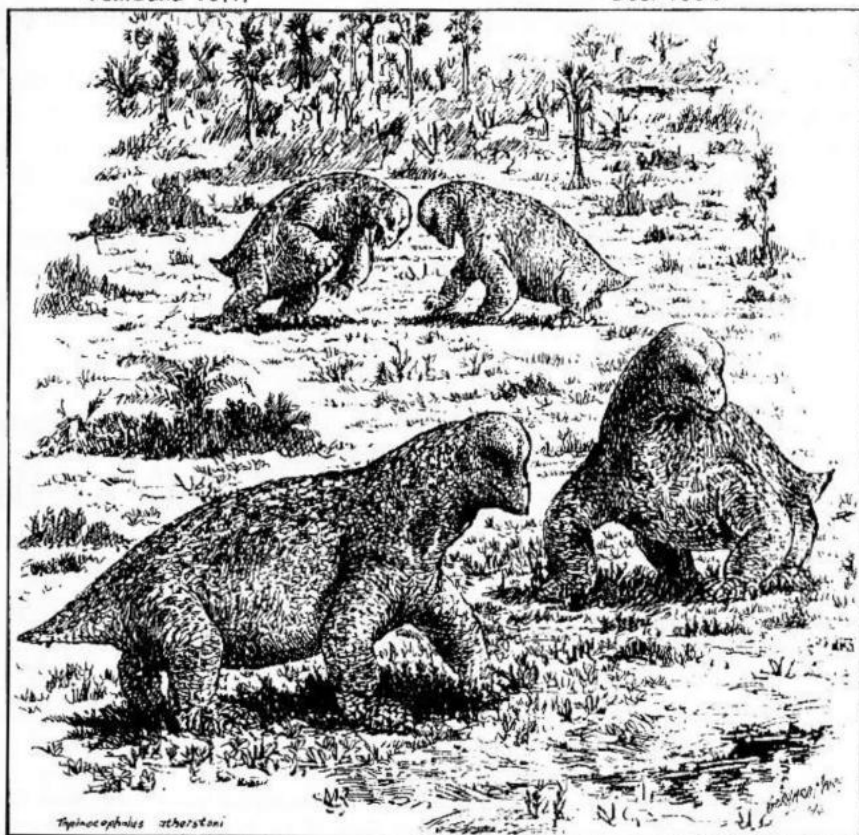


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NEWS  
**PAL** NUUS

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Part of a panel depicting the reconstruction of the *Tapinocephalus* Assemblage Zone (see p.26).

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Editor:	Dr Billy de Klerk	(Tel. 0461 - 22312 Fax 22398)
	Albany Museum	(email - amwd@hippo.ru.ac.za)
	Somerset Street	
	GRAHAMSTOWN, 6140	

### Front Cover:

Part of a painting in the Albany Museum's new palaeontology gallery depicting the *Tapinocephalus* Assemblage Zone of the Karoo Supergroup (a small group of *Tapinocephalus atherstoni*).

## EDITORIAL

Greetings to all with a palaeontological bias!

Well, the 8th Biennial Conference of our Palaeontology Society is an event of the past and its back to the grindstone until we again meet in Stellenbosch in 1996. By all accounts the PSSA'94 conference was quite a success and I would like to thank those members who made the effort to travel to the far flung outback of the Eastern Cape for the event. The unconfirmed minutes of the Biennial General Meeting of the PSSA which was held in Grahamstown in September will hopefully be included in the June 1995 issue of Pal News at which time I would also like to send out the updated PSSA membership directory.

I would like to appeal to those members whose circumstances have changed to please inform me of any change of title, address, telephone number, research interest or acquisition of an Email address before the deadline for the next issue of Pal News (20 June 1995) so that I can include it into the new directory.

Wishing you all a happy and peaceful Christmas and a New Year that is prosperous, productive and full of promise.

*Ed.*

## FRANK AND ERNEST

STAY AWAY FROM THOSE ERECT  
HOMINID GUYS--THEIR LOWER BACK  
PAIN MAKES THEM MEAN!



## PSSA - KEEPING OUR EYES OPEN TO THE FUTURE

*Presidential Address presented by Dr Bruce Rubidge at the 8th Biennial Meeting of the PSSA at Rhodes University, Grahamstown on 5 September 1994.*

Mr Chairman, fellow palaeontologists,

Over the past few years South Africans have witnessed numerous changes in our country. Like the political developments there have also been great palaeontological advances. All South Africans have been forced to re-think old ideas, and generally this has been a most profitable exercise. Likewise it is also necessary for the PSSA to follow suite.

Obviously the changes in our country will have lasting effects for science as the restructuring zeal increases shrinkage of the financial base directed at tertiary education and basic research, and possibly in particular a science like palaeontology, which may be perceived as being largely esoteric. Obviously none of us here believe this, but it is essential to ensure that policy makers don't either. It is thus necessary for the PSSA to seriously look to the challenges of the future, and to get its act together that these issues can be timeously addressed. In order to do this it is useful also to reflect on the activities of the PSSA and its members over the past few years.

The Society was founded after a conference in 1977 at the BPI Palaeontology, and in 1978, largely through the efforts of Dr Jaques van Heerden, a committee was elected with Dr Bob Brain as the first president. The following year the first conference of the society was held in Bloemfontein and organised by Jaques van Heerden. This gathering attracted 25 delegates. One has only to look at the more than 60 names registered for the 8th biennial conference, to realise the growth of the PSSA.

The society was formed because of the need to have a unifying palaeontological organisation in South Africa which could take decisions regarding ethics, research and also aspects of palaeontological education. Now is the ideal time to reassess the position of the PSSA: and to make decisions about its future course and role.

Palaeontology in South Africa has a great deal going for it, but there are 2 points which stand out:

### **1. Rich fossil heritage:**

We are all aware of the tremendous fossil wealth of this country, right from the earliest procaryotes in the Barberton Mountainland, through the Ediacaran fauna from Namibia, Palaeozoic life from the Cape Sequence, Mesozoic reptiles from the Karoo, a sample of Cretaceous life in the Zululand and Algoa basins, Tertiary faunas from Langebaan, and then a very rich Quaternary fauna from the various cave deposits in the Transvaal, and even more recent fossil sites yielding fossil mammals and hominids around the country.

Apart from Jurassic Park, a great deal has happened in the South African palaeontological scene over the past few years and many exciting new discoveries have been made. Maybe this plethora of new discoveries is simply a function of more fieldwork being done and points to the great, as yet unexploited, wealth of fossils in this country.

### **2. Dedicated and internationally famous palaeontologists - both professional and amateur:**

We all have our lists of South African palaeontologists who have made very great contributions to our knowledge in South Africa. Household names to all of us are people such as Dart, Crompton, Brain, Kitching, Tobias, Boonstra, Houghton, Cooke, van Hoepen and others. Many famous overseas names have also spent time in South Africa, DMS Watson, ER Parrington, F von Huene, F Broili & J Schroder, and AS Romer to mention but a few. Then there are also numerous amateurs without whose influence South African palaeontology would certainly not be as advanced as it is today. People such as AG Bain, T Bain, WG Atherstone, RN Rubidge, AW Putterill, J. H Waits, W van der Byl, Goggo Brown, Roy Oosthuizen, Sidney Rubidge and Croonie Kitching.

South Africa obviously has the primary resources to be an international leader in palaeontology. There are several factors which stand in the way:

1. **Lack of positions for palaeontologists**
2. **Dwindling financial resources**
3. **Ill-informed public**

Two previous presidents of the PSSA pointed out that the public are uninformed as regards evolution, and that we should strive to right this aspect in the school syllabus. However it is our duty to inform the public of the wealth of fossils in South Africa. An informed public will bring more sympathy to our cause.

These are all very real problems as they affect each and every one of us sitting here, and they need to be addressed now. This meeting is the correct place to look into these issues and find solutions. The PSSA has placed itself as the professional representative body for palaeontology in Southern Africa and has an obligation to fulfil this role. One of the very great strengths of the PSSA is the present encouraging unity of spirit towards palaeontological research that exists amongst its members, an aspect which will assist in looking at our future role.

