# THE 2017 FOSSIL EXPEDITIONS

Tim Broderick

GSZ Summer Symposium
1st December, 2017

Photos: Lucy Broderick

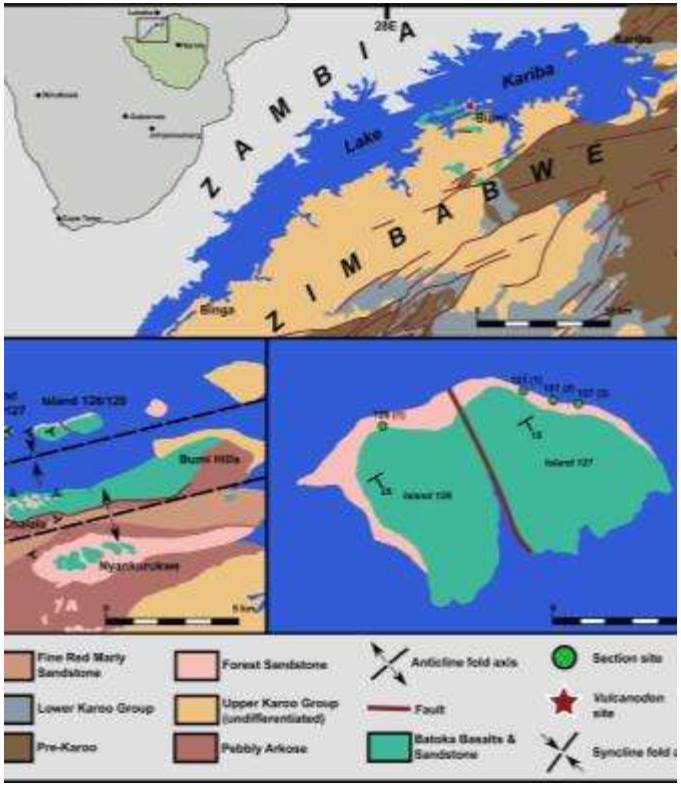
# FROM ARCHOSAURS TO DINOSAURS

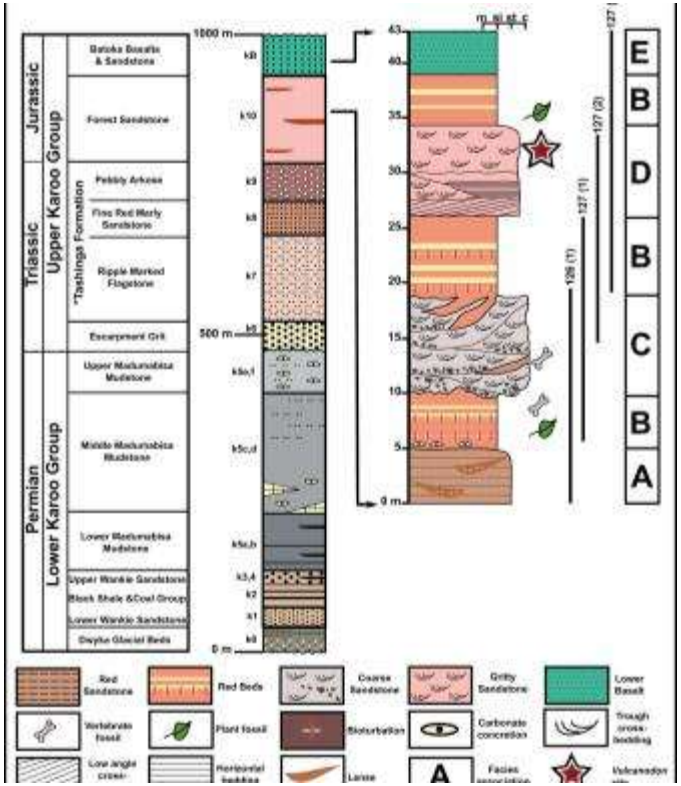
# The joint Evolutionary Studies Institute, Natural History Museum, Kensington and National Museums & Monuments' Expedition to Lake Kariba – January 2017

The timing sought to take advantage of the lowest lake level in recent history, which gave the maximum rock exposure along the shore. Hosted by Dave Glynn with mother ship *Musankwa* the objective was to explore the wave-cut scarp slopes of the Sibilobilo Islands for further evidence of *Vulcanodon karibaensis* and other fossils, to record the exposed stratigraphy and to follow-up on fossil sites known to Steve Edwards around the Ume estuary and on the Tashinga lake shore.

