BOLT'S FARM
(KLINKERT'S PORTION)

A research proposal compiled by the HOPE Research Unit (HRU) for the South African Heritage Resources Agency (SAHRA)

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RESEARCH PROPSAL FOR THE FOSSIL LOCALITY OF BOLT'S FARM (KLINKERT'S PORTION)

The main scientific goal for the HOPE Research Unit (HRU) team concerning the Klinkert's portion of Bolt's Farm, is to increase the fossil collection, as this locality is not as well-known as other fossil localities that fall within the Cradle of Humankind and in the scientific community. The more fossil specimens that are recovered, the larger the sample size which in turn, will contribute to a better understanding of the Cradle of Humankind World Heritage Area.

In the past few years, we have dedicated the majority of our time to prospect the Klinkert's portion, which resulted in the discovery of several new fossil deposits. These new sites will be our priority for the next three years. We plan to focus on the most interesting and promising deposits (in term of age and/or palaeoenvironmental information) such as Milo A, Milo B, Brad Pit A, Brad Pit B, Waypoint 160, Femur Dump and X Cave. In 2011, Dr John Hancox joined the HRU team as the main geologist and he will work on the dating and geology of Bolt's Farm (Klinkert's Portion). Dr Hancox will provide a valuable aspect to this project, by contributing to a better understanding of the geology associated with the fossil deposits.

Milo A:

Our aim is to continue collecting breccia blocks from the dump area around this deposit and also clean the site to better access the geology. We will also start excavating the decalcified breccia pockets found within the calcified breccia at Milo A. If funding permits, we plan to start a proper excavation of the *in situ* breccia with the help of a grid system, theodolite (total station) and other markers.

At present the fossil suids from Milo A indicates that the deposit is around 3 million years in age and could potentially represent one of the oldest fossil sites in the Cradle of Humankind. In order to support this age, more fossil specimens will be required for biochronological dating and also speleotheme samples will be collected for U – Pb dating purposes. The biochronological and absolute dating, as well as the fossil specimens recovered, will allow for a better understanding of the environment at this time in South Africa, and also for comparison with fossils and deposits of this age recovered from East African sites.

Milo B:
We have found a very rich fossiliferous dump associated with this deposit and would like to locate the *in situ* fossiliferous breccia. In order to do this, it is required that we remove the thick layer of capping sediment and/or decalcified breccia in order to reach this *in situ* breccia. At present we have no age estimate for this site, as the sample size of fossil specimens is still too small and more extensive geological investigations will be required.

Brad Pit A and Brad Pit B:
These two deposits are very close to each other and could potentially represent the same site. We need to clean these two deposits to better determine if it is in fact an individual deposit. We plan to do this by digging a trench between the two deposits to see if they link up in the geology. These two deposits have yielded some macromammalian remains, such as a crushed skull and mandible of a primate (*Parapapio broomi*) and also a good sample of microfaunal remains. However, we require more samples of faunal material for dating purposes and palaeoenvironmental interpretation.

Waypoint 160:
Currently, this is the oldest deposit at Bolt's Farm (both the Klinkert's & Greensleeves portion) and also in the Cradle of Humankind. This site is extremely rich in microfaunal remains and we have discovered a small sample of macrofaunal fossil, such as the oldest primate (*Parapapio sp.*) in the Cradle of Humankind.

A large dump is covering the top of the detritic cone where most of the fossil material is expected to be. We want to continue with the removal of the dump material, during which we will collect fossiliferous breccia blocks of both macro- and microfaunal fossils. Again, for a better understanding of the geology of this deposit, it will also be require from us to clean the site.

The biochornological dating based on the fossil of microfaunal remains indicated to us a potential age of between 4 to 4.5 million years for this site. If funding permits, we wish to conduct U – Pb dating on speleothem samples from this site to support this biochronological age. More fossil specimens from this site will allow us to find new taxa in this age range. The preliminary study of the material seems to indicate a dry and open environment, but this will be better supported by more fossil specimens.

Femur Dump:
This deposit is represented on site as a huge mine dump. Also known as Pit 23, this site has yielded the biggest collection of the false sabre-tooth cat, *Dinofelis barlowi* and also many primate remains (*Parapapio broomi* and *Cercopithecoides williamsi*). The best preserved skull of *Parapapio broomi* from Pit 23 is larger than other skulls of the same species found at different fossil sites in the Cradle of Humankind but, it is smaller than those found at Makapansgat.

We discovered, at Femur Dump, a maxilla of *Parapapio broomi* almost identical in size to the maxilla of the skull previously discovered at Pit 23. We also found some mandibular remains which are different from the "classical" morphology of *Parapapio broomi*.
We want to continue to clear and excavate the dump in an attempt to increase the collection for this deposit and also to confirm our previous observations.

X Cave:
For a couple of years now, we have been working through the main dump of this deposit. Most blocks of breccia that we have removed are very rich in micro- and macrofauna. The preliminary study of the microfaunaremains suggests that the blocks of breccia collected could possibly come from to two different geological deposits. We must confirm this assumption with a larger sample and the expertise provided by Dr Hancox.

We want to continue working on clearing and excavating the mine dump and we will continue to systematically separate, in allocated dumps, the fossiliferous breccia from the others blocks (sterile breccia, dolomite, chert, etc.). This practice is followed after it was suggested for X Cave by SAHRA staff during the last site inspection at Bolt's Farm.

Publication strategy:
We plan to publish regularly (as we have been doing for several years now) with the new results on Bolt's Farm. The journals we have considered for publication so far includes, in South African journals, the Annals of the Ditsong National Museum of Natural History, South African Journal of Science and Palaeontologia Africana. Regarding international journals, we hope to be able to publish in journals such as the Journal of Human Evolution, C. R. Palevol, Geobios, etc.

We also plan to participate at local and international conferences (if funding becomes available) where we can share our results on Bolt's Farm with the scientific community.

Preparation and training:
The new chemical preparation laboratory is almost nearing completion. The preparation laboratory has adopted a very accurate method of capturing as much data as possible related to the breccia block prior to preparation and during preparation. The data that gets collected prior to preparation is the block weight, colour, photograph with scale bar and a sample block gets collected and stored in the Bolt's Farm collection. During preparation that data captured includes the percentage of acetic acid, type of consolidant and solvent used, photographs get taken after every acid bath, weight loss gets established after every bath and duration of preparation from start to finish also gets recorded. All data information will be available in hardcopy and electronic database format.

The laboratory has also been used as a training facility to students and interns interested in learning more about chemical preparation methods. At present three interns that are funded by the National Research Foundation (NRF) are being trained in this method of breccia preparation.

The casting laboratory at the museum has been active for over a year, whereby casts of fossils from Bolt's Farm are produced for both collection purposes and to aid in educational outreach programmes offered by the museum's educational department.

Education and outreach:

Upon more specimens being recovered and the scientific information they provide, we plan to share this with the public in the form of educational displays and outreach programmes.

Displays will rotate between the museum, Maropeng and hopefully also at the University of the Witwatersrand. The aim of these displays are not purely on the education of the fossil record to the general public, but also to put more emphasis on the Bolt's Farm deposits and the importance they provide to understanding a time period which is poorly preserved in the Cradle of Humankind and South Africa.