In his opening address at the previous palaeontological conference at the Bernard Price Institute (Palaeontology), Professor Friedel Sellschop, Deputy Vice Chancellor research of the University of the Witwatersrand, stressed the importance of supporting high quality research, and to ensure this quality it is essential to bring all research projects to fruition by publishing in well-refereed journals. It is necessary to give real reasons why investment in palaeontological research is indeed in the relevant interests of the peoples of this country. This is sound advice as it will bring about international collaboration and so ensure stability in our research efforts.

During the course of this year the issue of the future of palaeontology in South Africa was discussed with numerous palaeontologists around the country, and several important aspects arose:

Some people felt that the PSSA as a body should try to raise international funding for specific palaeontological research projects. Others quite rightly said this was not the right approach as the PSSA is a very diverse organisation, and suggested that individuals/or research groups seek their own funds.

Many palaeontologists are already involved in sponsorship from various quarters. However these initiatives which are listed here, need to be expanded by all of us.

**1. Funding from the private sector:**

This has been successfully done for palaeoanthropological research by Lee Berger and Philip Tobias.

**2. Collaboration with overseas researchers on field-based projects:**

Funding is becoming available from overseas governments for collaborative scientific projects involving both South African and overseas palaeontologists.

**3. Making use of amateurs for technical assistance - encourage people to pay to go on supervised fossil digs. This sort of strategy has been successfully employed in the USA and Australia.**

**4. Contract research projects.** This has managed to sustain several palaeontological posts at both museums and Universities.

The rich fossil record of southern Africa is a tremendous strength. Brain (1984) wrote "in international palaeontological circles, Southern Africa is specially renowned for its fossil record covering two critical evolutionary episodes: the transition from reptiles to mammals during Permo-Triassic times, and the emergence of man during the Plio-Pleistocene periods." The fact that so many evolutionary missing links have come from southern Africa means that no book on the evolution and development of life would be complete without specific mention of South African fossil finds and naturally the South Africans who discovered and researched them.

Discoveries from this country have caused a revolution in evolutionary thinking in the world. But how many South Africans know that. The only people who are aware of the importance of our fossils are ourselves and a few others - and we are all converted! We now need to make the South African public aware of this remarkable heritage that all (politicians and businessmen alike) will be prepared to support the very useful work being done on them. The key to valuing a thing is to understand it; the way to understand it, is to learn about it; to learn about it, you need to be taught. There are several ways in which this can be addressed:

### **1. Education**

Children right from primary school should be taught about our palaeontological heritage, and we must ensure that this gets into the syllabus. The time is ripe right now, in fact there has never before been a better time as educational authorities are looking into the restructuring of the syllabus. The deadline for this is 1997 - we need to act now and set up representation.

Universities and museums should participate actively in this process - displays could be designed to back up the syllabus, and perhaps even travelling palaeontological exhibits could be arranged.

## **2. Tourism**

The enthusiasm that the film "Jurassic Park" managed to spark last year indicated the great public interest in fossils, but have we scientists not tended to stifle that enthusiasm with laws and collecting permits, and wishing to keep our little discoveries to ourselves. Amateurs have made some of the most important discoveries in this country - most of them without permits. How much have we as individuals or an organisation gone out to inform the general public of our discoveries, and maybe enthuse them. Various museums in the country do take out groups (friends of the museums) on collecting excursions, and this has certainly done a great deal to increase public involvement. But this is not enough as it reaches only a few people.

Our country has tremendous tourist potential which is greatly underutilised, and it brings in great revenue. With our great fossil heritage, palaeontology must be part of this. Already this aspect of the hominid sites around Krugersdorp is being looked at to try and make Johannesburg a more friendly palace for overseas tourists. But equally so the Karoo with its fossil wealth could also become a great attraction.

Opening sites to the public could lead to their destruction, but there are many sites in the Karoo, and if one or 2 were opened to the public not for, exploitation, but for education they could be a source of revenue.

Obviously there are so few palaeontologists that it is not feasible for us to go around taking tourists to view fossil sites, but maybe the PSSA could provide expertise to guides and earn a percentage of the profits which could be made available for research or bursaries. There are local entrepreneurs who wish to get involved in this sort of business, they deserve our support.

## **3. Souvenirs**

Emanating from the tourist side, is obviously the aspect of souvenirs. Some people manage to sell little bottles of elephant dung to gullible tourists visiting Knysna. Acacia thorns are being sold with the label "Karoo pric" - and people buy them!



There are so many tiny bone fragments lying strewn about in the Karoo that no palaeontologist is ever going to look at - is it not possible to bottle these and market them through the PSSA. Norman 1993, pointed out that although it may be undesirable to put a monetary value on any aspect of our natural heritage, there are merits in doing so for fossils. On the other hand Michael Shishkin the Russian palaeontologist who visited South Africa earlier this year would disagree strongly after having type specimens stolen from his institute when Russians started feeling the economic pinch. (Shishkin pers comm)

The time is right now for the PSSA as a professional body to make decisions which will have lasting effect on the future of each of us, and the future of palaeontology in South Africa.

The PSSA must, as the ethical body of palaeontology in Southern Africa make decisions regarding research and professional ethics, funding, education, and collecting policy. The PSSA furthermore has an obligation to ensure that the decision makers of this country are well-informed. South Africa at this time is crying out for some unifying identity - nothing is more unifying than a common ancestor.

There are enormous possibilities, very few of which have been explored. If we do not look at them as a society, we can rest assured that somebody else will and make the decisions on our behalf, and the palaeontological community will lose out. Thank you.

*Bruce Rubidge*

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### News from the Transvaal Museum - Francis Thackeray

**Heidi Fourie** has been appointed as Collections Manager, and has settled in well. **Sharon Moss** has been appointed Associate Curator, and is currently working on a collection of fauna from "Kromdraai A". Excavations at Kromdraai are proceeding well, with assistance from **Colin Menter** and **Lee Berger** (Wits). We greatly appreciate financial support from PAST (the Paleo - anthropological Scientific Trust) and from Harvard University. A group from Harvard is expected in June and July 1995. We intend to continue excavations at KA and KB, with the objective of resolving chronological problems as well as trying to quantify palaeo-environmental variability within both sequences.

**Ginny Watson** has completed her work on *Oreotragus* (with **Ina Plug**), and will continue her work on equids from Wonderwerk.

**Francis Thackeray's** interests in hominid taxonomy have been stimulated by **Susman's** recent work on hominid hand-bones from Swartkrans, and by **Andy Sillen's** work on strontium-calcium ratios in hominid specimens from the same site.

**Ira Grieff** is manufacturing good quality casts of hominid fossils, which are in demand.

We have support from the Ministry of Arts, Culture, Science and Technology for the proposal to promote an awareness of palaeontology through casts and pamphlets. The same proposal has been submitted to the Department of Education, together with ideas put forward by **Eddie van Dyk**. We look forward to a reply from that Department, since there clearly is a need to promote an awareness of palaeontology at school level.

*Francis Thackeray.*



Primitive spelling does

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## **PROPOSAL FOR ACCESS TO A NEUTRON LINE AT SAFARI-1 REACTOR (AEC) FOR BASIC SCIENTIFIC RESEARCH**

We would like to make a strong recommendation that a neutron line at SAFARI-1 (at Pelindaba) be made available for basic non-destructive scientific research. This implies the use of a neutron diffraction beam line, the neutron radiography facility, as well as neutron activation analysis. The neutron lines are available at cost to external users. These costs are prohibitive for the broader scientific community which includes universities and state sponsored institutions.

The proposal has as its aim the design of mechanisms to permit the use of this facility by the above-mentioned community, either through sponsorship or by means of some special arrangement with the AEC. The value of the SAFARI facility also includes its possible use as a strategic centre for advanced training of students, as well as for the general promotion of technology as an integral part of the government's RDP program. The above-mentioned neutron scattering techniques are inherently non-destructive, and their application to the structural studies of specimens such as irreplaceable hominid fossils, is extremely valuable.

Other neutron scattering centres in the world are almost exclusively funded by their respective governmental agencies. We believe that it is essential that a well co-ordinated policy be structured to contribute not only to the future existence of the SAFARI reactor, but also to ensure its utilization by the people for the people of this country.

This proposal was drafted in the course of discussion among interested parties associated with the proposal, and after preliminary consultation with Dr Faan le Roux, Marketing Manager for Technology Development at the AEC. It is to be used as a starting document for discussions between the two main parties involved, namely AEC and FRD.