## Island 126/127

With Dr Pia Viglietti we measured the stratigraphic sequence on Island 126/127 over 4 sections and concluded that there is no lower basalt flow and that the *Vulcanodon* horizon falls within the upper part of the Forest Sandstone Formation.

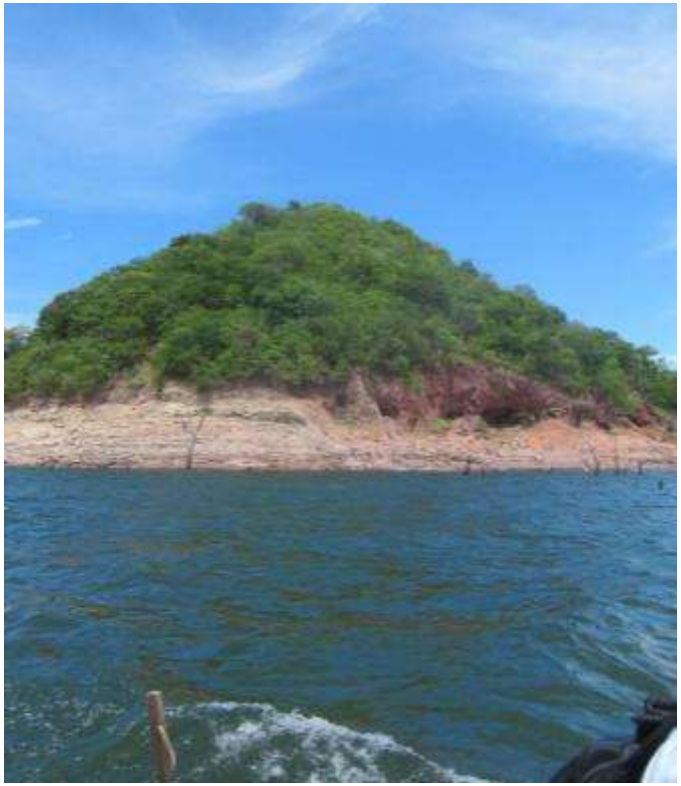



# Stratigraphic Sections

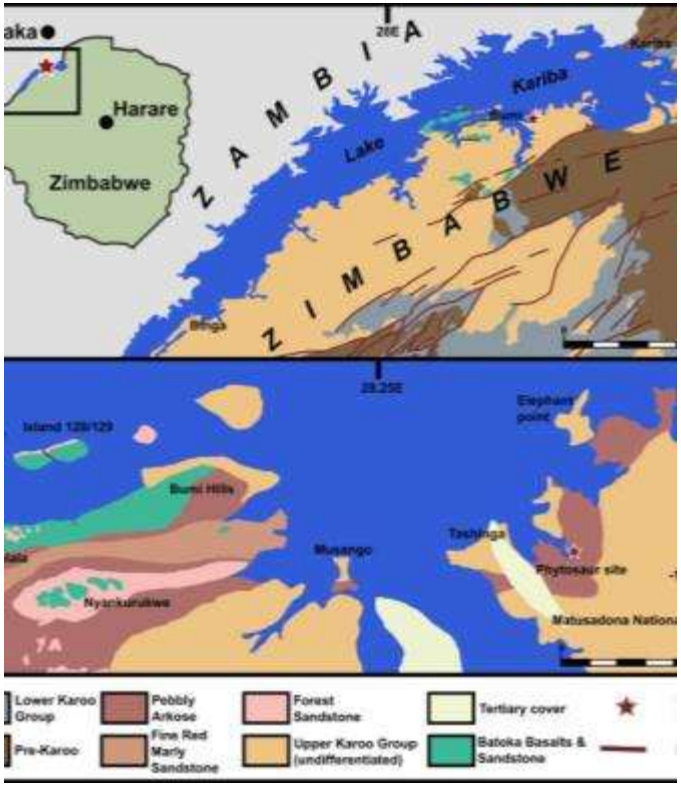
*J. Afr. Earth Scis*, Published on line, Oct. 2017.
**137** (2018) pp. 149-156.

