

Supporting Online Material for:

***COMBINING LEGACY DATA WITH NEW DRONE AND DGPS MAPPING TO  
IDENTIFY THE PROVENANCE OF PLIO-PLEISTOCENE FOSSILS FROM BOLT'S  
FARM, CRADLE OF HUMANKIND (SOUTH AFRICA)***

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[SOM includes:](#)

*Supplementary text:*

Text S1: Faunal descriptions for each UCAE locality, specimens housed at UCMP. Prepared by Dr. Justin Adams.

## Text S1: Re-assessment of biochronological Fauna

**Locality Names:** Pit 1, Kraal Pit, Kraal Pit Loose Fill

**Peabody Locality Number:** 55-1

**UCMP Locality Numbers:** V67256, V75133

**Maximal biochronological age range:** <2.33 Ma – 0.78 Ma

Pit 1 contains no *in situ* deposits or nearby dumps. As such it is unlikely to yield any more fauna and there was considered to be no potential for geochronological analysis.

Of the taxonomically identifiable remains within the UCMP Pit 1 collections (both the Kraal Pit calcified sediments and Loose Fill) only two specimens provide biochronological indicators of a deposition age. The maximum depositional age of younger than 2.33 Ma for the Kraal Pit is provided by the recovery of a single *Equus* Linnaeus 1758 terminal phalanx (UCMP 89196) that necessarily postdates the entry of the genus into Africa (Geraads et al., 2004; Bernor et al., 2010). The specimen is significantly smaller than *Equus capensis* Broom 1909 specimens recovered from other South African deposits (e.g., Swartkrans; Churcher and Watson, 1993) and comparable in size to extant *Equus quagga* ssp. Boddaert 1785 (*sensu* Groves and Grubb, 2011). The rest of the ungulate sample is predominantly composed of *Antidorcas* sp. (Sundevall 1847) or *Antidorcas recki* (Schwarz 1932) craniodental remains (e.g., UCMP 89200, right maxilla preserving the third premolar through second molar; UCMP 89201, antimeric mandibular corpora with near complete tooththrows; UCMP 89202, partial left immature mandible with the deciduous premolar row, first molar and erupting second molar). This species has been recovered from eastern and South African deposits spanning the late Pliocene (e.g., Shungura Formation B-H; Gentry, 2010; McDougall et al., 2011; Brown et al., 2013) to the >1.07 Ma (or <0.780 Ma) Olduvai Bed IV (Tamrat et al., 1995) and the 1.07-0.780 Ma Elandsfontein deposits (Gentry, 2010; Braun et al., 2013). While a later Pleistocene depositional age could be proposed based on the identification of two sets of craniodental remains (UCMP 89197 and UCMP 89198) originally catalogued as *Connochaetes* cf. *taurinus* Burchell 1824, these isolated dental remains are most appropriately treated as indeterminate Class II to III alcelaphins given the lack of specific diagnostic features on isolated members of this tribe.

Amongst the carnivores identified from Pit 1, the only taxa identified are extants with uncertain, terminal Pliocene or Pleistocene African origins that cannot refine the biochronology of the deposits (e.g., *Proteles cristatus* Sparrman 1783 [UCMP 89194-89195], *Canis adustus* Sundevall 1847 [UCMP 88752], *Prototocyon/Otocyon* sp. Desmarest 1822 [UCMP 89191])(Werdelin and Peigné, 2010). Although there is a single catalogued *Dinofelis* Zdansky 1924 specimen (UCMP 88753) it was on loan during our evaluation of the UCMP collections; Cooke (1991: Appendix A) notes this is a collection of postcranial remains (a partial left femur and phalanges) that may not be ultimately specifically diagnostic and refine the age of the Pit 1 deposits. The single primate specimen (UCMP 56706) is a partial cranium that preserves part of the left posterior mandibular corpus with the m2 and m3. The overall morphology is consistent with attribution to *Papio hamadryas robinsoni* Freedman 1957 and directly comparable to previously specimens from Swartkrans (e.g., SK 555, 560) (Freedman, 1957) that also supports interpreting Pit 1 as maximally an early Pleistocene deposit.

**Locality Name:** Pit 2, Kiln Cave

**Peabody Locality Number:** 55-2

**UCMP Locality Number:** V67257

**Maximal biochronological age range:** Unknown

This pit was described by Cooke (1991) as having only a rodent-containing breccia that was not further described or developed in the UCMP collections. A recent assessment of deposits confirms that this pit contains a mix of microfauna, but at present the lack of analysis prohibits either a biochronological dating and with the locale offering limited or no geochronological potential due to an absence of preserved stratigraphy.

**Locality Name:** Pit 3 (Kaffir Beer Cave), Pit 3 Loose Fill (Kaffir Beer Cave 2), Cobra Cave

**Peabody Locality Number:** 55-3

**UCMP Locality Number:** V67258, V75132

**Maximal biochronological age range:** <2.33 Ma/1.89 Ma – 0.78 Ma

The Pit 3 fossil assemblage, derived from both processed calcified sediments and decalcified infills, is the largest in the UCMP collections. Only one primate specimen is catalogued, consisting of two heavily occluded mandibular teeth (UCMP 80127: left third molar, probable molar crown). These may be derived from *Papio* sp. (Müller 1773) but are best treated as in indeterminate papionin (Burnett, 1828).