Dr Gert Kruger, Rand Afrikaans University

Dr Francis Thackeray, Transvaal Museum

Dr J de Villiers, Mintek

Prof. S de Waal, Geology Department, University of Pretoria

Dr D Buhman, Council for Geosciences

Dr Bruce Rubidge, Bernard Price Institute, Wits

Dr W.P. Grotepass, Medunsa

*Any PSSA member who is interested in supporting this proposal, and who would like to perhaps use the facilities at the SAFARI reactor for palaeontological research, can write to Dr Francis Thackeray, Transvaal Museum, PO Box 413, Pretoria 0001.*

**News from Anusuya Chinsamy - South African Museum, Cape Town.**

I'm back! After two years in the United States, I am quite thrilled to be back home. Honest! I had a wonderful time in the States. I learnt a lot, met many scientists, gained exposure in the scientific field and made many friends. I also had the opportunity of paying homage to some of the great dinosaur graveyards of North America such as Dinosaur National Monument, Dinosaur National Park, and Ghost Ranch. Dinosaur National Park, Drumheller, Canada, is incredible! Phil Currie of the Tyrell Museum, took me on a guided tour exploring the badlands. I had the good fortune of being there to witness the excavation of a beautifully preserved articulated *Albertosaurus*. I did some small scale excavations myself but was a bit disappointed that I did not find a dinosaur to rave about. I did however find a new plant locality in the park! The palaeobotanist in our team, Kirk Johnston, was thrilled with the find since although dinosaurs are just everywhere, plants are pretty scarce.

Just before returning to SA my husband and I had an exciting trip to the mid-west. Our visit to Dinosaur National Monument, Utah was a definite highlight. I had seen slides of this locality perhaps a hundred times, but still I was not prepared for the astounding scene. There it was ... a ..67 degree tilt of 55 feet high sandstone, just embedded with bones. More than 2000 bones were exposed. Mostly disarticulated single skeletal elements representing an assortment of dinosaurs - *Allosaurus*, *Diplodocus*, *Barosaurus*, *Stegosaurus*, etc. I also managed to squeeze in a visit to the little town called Dinosaur, where even the streets are named after dinosaurs.

Now, let me not create the impression of all play and no work! I did do lots of work. Luis Chiappe, Peter Dodson and I described the bone histology of *Patagopteryx* and enantiornithines which are the most primitive birds ever examined histologically. We found that contrary to the belief that early birds were physiologically like their modern descendants, their bone histology appears to be more closely allied to that of their theropod dinosaur ancestors. This suggests that birds evolved classic endothermy along their own evolutionary lines and did not inherit it from their theropod ancestors. This study was published in *Nature* (see below). As you can imagine these findings caused quite a stir and shook the old ideology of nonavian dinosaurs being endotherms because of their phylogenetic link to birds. From all accounts, it appears that at the recent (October) SVP meeting in Seattle, the vibrations are still being felt.

Besides these feathery dinosaurs, I have worked on growth series of several nonavian dinosaur taxa. Early next year my paper on the bone histology of *Dryosaurus lettowvorbecki*, an ornithomimid dinosaur from the Tendaguru Beds of Tanzania will be published in the Journal of Vertebrate Palaeontology. This dinosaur represents the first growth series of an ornithomimid to be studied histologically. The findings are very interesting since unlike any of the other growth series of dinosaurs examined, these do not show any evidence of growth rings. *Dryosaurus* appears to be a rapidly growing dinosaur that is capable of a high sustained rate of bone formation. This finding supports the idea that there is no single unique Dinosaurian physiology and that it is likely that there were physiological variations among the Dinosauria. For more details.... look out for the article in JVP. I have also begun detailed studies of growth series of *Pachyrhinosaurus*, *Coelophysis* and *Protoceratops*. I will shortly be commencing with a study of the bone histology for dinosaurs from Dinosaur Cove, Australia. These high latitude dinosaurs are regarded as strong candidates for endothermy .... the bones will tell!!

I could go on for a long time....but I will spare you. Except to say..... I am now working at the South African Museum. I have had a very warm welcome by Mike Cluver, Roger Smith and his team. I am very easily settling down to the comfort of an office with a great view!

Anusuya

achinsam@uctvax.uct.ac.za

#### Recent Publications:

Chinsamy, A., Chiappe, L., & Dodson, P. (1994) Growth rings in Mesozoic avian bones: Physiological implications for basal birds. *Nature* 368:196-197.

Chinsamy, A. (1994) Dinosaur Bone Histology: Implications and Inferences. In: G.D. Rosenberg, & D. Wolberg (eds.) The Dino Fest Proceedings Volume.

Chinsamy, A. (1993). Image analysis and the physiological implications of the vascularization of femora in Archosaurs. *Modern Geology* 19(1):101-108.

Chinsamy, A. & Rubidge, B (1993). Dicotylodont (Therapsida) bone histology: phylogenetic and physiological implications. *Palaeont. Afr.* 30:97-106.

Chinsamy A. (1993) Bone Histology and Growth trajectory of the prosauropod dinosaur *Massospondylus carinatus* Owen. *Modern Geology* 18:319-329.

In press

Chinsamy, A. Histological perspectives on growth in the birds *Struthio camelus* and *Sagittarius serpentarius*. In 3rd symposium of the Society of Avian Paleontology and Evolution, 1992. Courier Forschungsinstitut Senckenberg.

Chinsamy, A. Ontogenetic changes in the bone histology of the Late Jurassic Ornithomimid *Dryosaurus lettowvorbecki*. Journal of vertebrate Paleontology.

Chinsamy, A., Hanrahan, S. A., Neto, R. M. & M. Seeley. A skeletochronological assessment of age in *Angolosaurus skoogi*, a lizard living in a seasonal an environment. Journal of Herpetology.

Chinsamy, A. Dinosaur Bone Histology. McGraw-Hill Encyclopedia of Science and Technology.

Anusuya Chinsamy

oOo

**News from Arthur Cruickshank - Leicester, UK.**

Work on our plesiosaurs has come to a natural break for the moment...one MS on trying to re-classify the pliosaurs in the pipeline, subject to reviewers as always. For the moment I am busy with an Albian pterosaur of gigantic dimensions, from the Santana Formation of Brazil. Don't ever say that I stick to one group of fossils! Included is a list of recent publications on Sauropterygia - The Plesiosaur Project.

Arthur

Taylor, MA & Cruickshank, ARI. 1989. The skull of "*Plesiosaurus*" *megacephalus* (Stutch 1846): the Barrow Kipper. *Trans. of the Leicester Literary and Phil. Soc.* 83:20-24.

Martill, DM, Cruickshank, ARI & Taylor, MA. 1991. Dispersal via whale bone. *Nature*, 351:p.193.

Cruickshank, ARI, Small, PG & Taylor, MA. 1991. Dorsal nostrils and hydrodynamically driven underwater olfaction in plesiosaurs. *Nature* 352:62-64

Taylor, MA & Cruickshank, ARI. 1993a. A plesiosaur (Plesiosauria: Reptilia) from the Rhaetian of Linksfield, Elgin, Morayshire. *Scottish Jour. of Geol.* 29:191-196

Taylor, MA & Cruickshank, ARI. 1993b. The cranial anatomy and functional morphology of *Plesiosaurus brachyspondylus* from the Kimmeridgian of Westbury, Wiltshire. *Phil. Trans. of the Royal Soc. London.* B341:399-418

Taylor, MA, Norman, DB & Cruickshank, ARI. 1993. Remains of an ornithischian dinosaur in a pliosaur from the Kimmeridgian of England. *Palaeontology.* 36:357-360.

Cruickshank, ARI. 1994a. The cranial anatomy of the Liassic pliosaur *Rhomaleosaurus megacephalus* (Stutchbury) (Reptilia: Plesiosauria). *Phil. Trans. of the Royal Soc. London.* 343:247-260.

Cruickshank, ARI. 1994b. A Victorian whole mount technique: a lesson for our time. *Geological Curator.* 6:17-22

Cruickshank, ARI. 1994c. A juvenile plesiosaur (Plesiosauria: Reptilia) from the Lower Lias (Hettangian: Lower Jurassic) of Lyme Regis, England: a pliosaur - plesiosaur intermediate? *Zoo. Jour. of the Linn. Soc. of London.* 112:1-28.

Brown, DS & Cruickshank, ARI. 1994. The Skull of *Cryptoclidus* (Reptilia: Plesiosauria). *Palaeontology.* 37: (in press).