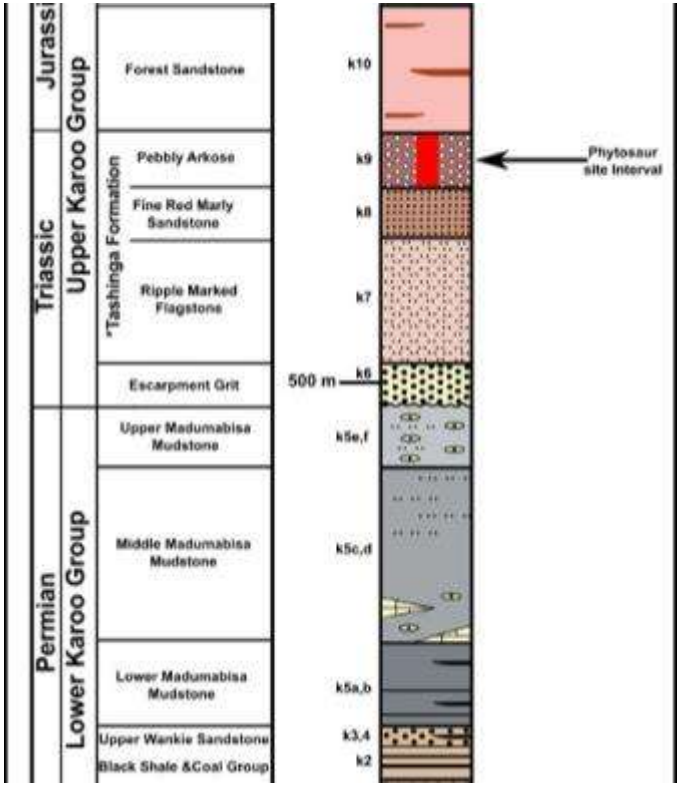
Although the stratigraphy along the island shores is continuous only fragmentary bone material was found that may not necessarily be representative of *Vulcanodon.*



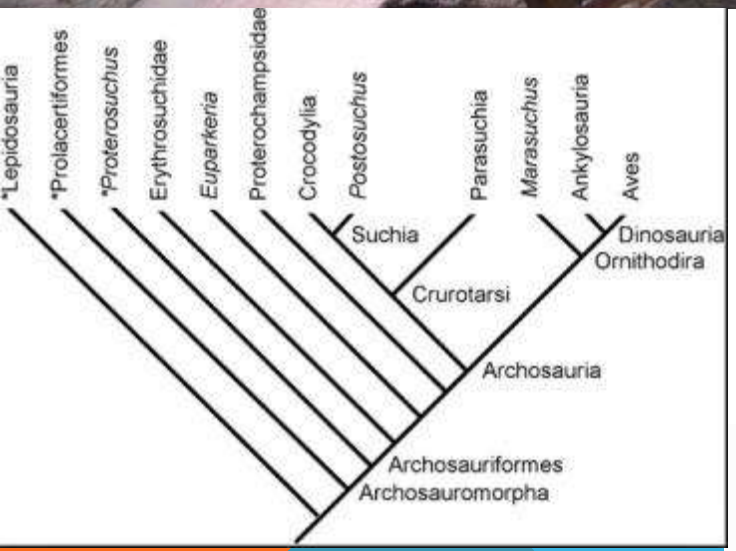
Downthrow to the north along strike faults causes repetition of stratigraphy with a consistent southerly dip into the axis of the Sibilobilo Syncline.

The association of fossil wood and coarse pebbly sandstone appears to place the horizon around Tashinga within the Pebbly Arkose of the upper Tashinga Formation. This is the location of what is the first Archosaurian Phytosaur fossil in Africa south of the Sahara.



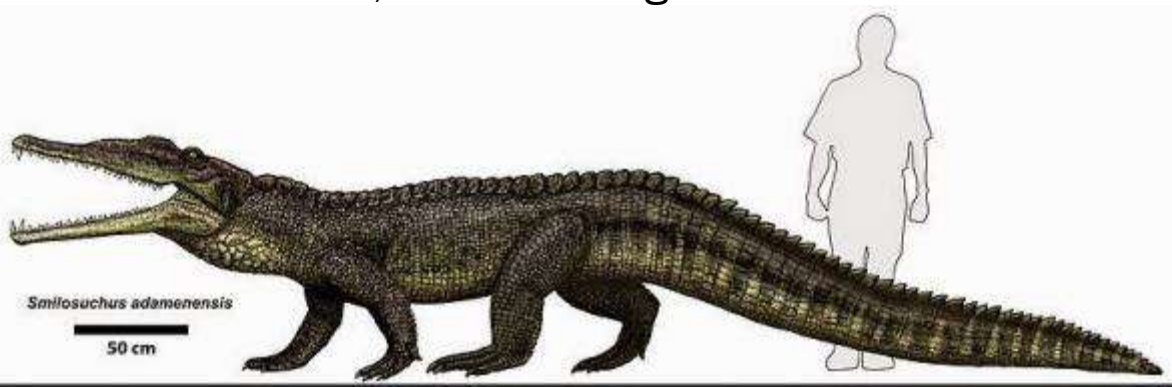




# The Pebbly Arkose




Steve Edwards' bone collection from a grey mudstone facies near Tashinga comprises craniodental material and osteoderms in association with *Ceratodus* (lungfish) dentition indicating a palaeo-feeding frenzy. The deposit Includes associated coprolites. Phytosaurs evolved separately towards crocodiles and to dinosaurs and birds in the late Triassic, hence the significance of this find.

# Phytosaur



Paul Barrett & Mike Zondo

Jonah Choiniere

Then on farther east we started to find prosauropod dinosaur remains. However, we were chased off after a narrow escape, but the evidence is there for a return exploration trip in 2018.

# Early dinosaurs

SATURDAY AFTERNOON, AUGUST 26, 2017
TECHNICAL SESSION XIX TELUS CONVENTION CENTRE, MACLEOD C
MODERATORS: Mateo Fabbri and Kohei Tanaka
1:45 P. M. Barrett, T. J. Broderick, K. Chapelle, J. N. Choiniere, S. Edwards, D. Munyikwa, P. Viglietti, M. Zondo
NEW INFORMATION ON THE UPPER KAROO VERTEBRATE FAUNAS OF THE LAKE KARIBA REGION, ZIMBABWE

Our preliminary results were presented at the Calgary Meeting of the SVP in August, 2017, and at the 65th Symposium on Vertebrate Palaeontology and Comparative Anatomy at the University of Birmingham in September 2017.

Grant Information:
NRF AOP Grant, NRF CPRR Grant, DST/NRF CoE Operational Support Grant, Palaeontological Scientific Trust (PAST) Grant: all to JNC
NHM Earth Sciences DIF Grant: PMB

Chris Griffin, PhD Student at Virginia Tech in Blacksburg VA was awarded a Young Explorers Grant by National Geographic to follow up on the indicated association of rhynchosaur remains with earliest dinosaur fossils from the Upper Triassic, as intimated by Raath, Oesterlen & Kitching (1992) from Pebbly Arkose in the Dande Communal Land.

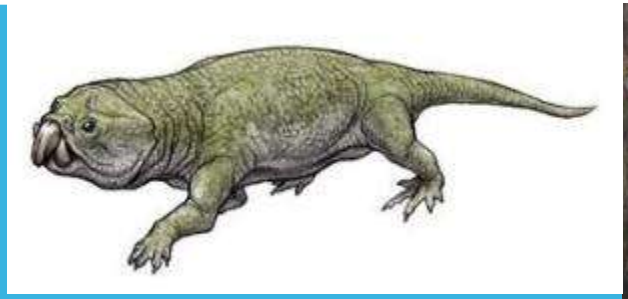
In addition he sought to investigate the possibility of new therapsid locations within the Upper to Middle Madumabisa Mudstone as exposed in the Omay C.L. south of Lake Kariba.

## August, 2017

The expedition was organized in association with National Museums and Monuments and involved the participation of Darlington Munyikwa, Mike Zondo and Hazel Taruvinga. Steve Tolan, therapsid aficionado based in the Luangwa Valley, and the presenter were invited into the team.

Targeting badlands eroded into the sandstone and mudrock interbeds, as is the expression in the Pebbly Arkose along the southern Zambezi Escarpment, it did not take long to find bone material, including the distinctive rhynchosaur dentition of the upper maxilla.