Cruickshank, ARI. 1994 (submitted a). A revision of the cranial anatomy of *Rhomaleosaurus thorntoni* Andrews, 1992. *Bull. of the Brit. Museum (Nat. Hist.)*

Cruickshank, ARI. 1994 (submitted b). A Lower Cretaceous pliosauroid from South Africa. *Annals of the South African Museum.*

Arthur informs me that he is now "surfing through cyber space" and his Email address is - aric1@leicester.ac.uk Ed.

## DNA FROM DINOSAURS?

Bits of ancient genes turn up in some very old bones

Anyone who thought Jurassic Park was farfetched should talk to molecular biologist Scott Woodward. In last week's Science, Woodward announced that he had isolated DNA from an ancient creature that he was 90% sure was a dinosaur. If enough of it were collected, such a sample could, in theory, be cloned into a living specimen - just like in the movies. Woodward, an associate professor at Brigham Young University, extracted the DNA from two bone fragments found in a Utah coal mine, where they had been protected by muck and never fossilized.

So does this mean that a dinosaur assembly plant is on the way? Don't hold your breath. The sections of DNA that Woodward collected are much too short for any practical use. The full complement of genes needed to create an organism contains billions of nucleic acid pairs. Woodward found 174 pairs, too few to be certain what animal they came from. "The pieces are so short that you can't say they are like one thing or another," says Ward Wheeler, a molecular biologist at the American Museum of Natural History. "It could be a turtle or a mammal or whatever." Some researchers even suggest that the DNA Woodward extracted could have come from bacteria that feasted on the decaying carcass millions of years ago.

By Christine Gorman. Reported by Andrea Dorfman/New York  
TIME 28 November 1994. Volume 144, No. 22.

Cape Times, Saturday, November 5 1994



**JURASSIC FIRST**... The embryo in this egg, laid 80 million years ago, is the first ever found of a meat-eating dinosaur. Picture: AP

## Dinosaur embryo found

LONDON. — The first discovery of a meat-eating dinosaur's embryo was announced yesterday by a team of scientists from the American Museum of Natural History and the Mongolian Academy of Sciences.

The exquisitely-preserved specimen is one of only half a dozen or so dinosaur embryos known to science.

The report on it in the journal Science reveals a remarkable case of mistaken identity.

When dinosaur eggs were first discovered at the site in 1923 they were thought to be those of a small plant-eating dinosaur once abundant there.

The identification of the embryo were of a meat-eating species.

The embryo is about 80 million years old, found at Ukhaa Tolgod, Mongolia.

The new embryo is probably a rare grew to be about two metres long a looked similar to a small ostrich with Mark Norell, associate curator at Museum of Natural History and the the embryo.

The embryo was found in its original position within the egg, curled up with its head



# Researchers find bones of new species of dinosaurs

By PAUL RECER  
AP Science Writer

WASHINGTON — Bones from two new species of dinosaurs — a fleet-footed hunter and a long-necked grazer — have been found in Africa. They lived 130 million years ago in a lush, tropical paradise that is now the Sahara desert.

The new hunter dinosaur, about 27 feet long, was named *Afrovenator abakensis*, or "African hunter from In Abaka," referring to the area of Niger where the bones were found.

The second newly discovered African species was a 60-foot-long plant-eater that is still unnamed. It was a sauropod — akin to the brontosaurus — with a long neck and tail and a massive body. It was so big that its thigh bone was six feet long.

Paul C. Sereno, leader of a University of Chicago team, said the dinosaur species were the first found in Africa that date from the Cretaceous, the second half of the age of dinosaurs. The newly found species are similar to animals that lived during an earlier time in North America and Asia, he said.

"All of these types of dinosaurs went extinct in the north, but they survived (much longer) in Africa," said Sereno.

A report by Sereno and his colleagues on studies of the new dinosaurs will be published today in the journal *Science*.

Sereno said *Afrovenator* was a type of predator known as an allosaurus. It was smaller than *Tyrannosaurus Rex*, the killer king that lived during a later era in the

**"All of these types of dinosaurs went extinct in the north, but they survived (much longer) in Africa."**

**Paul C. Sereno  
researcher**

American West, but was bigger than the *Velociraptor* that was featured in the film "Jurassic Park."

"*Afrovenator* ran on two back legs and had very strong forelimbs with sickle-shaped claws," said Sereno. "The whole skeleton is more slender and has a lighter weight and a faster-running ability than allosaurus. It seems to have been designed to kill live prey."

And yet, the much smaller *Afrovenator* was apparently such a fearsome hunter that it preyed on the far bigger sauropod.

"At every place we found the sauropod we did find traces, such as teeth, of the theropod," said Sereno. "It is very likely that they were prey and predator."

But it apparently was not an easy task for the *Afrovenator*. The size difference would be comparable to a collie attacking an elephant.

"Any animal that is 60 feet is difficult to bring down," said Sereno.

The animals lived together in what may have been a prehistoric Eden, Sereno said the area was once in a perpetual summer. There was plentiful rainfall and lush forests. Rivers and lakes were filled with fish and, even then, there were crocodiles.

Now, that same area is the Sahara desert, isolated from the rest of the world with one of the most forbidding climates on Earth.

Experts said the Africa discoveries add new understanding about the worldwide distribution of dinosaurs.

"These are good, fine skeletons from brand new dinosaurs and they suggest a diversity from that area that we didn't know about before," Lou Jacobs, a Southern Methodist University paleontologist said in a statement to *Science*. "Finally, we've got some pieces of the puzzle coming in."

During the dinosaur era, the landmasses that eventually aligned themselves into continents were just beginning to drift apart. Africa, India, Antarctica and Australia were all joined together. North America was split in half, with the western part joined at the Bering Strait with Asia.

Sereno said the similarity between the African dinosaurs he

found and those discovered in North America and Asia suggest a land bridge connected the continents for at least part of the Cretaceous era.

*Science*, which published the study, is the journal of the American Association for the Advancement of Science.

## Find upsets theory

Indicates they  
its knees. It is largely complete and was close  
hatching when it died.

ers old and was  
Half of the egg containing the embryo has been  
eroded away, revealing the skeleton inside.

When the egg was whole it would have been about  
15cm long.

"The discovery of a dinosaur embryo is particularly  
exciting because it allows us to examine  
array of questions that scientists are usually  
able to explore," said Dr Norell.

"The embryo allows insight into issues of dinosaur  
behaviour." — The Telegraph plc

# Paleontology

Science News

196(4):63

July 1994

## Hot under the collar over dinosaurs

Two researchers have added a hot new twist to the simmering debate over dinosaur physiology. By analyzing oxygen stored within the bones of a *Tyrannosaurus rex* skeleton, they have found evidence suggesting that the king of all carnivores had a warm-blooded metabolism more like that of mammals than that of reptiles.

Their study, however, has received a cool reception from researchers who question the validity of applying this innovative technique to fossil samples.

Reese E. Barrick and William J. Showers of North Carolina State University in Raleigh studied an exceptionally well-preserved *T. rex* skeleton from the late Cretaceous, a period that ended 65 million years ago. To gauge the body temperature of the animal during its life, they measured the ratio of two oxygen isotopes in bones from several different parts of the body. A high ratio of oxygen-18 to oxygen-16 indicates that the bones developed at relatively cool temperatures.

Barrick and Showers contend that isotopic tests can tell warm-blooded from cold-blooded metabolisms. Because of their high metabolisms, mammals and other endotherms show little temperature variation throughout the year, the researchers suggest. They also surmise that endotherms keep their extremities at almost the same temperature as their body core.

Given that supposed pattern, the isotopic signature of *T. rex* bones suggests that the animal was endothermic. The dinosaur's limbs and tail averaged only 2°C cooler than its core, and its overall body temperature varied less than 4°C for different times in its life, they report in the July 8 *Science*.

But physiologist John Ruben of Oregon State University in Corvallis argues that Barrick and Showers have jumped to conclusions without studying enough about modern endotherms. Mammals, says Ruben, sometimes keep their limbs much cooler than their bodies.

Other investigators also question the study. Among the skeptics is Yehoshua Kolodny of the Hebrew University of Jerusalem, who applied the oxygen isotope technique to the study of fossils. At an international meeting last year in Oxford, England, Kolodny reported that his experiments with fossil dinosaurs, fish, mammals, and aquatic reptiles revealed that the fossilization process altered the oxygen isotope ratios, wiping out the original information.