The search began and the number of sites producing associated bone material multiplied.



Rhynchosaur

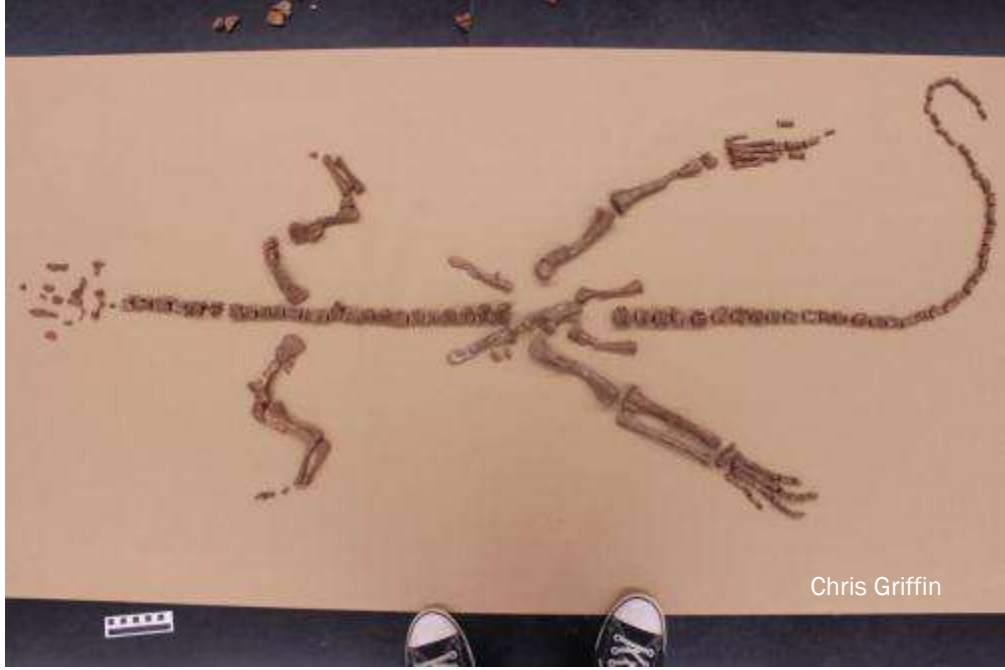
Associated and partly articulated bone material accumulated and was bagged and labeled with GPS co-ordinates.

# Specimen Collection

Worn tusks

# Excitement as the dinosaur connection Is made

Something different – a diagnostic feature for all dinosaurs is a hooked head to the femur. The bone continued into the ground. The dig began and more and more bone emerged from the excavation. A trench was developed around the articulated section. Thank goodness the bone was preserved in mudstone and that this prosauropod was small! A plaster jacket was made.



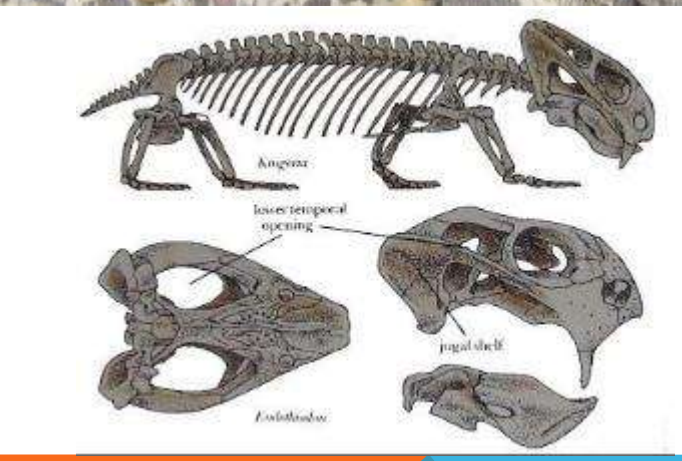

The jacket was retrieved, then shipped to Virginia. However, the loose bone alone makes for a remarkably complete skeleton, which will be made more so by addition of ribs and, from the block, important completion of the hip, sacral vertebrate area and skull.

This is a highly significant discovery as it should be the earliest dinosaur known from Africa. This is so as rhynchosaurs hold a very narrow time span in the Carnian of the Upper Triassic and this specimen must pre-date the common early dinosaur, *Massospondylus.*

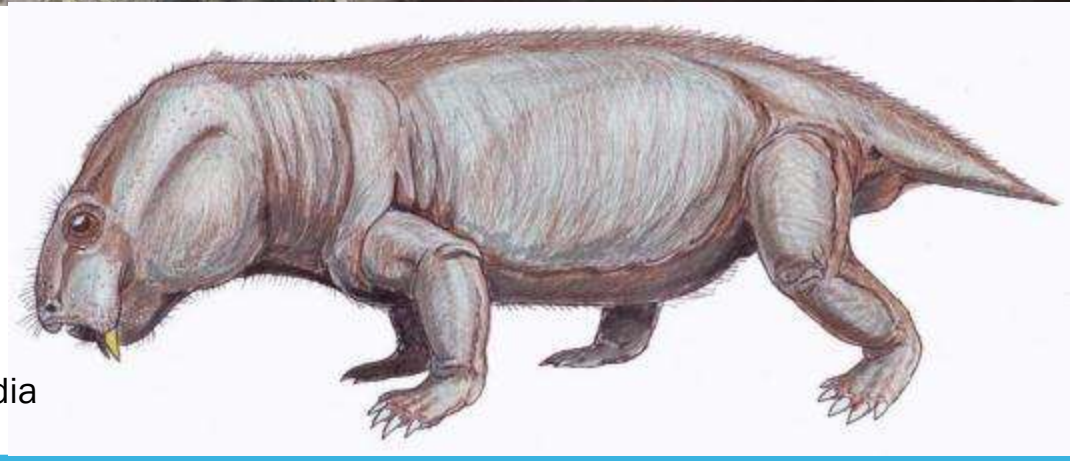
# A young palaeontologist has his career made

And as for the teeth! Quite a nipper!

On to the Omay and into the badlands below the Escarpment Grit. But only sandy to limey colluvial deposits with residual pebbles from the overlying grit showed. We find some early mammalian dentition and fragments of tortoise carapace. Where is the Madumabisa? Then closer to the foot of the scarp we find the mudstone, often preserved as outlandish pillars protected by fallen slabs of Escarpment Grit. And then we start to find therapsid bone of Dicynodonts and Endothiodon, we believe.




Wikipaedia



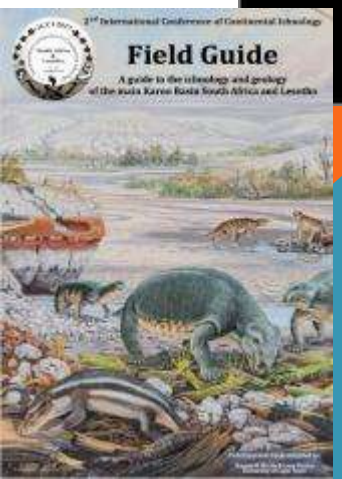
Dicynodont skulls are preserved in limey nodules. The name means ‘two dog tooth’

Then we realized that the skulls were encased in hard limey nodules. You can recognize the skull detail, see the preserved bone and recognize the telltale tusks of these herbivorous non-mammalian therapsids that bridged the Permian / Triassic extinction. With good preservation, some preparator has a challenge in store.

Some target areas proved to be negative with respect to their fossil content where subsurface erosion was seen to be the principal mechanism of badland development in the Madumabisa.

However, the Bond & Macgregor's 1951 Endothiodon locality at Chidomo Hill was revisited, and there were the beaky skull nodules.

A well worthwhile and productive ten-day field excursion generated significant new material for the Natural History Museum in Bulawayo, which will breed far-reaching results that can only generate more support in years to come. Watch this space!




2nd International Conference of Continental Ichnology, Cape Town

The Ntumbe Dinosaur Tracksite, Chewore Safari Area, Zimbabwe:
A place for new discoveries

by

T.J. Broderick (makari@zol.co.zw) and Dr. A. Ait-Kaci (ali_aitkaci@yahoo.fr)

As read by Dr. Lara Sciscio, October 2017

Finally, Ali and I prepared a review presentation on the Ntumbe Tracksite so as to put Zimbabwe on the map as far as trace fossils are concerned. Presented on our behalf by Dr Lara Sciscio, the paper is reported to have been well received.

Thank You