Anusuya Chinsamy of the University of Pennsylvania in Philadelphia contends that Barrick and Showers should have tested whether the isotopic technique can discern a difference between fossil mammals and reptiles before reporting the *T. rex* data. "They haven't done the basic research yet," she says.

Chinsamy has other reasons to doubt the findings. In her own preliminary studies of *T. rex* bone, she has found growth rings, a characteristic of ectothermic animals (*SN*: 5/14/94, p.312). "The growth rings indicate that these animals were not endothermic," she says.

## *T. rex* discovered in Canada

Three years after a local principal brought them pieces of a *Tyrannosaurus rex*, paleontologists with the Royal Saskatchewan Museum in Regina finally found time to check out the lead. What they uncovered ranks among the rarest of all fossil discoveries: a well-preserved *T. rex* skeleton.

"This would be only the 12th decent *T. rex* skeleton," says curator John Storer, who is working with assistant curator Tim Tokaryk to unearth the fossil. So far, they have found major parts of the skull, the lower jaw, parts of the hip, various vertebrae, the femur, and elements of the front leg. "I'm quite confident that what we have is a nearly complete *T. rex*," says Storer.

## THE GREEKS HAD A WORD FOR IT...

With worldwide earnings of more than \$450 million just two months after its release, *Jurassic Park* could challenge 1982's *E.T. The Extra-Terrestrial* (more than \$700 million) as the top-grossing movie of all time. The film celebrates the worldwide fascination with dinosaurs, a word coined by English anatomist Richard Owen in 1841 from the Greek *deinos* ("terrible") and *sauros* ("lizard"). Below, a brief survey of the word on kids' lips around the globe:

dinosaur  
Afrikaans

دایناسور

Arabic

恐龍

Chinese

dinosauro  
French

Dinosaurier  
German

δεινόσαυρος  
Greek

ไดโนเสาร์

Hebrew

dinasorus  
Indonesian

dineasár  
Irish

dinosauro  
Italian

恐竜  
Japanese

ឈ្មួញ

Khmer

none\*  
Kikuyu

raksasa  
Malay

dinozaur  
Polish

dinossauo  
Portuguese

ДИНОЗАВР  
Russian

dinosaur  
Spanish

ไดโนเสาร์

Thai  
khung long  
Vietnamese

igongqongqo  
Xhosa

inunu  
Zulu

\*"How can we have a word," asked one Kikuyu, "for something we didn't know existed?"

**News from Eric Anderson - JLB Smith Inst. of Ichthyology, Grahamstown.**  
Since the departure of Norton Hiller and my two month absence after PSSA'94, work on the Grahamstown fossil fishes has temporarily slowed. John Long is safely back in Australia and publications on the fishes with all of us as authors will slowly appear, the first on the placoderms. Meanwhile, PSSA'94 best poster winner, Mr. Robert Gess, is working on the plants and is publishing a catalogue of all our material with Norton Hiller. Rob will be doing his honours during 1995 at Rhodes. Our joint paper (my presentation at PSSA'94) has just come out (Africa's first Bothriolepis-associated fish fauna; *South Afr. Jour. Sci.* 90:397-403).

As an addendum, after PSSA'94, Dr John Long visited Port Elizabeth, Cape Town area, and Johannesburg, making new friends, scientific contacts, and generally enjoying SA hospitality. Below, I paraphrase from his report to FRD about his visit after the conference:

"After the conference was over, Dr Long visited the Port Elizabeth Museum and discussed research on Australian dinosaurs with the Director, Dr. Mike Raath, and then went on to Cape Town to spend a few days working on the collections in the South African Museum. During this time Dr. Long discovered much new material of Devonian fishes from the Barrydale area that had not been studied, and possible plans for a future visit to develop the site were discussed with Drs. Roger Smith and Herbert Klinger of the SA Museum." Research plans were discussed with Drs. John Almond and Johannes Theron (Geological Survey) and Mnr. Johan Loock (Univ. OFS). "A short visit to the Zoology Dept. of the University of Stellenbosch enabled Dr. Long to discuss mammal-like reptile evolution with Dr. Jurie van den Heever, and look at student projects in progress." During the meetings Dr. Long discussed the matter of future work on Karoo fish fossils with Dr. Bruce Rubidge, and agreed to take on the role of supervisor of Mr. Patrick Bender, who is going to begin a doctoral dissertation studying the fishes of the Karoo Basin (Permian & Triassic). "Finally, on his last day in South Africa, Dr. Long briefly visited the University of the Witwatersrand's Medical School and was shown some of the new hominid discoveries by Dr. Lee Berger, with whom he discussed the possibility of future talks in Australia on South African hominid finds."

ihma@hippo.ru.ac.za Tel: (0461) 27124 **Eric Anderson**

oOo

### **News from Wits BPI Palaeontology - Marion Bamford**

The staff and students have been working away quietly since the PSSA conference. Sue de Villiers, Heidi Fourie, Grigor Aitken and John Hancox should all finish their PhD's "sometime next year" (1995). The same applies to Elizabeth Latimer and her MSc. Elizabeth is very excited about the complete *Rhinesuchus* cranium she has just received from Juri van der Heever. The Honours students have written their exams and vanished. We expect several new Honours students next year.

Carol Aston, even though she has relocated to Cape Town, is carrying on with her description of the cranium of *Hipposaurus*, as she has prepared a rather nice, newly discovered skull.

At the beginning of November Bruce Rubidge and Caiphus Hlatwayo, and the Bloemfontein team of Johann Welman, John Nyaphuli and Joel Mohoi spent ten days on the Ecca-Beaufort contact in the Williston-Carnarvon area. Outcrops were relatively good and they had a most fruitful time: eight most worthwhile fossils, some of them right on the Ecca-Beaufort contact, were collected. This compared well with their normal collecting average in the *Eodicynodon* Zone of one specimen per week! At the moment both the BPI and National Museum preparators are hard at work on the dicynodonts to determine whether they are indeed *Eodicynodon*. One of the other exciting discoveries is a biarmosuchid found by John Nyaphuli. Only time and preparation will tell exactly what it is!

John Hancox and Roger Smith are in Madagascar looking at Gondwana deposits. No doubt there will be interesting news from them in the next issue of Pal News!

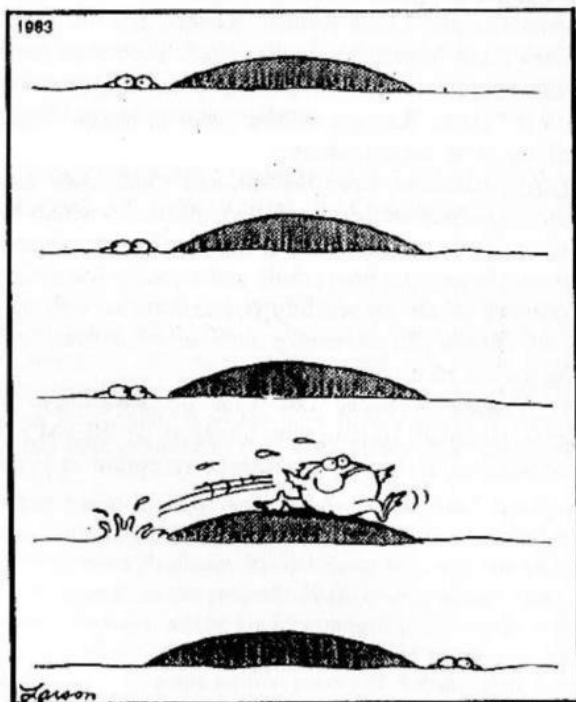
Another exciting happening has been the two week visit of a delegation of palaeontologists from the Palaeontological Institute, Beijing, China, consisting of Professors Wu Rukang, Li Chuankui, and Li Jinling. Li Jinling, thanks to a grant from the FRD, spent a longer time in South Africa in order to study Karoo amphibians and dinocephalians.

**Ann Cadman** has a new sponsor for her daily pollen count and so that research can continue and also the related allergenicity. She is also doing some contract work for fossil pollen.

**Marion Bamford** is continuing with her fossil wood research and receiving wood from farther afield. A new and challenging task for her is the sorting out of the palaeobotany herbarium. There are more than 25 000 plant specimens, most of which have been catalogued, but they need sorting! The catalogue will eventually be computerised. **Luigi Zampieri** is helping with the plants and **Sue de Villiers** with the sorting and cataloguing of the pollen and slide collection.

*Marion Bamford*

oOo



Another great moment in evolution

**News from Roger Smith - South African Museum, Cape Town.**

Palaeontological extracts from Roger Smith's diary:

July 26-31 Took 20 Friends of the museum to Graaff Reinet. Found the biggest *Cistecephalus* skull that I've ever seen on Steilkranz in the Nieu Bethesda district. Visited Wellwood, many thanks to the Rubidges for their hospitality.

Aug 6 Paul October, Annelise Crean and I attended opening of fossil trail for blind in Karoo National Park. "Jezebel" the controversial *Bradysaurus* looked splendid in her new glass case.

Aug 14-28 A week on a riverboat with Prof "Sakkie" Rust looking at Amazon River floodplain deposits followed by the IAS Sedimentology Congress in Recife. Gave talk on Beaufort trace fossils in ichnology symposium. One magical evening on Ipanema beach.

Sept 4-10 PSSA conference Grahamstown with trip to Devonian fish fossil site. Good food, good talks, good company. Pity about John Long's Australian jokes.

Oct. 20-22 Annelise and I took Ryuichi Kaneko and his party to the Fraserburg district to show them "therapsids in the rock". They took hundreds of photos for a Japanese dinosaur magazine. Gave an early morning opening address on fossils of the Karoo at "Game Rangers Indaba" held in Karoo National Park. Learned the basics of Japanese tea ceremony.

Nov 16 - Dec 4 Annelise, John Hancox and I collected numerous *Hovasaurus* fossils, (including complete adult and juvenile skulls which have not been found before) from the Lower Sakamena Formation of southwestern Madagascar. Also recovered some dicynodont post crania and a toothy lower jaw- very interesting. John was relieved of all his worldly possessions as well as passport, visa and ticket. A real third-world adventure more about it next time. Annie won't be volunteering for the next trip.

Dec 5 My PALAIOS paper last year on ichnology of Lower Beaufort palaeosurfaces awarded Honourable Mention by SEPM's Outstanding Paper Selection Committee. Invited to President's reception in Houston next year.

*Roger Smith*

oOo

## GONDOLIN AND THE MACKENZIE CAVE

*Gondolin, situated near Broederstroom, has yielded a remarkably well preserved faunal assemblage that is considered to be in the order of 2 million years old (Watson, 1993). Calcified deposits with rich concentrations of ungulate bone from part of a large cave complex were excavated by Elizabeth Vrba and David Panagos in 1979. Blocks of breccia of manageable size were transported to the Transvaal Museum, where fossils were prepared in acid under the supervision of David Panagos. The rockface from which the faunal assemblage was derived has been referred to as "Gondolin", being the name of the property then owned by Mr and Mrs Michael O'Dowd. However, the overall complex had previously been referred to as the "MacKenzie Cave" after Ken MacKenzie who had discovered the site in 1977. He had recognised the palaeontological importance of the site, and had brought it to the attention of professional palaeontologists.*

*For purposes of recording the history of events prior to excavations undertaken by Elizabeth Vrba and David Panagos, Ken MacKenzie has written an account which is presented here in summary form.*

*Francis Thackeray*

## HISTORY OF EVENTS LEADING TO PALAEOLOGICAL EXCAVATIONS AT GONDOLIN, ALIAS "MACKENZIE CAVE".

**Ken MacKenzie**

In mid-1977, while riding on horseback in the Broederstroom area, near Hartebeestpoort dam about 40km west of Pretoria, I came across a large cave complex which had been mined for lime more than 50 years ago. There is at least one well-preserved kiln, and an extensive dump of fossiliferous breccia that had been discarded by lime-miners during their exploration for pure lime. Clearly a very large volume of calcified deposits had been removed by the miners prior to the collapse of the lime-mining industry in the 1940's.

Soon after I had found the site, news of the cave spread rapidly within the local population. It was visited by many "Sunday trippers". As a resident of Broederstroom myself, I happened to meet Professor Revil Mason who was working on an extensive Early Iron Age site situated on the property of the Leiden Observatory. I informed him about the fossiliferous deposits, and he kindly arranged that a breccia sample be examined at the Department of Geology at the University of the Witwatersrand. I was informed that the material could be more than one million years old. Subsequently I met a professional palaeontologist at the Bernard Price Institute.



Months passed and I was told that local school children had been visiting the site and one could see evidence of a number of fossils having been damaged. I consulted Professor Mason, who reported the matter to the National Monuments Council.

Shortly thereafter, Elizabeth Vrba invited me to meet her at the Transvaal Museum. I told her about the site in some detail, and she promised to look into the matter. After she had visited the site herself, we met again. She indicated that she wanted to excavate it, but in order to do so she needed to know the owner of the property. Unfortunately there was no one home on the site, or at the time in the surrounding area. My home was only two kilometres away from the cave complex, which was locally referred to as "The MacKenzie Cave".

In view of Elizabeth Vrba's need to locate the owner, I consulted the Surveyor General's office in Pretoria. I learnt that many of the properties in that area are strips about 100 metres and up to a kilometre long. The properties had been surveyed, but there were very few if any fences to demarcate boundaries. This made it particularly difficult to identify the owner of the property on which "The MacKenzie Cave" was situated.

Several months thereafter, I revisited the cave complex and met Mr and Mrs Michael O'Dowd on a path some 300 metres below the fossil locality. They said they owned the land "back up the hill". I asked if their land included the fossil deposits. They replied "What fossils?" I suggested they retrace their steps with me. I showed them the site, and asked if their name could be released to the Transvaal Museum. They agreed. I passed the information on the Elizabeth Vrba, and happily the project got under way.

Early in 1979, some 18 months after I had first found the fossiliferous deposits, Elizabeth invited me to be present when she and others at the Transvaal Museum were to begin excavations. As blocks of breccia were removed, there were many exciting moments. In one instance, Elizabeth identified a mandible as being that of a large pig. Although completely out of my depth, I nevertheless felt the excitement a four year old child must have felt on a Christmas morning.



The last time I met Dr Vrba was after she had telephoned me, suggesting that I call in at the Transvaal Museum because something exciting had been found. She did not want to talk to me about it on the telephone, but said that it might "interest" me. I got to the Museum almost before she had put the telephone down. She took me to the acid preparation laboratory, and with unconcealed pride said "Look, the tooth of a hominid, straight out of the breccia and you are one of the first people to know about it."

The hominid tooth has subsequently been recognised to be that of a modern *Homo sapiens*, certainly not a tooth from the breccia as once suggested. The explanation for this is not yet known, but Francis Thackeray and his colleagues are looking into the matter. The site of Gondolin, which has previously been referred to as part of the "MacKenzie Caves", has considerable potential as a site with an abundance of well-preserved Plio-Pleistocene faunal remains. As yet no hominid has been found in situ, but the site deserves further attention.

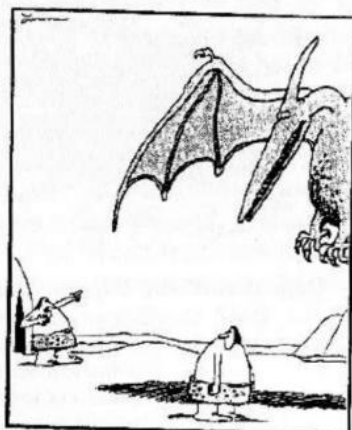
#### Reference

Watson, V. 1993. Glimpses from Gondolin: A faunal analysis of a fossil site near Broederstroom, Transvaal, South Africa. *Palaeontologia africana* 30:35-42.

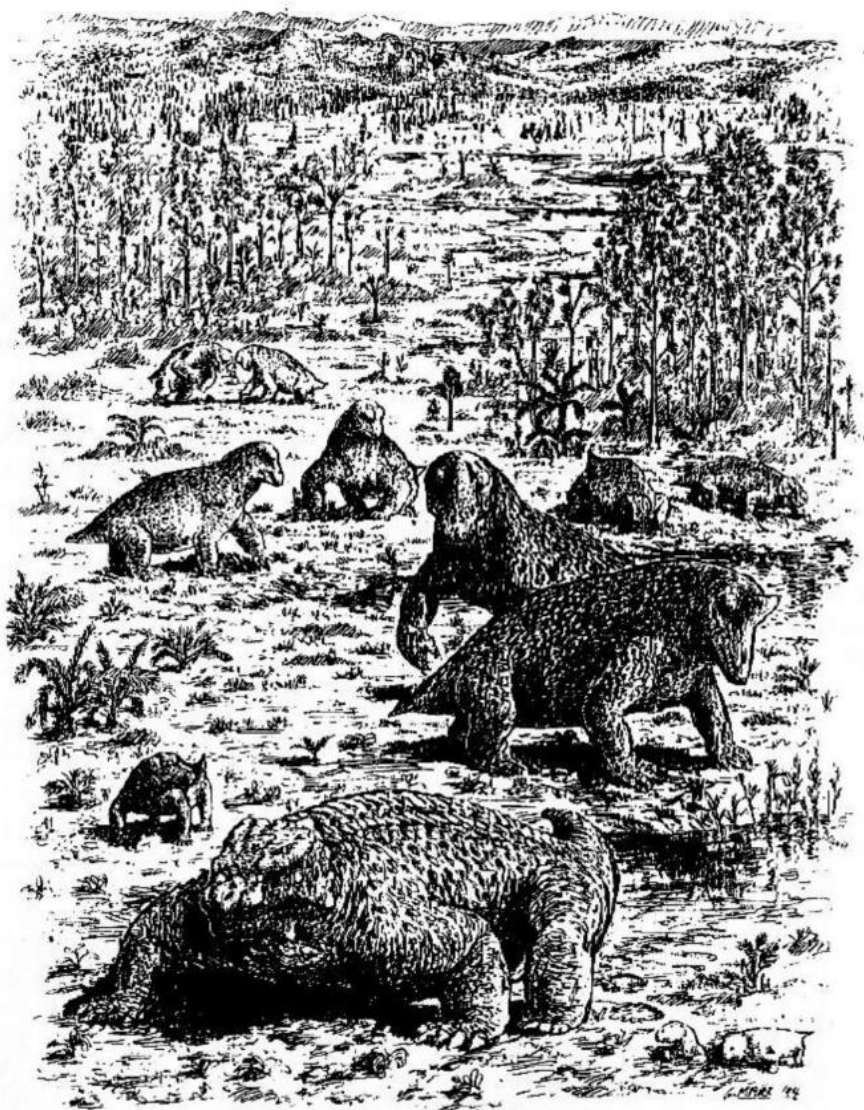
oOo



Practical jokes of the Paleolithic



"Look out, that's a ... a ... dang!  
Never can pronounce those things!"



Depiction of the *Tapinocephalus* Assemblage Zone (full size - 2.8 x 1.9m).

- Bradysaurus bairdii* - front & two at back right.
- Tapinocephalus atherstoni* - group of 4 at back left.
- Stethocephalus whalshii* - two at middle right.
- Lycosuchus vanderrieti* - small chap at left.
- Robertia broomiana* - two in right front corner.

### **News from Billy de Klerk - Albany Museum, Grahamstown.**

Those members of the society who attended the PSSA'94 conference in September would have seen the large empty gallery (22m x 9m) in our the Natural Sciences building that has been earmarked as the new Palaeontology hall. The palaeo theme of the displays in this gallery will be to depict the fossil heritage of the Eastern Cape. Apart from displaying real fossil material we intend to also include reconstructions and palaeoenvironmental illustration of certain areas through time. The Eastern Cape is rather fortunate to have a fossil record that spans a period from Devonian times through to the present with relatively few gaps. While "palaeo fervour" was still at a high after the PSSA conference we immediately started with the planning and scripting of this new gallery with the in-house team being made up of Wouter Holleman, Gerhard Marx, Ray Black, Janet Hall, Eric Anderson and myself. At this stage we are focusing our efforts on the north wall of the gallery (22m long). It is envisaged that the palaeontological record of the Karoo Supergroup will be displayed in this area using the various Formations and Assemblage Zones as a framework.

Part of the display will feature a series of large paintings (10 panels, each 2.8 x 1.9m) mounted along the wall with each depicting Karoo scenes through time. A sketch of the first of these panels is illustrated on the adjacent page and a more detailed part of the panel is shown on the front cover of this issue.

The monumental task of all this artwork has been eagerly tackled by our exhibition artist **Gerhard Marx** who considers this project one of the most demanding challenges that he has had in his artistic career. Gerhard has to-date not only devoted his talents to the fine arts but also to the more precise scientific illustrations of succulent plants and living reptiles. In recreating the animals, plants and landscapes Gerhard and I have tried to be as accurate as possible and have solicited comment from various specialists in different palaeo fields. As these panels are still being researched and sketched we would welcome any comments or suggestions for improvements in the reconstructions. In future edition of Pal News I plan to include similar illustrations as the work progresses.

*Billy de Klerk*

oOo

### Fossil Philately - Billy de Klerk

Listed below are some recent stamp issues with a fossil theme that have appeared over the past few months to the end of September 1994. The list is by no means complete.

### AUSTRALIA (1 Oct. 1993)

- 45c - *Leaellynasaura amicagraphica* (hypsilophodont)  
45c - *Ornithocheirus* (pterosaur)  
45c - *Allosaurus*  
45c - *Timimus hermani* (ornithomimosaur)  
75c - *Muttaborrasaurus langdoni* (iguanodont)  
\$1.05 - *Minmi paravertebrata* (ankylosaur)

BARBADOS Prehistoric Aquatic Creatures (28 Oct. 1993)

**All 90c stamps**

Plesiosaurus    Ichthyosauri    Elasmosaurus    Mosasaurus    Archelon

## NEW ZEALAND Dinosaurs (1 Oct. 1993)

- |                    |                              |
|--------------------|------------------------------|
| 45c - Sauropod     | 80c - Pterosaur in flight    |
| \$1 - Ankylosaur   | \$1.20 - Maiasaurus swimming |
| \$1.50 - Carnosaur |                              |

GUYANA Elephants of the world (1992)

All \$50

Mammoth (Oligocene) Stegodon (Mid Miocene) Mammoth (Pliocene)

**ASCENSION** Prehistoric aquatic reptiles (25 Jan 1994)

- 12p - Ichthyosaurus      20p - Metriorhynchus      25p - Mosasaurus  
30p - Elasmosaurus      65p - Pleiosaurus

### ROMANIA Prehistoric Creatures (30 July 1993)

- 29L - Brontosaurus      46L - Plesiosaurus      85L - Triceratops  
171L - Stegosaurus      216L - Tyrannosaurus      319L - Archaeopteryx

**MALDIVES** Dinosaurs (15 Sep. 1994)

50l - Stenonychosaurus      R1 - Parasaurolophus      R1.25 - Scelidosaurus  
R1.75 - Tyrannosaurus      R3.50 - Iguanodon      R5 - Monoclonius  
R10 - Euoplocephalus      R25 - Triceratops  
Miniature sheet:      R25 - Tyrannosaurus attacking Triceratops  
R25 - Brachiosaurus and Iguanodons

**GUYANA** Prehistoric Creatures (1993)

Three sheetlets, each containing 12 stamps (each stamp \$30). Total 36 stamps!

**Sheet A**

Archaeopteryx      Pteranodon      Quetzalcoatlus      Protoavis      Dicraosaurus  
Moschops      Lystrosaurus      Dimetrodon      Staurikosaurus      Cacops  
Diarthrognathus      Estemmenosuchus

**Sheet B**

Pteranodon      Cearadactylus      Euphymodon      Pterodactylus      Staurikosaurus  
Euoplocephalus      Tuojiangosaurus      Oviraptor      Protoceratops  
Panaoplosaurus      Psittacosaurus      Corythosaurus

**Sheet C**

Sordes      Quetzalcoatlus      Archaeopteryx      Rhamphorynchus      Spinosaurus  
Anchisaurus      Stegosaurus      Leaellynosaurus (sic)      Minmi  
Heterodontosaurus      Lesothosaurus      Deninonychus

**MONTSERRAT** Prehistoric Aquatic Creatures (6 May 1994)

\$1 - Elasmosaurus      \$1.15 - Plesiosaurus      \$1.50 - Nothosaurus  
\$3.45 - Mosasaurus

**ST KITTS** Prehistoric Aquatic Reptiles (18 Feb. 1994). All \$1.20

Mesosaurus      Placodus      Lipoleurodon      Hydrotherosaurus  
Caretta turtles

**TURKS & CAICOS ISLANDS** Dinosaurs (15 Nov. 1993)

15c - Coelophysis      35c - Dilophosaurus      50c - Pterodactylus  
65c - Elasmosaurus      \$2 - Dilophosaurus (miniature sheet).

oOo

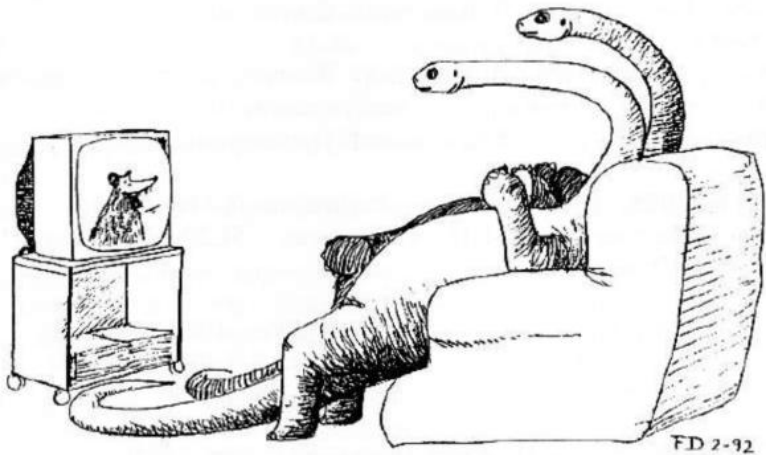
## CONFERENCE

### \* 9th PSSA Conference

Stellenbosch University, Western Cape - September 1996

Contact: Dr Jurie van den Heever, Dept. of Zoology, University of Stellenbosch, STELLENBOSCH 7600,  
Tel: (021) 808-3223/36 Fax: (021) 808-4336  
808-9111 Email: javdh@maties.sun.ac.za

ANTROPOMORF.



NOG 'N REDE HOEKOM DIE DINOSOURIËRS UITGESTERF HET



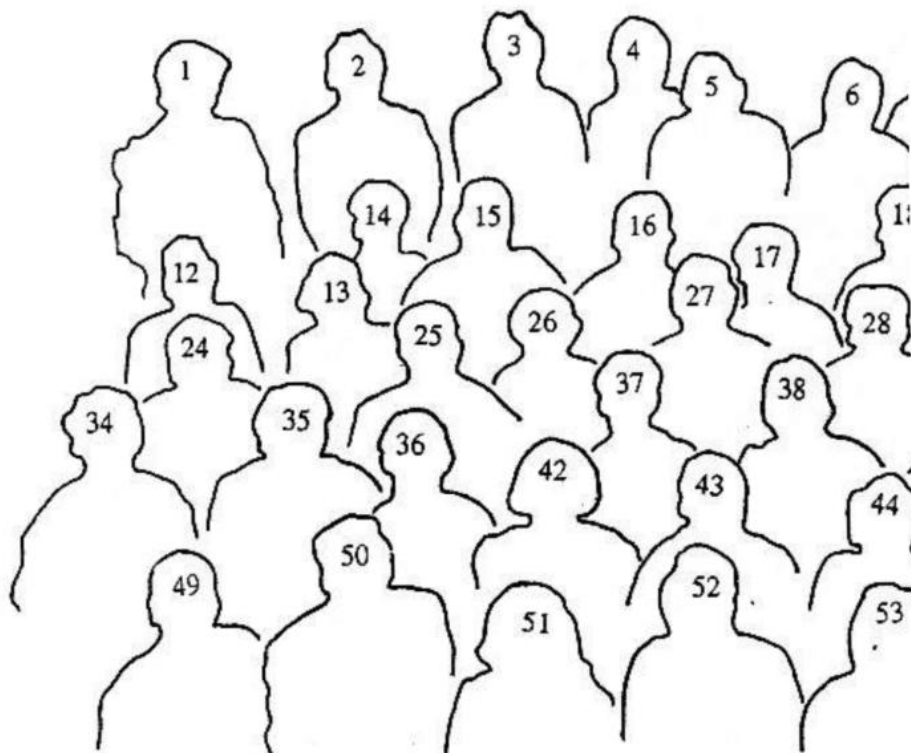
Great moments in evolution

**Reminder:** Deadline for contributions for the next issue of PAL News is  
**20 June 1995**





**PS**  
8th BIENNIA



1. Dr Kevin Kuykendall  
6. Dr Virginia Watson  
11. Ms Pippa Haarhoff  
16. Mr John Hancox  
21. Mr Alain Renaut  
26. Ms Heidi Fourie  
31. Dr Herbert Klinger  
36. Dr Bruce Rubidge  
41. Dr Eddie van Dijk  
46. Dr John Almond  
51. Dr Marion Bamford  
56. Dr Margaret Avery

2. Dr Jeff McKee  
7. Dr Gideon Rossouw  
12. Ms Sue Frost  
17. Mr Marius Loots  
22. Ms Michelle Saunders  
27. Dr Mike Raath  
32. Dr Francis Thackeray  
37. Mrs Lynn Meyer  
42. Ms Elizabeth Latimer  
47. Ms Linsey Firm  
52. Mrs Marina Rubidge

3. Dr Colin MacRae  
8. Mrs Laura Brain  
13. Mr Robert Gess  
18. Dr Lee Berger  
23. Dr Chris Gow  
28. Dr Jurie van den H  
33. Mr Johan Neveling  
38. Dr John Long  
43. Prof Barry Cox  
48. Ms Fiona Evans  
53. Dr Roger Smith

**Not Present:**

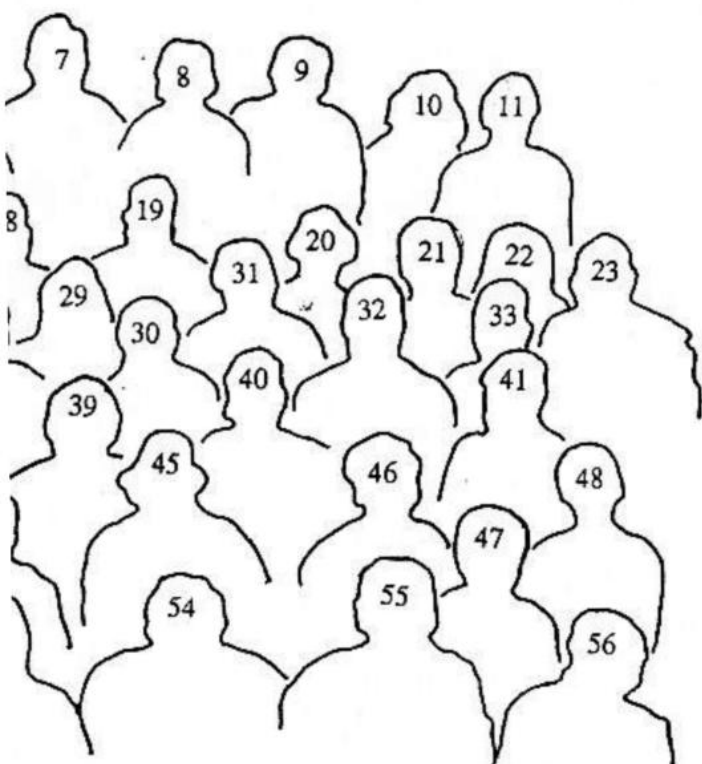
Dr Ann Cadman

Dr Janette Deacon

Mrs Betty Kitch

# SA'94

## L CONFERENCE



4. Mr Ludwig Döhne  
9. Dr Bob Brain  
14. Mr Charles Lockwood  
19. Mr Colin Menter  
24. Mr Johann Welman  
29. Dr Barbara Brauer  
34. Mr James Brink  
39. Dr Dave Roberts  
44. Dr Arthur Cruikshank  
49. Dr Norton Hiller  
54. Mr Johan Look

5. Prof James Kitching  
10. Ms Samantha Black  
15. Dr Francois Durand  
20. Dr Brigitte Senut  
25. Mr David Dilkes  
30. Dr Hannes Theron  
35. Prof Tom Mason  
40. Dr Barry Millstead  
45. Dr Eric Anderson  
50. Dr Billy de Klerk  
55. Mr Patrick Bender

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