In contrast, the carnivore component is diverse but biochronologically uninformative. There is a single left maxillary fourth premolar (UCMP 69466) that was originally catalogued as *Hyaena bellax* Ewer 1954, a species that (as noted for Pit 3) was subsequently subsumed into *Pachycrocuta brevirostris* Aymard 1846 (see Werdelin, 1999) which is distributed across African localities from ~4 Ma eastern African deposits and 3.03-2.58 Ma Makapansgat Member 3 deposits to as late as Sterkfontein Member 5 (Werdelin and Peigné, 2010; Herries et al., 2013). Unfortunately, the Sterkfontein Member 5 *P. brevirostris* specimens are derived from grid squares with uncertain provenience relative to the subdivided Member 5 deposits (Turner, 1987; O'Regan, 2007) that were deposited across the early to mid-Pleistocene (Herries et al., 2009); as such an effective last-appearance date for the species in South Africa is not confidently established. The only other large carnivore represented is *Panthera* cf. *pardus* Linnaeus 1758 (UCMP 80233 left calcaneus, UCMP 80234 left astragalus), an extant species broadly represented across African localities going back to at least ~2 Ma (and part of a nebulous evolutionary lineage extending to the Pliocene; Werdelin and Peigné, 2010). This is equally true of the mesocarnivores (e.g., cf. *Canis adustus* [UCMP 80242, UCMP 80243], cf. *Canis mesomelas* Schreber 1775 [UCMP 80245, UCMP 80246, UCMP 89250], *Prototocyon/Otocyon* sp. [UCMP 80244], cf. *Vulpes chama* Smith 1833 [UCMP 80250]) and small carnivores (e.g., *Aonyx capensis* [UCMP 80239], cf. *Suricata* sp. [UCMP 80230, UCMP 80238, UCMP 80240]). Unfortunately, all six *Dinofelis* Zdansky 1924 specimens from Pit 3 (UCMP 69525-69530), catalogued as *Dinofelis barlowi* Broom 1937, were on unavailable during our evaluations of the collections in 2007 and 2012; further evaluation of these remains and confirmation of this specific allocation may provide further biochronological data for the locality.

There is a substantial sample of equids from both the calcified and decalcified deposits representing at least two different species of *Equus*. A series of craniodental (UCMP 80217 occipital fragment; UCMP 80223 right maxillary deciduous third incisor; UCMP 80225, left maxillary deciduous third premolar) and postcranial (UCMP 80220, complete proximal phalanx) specimens are larger than extant *Equus quagga* ssp. and are morphologically and metrically consistent with specimens attributed to *Equus capensis* (Mendrez, 1966; Churcher, 1970; Churcher and Watson, 1993; Adams, 2012). The remaining loose fill equids consist of 11 specimens divided over two catalogue numbers: UCMP 8022, consisting of a right maxillary premolar or molar and a right maxillary deciduous third premolar; UCMP 80222,

consisting of the right mandibular deciduous second-fourth premolars, two right mandibular deciduous incisors, one maxillary deciduous incisor, and a small canine; and UCMP 80224, a complete second phalanx. All of these specimens are directly comparable to fossil and extant *E. quagga* ssp. remains in both preserved morphology and size. As with Pit 1, the presence of *Equus* here limits the age of the deposits to less than ~2.33 Ma.

Two suid specimens (UCMP 80218, unworn right maxillary second molar; UCMP 80219, rostral portion of the cranium) are catalogued from the calcified materials and a single from the loose fill deposits (UCMP 80216, right mandibular canine). While neither of these specimens are diagnostic, the preserved morphology of UCMP 80218 is not consistent with extant *Phacochoerus* Cuvier 1817. Ultimately, these specimens may represent additional *Metridiochoerus modestus* van Hoepen and van Hoepen 1932 remains that complement the nearly complete cranium from Pit 3 (TM BF 3-335), previously described by Cooke (1993). Cooke (1996) considered the UCMP 80218 second molar too large for *M. modestus* and potentially representative of *Potamochoeroides shawi* Dale 1948 (alt. Stage I *Metridiochoerus andrewsi* Hopwood 1926 *sensu* Harris and White, 1976; *Potamochoeroides hypsodon* Dale 1948 *sensu* Pickford, 2013) as recovered from Bolt's Farm Pit 14 (see below). If both are treated as consistent with the previously described *M. modestus* cranium, these suids suggest deposition between 1.89 Ma and 0.78 Ma based on correlation with the east African record of the species in the Koobi Fora and Olduvai Gorge deposits (White, 1995). If UCMP 80218 is derived from a more primitive suid population it would minimally indicate a pre-2.0 Ma depositional age for at least some of the Pit 3 assemblage.

The bovid sample is large and diverse with identifiable remains of alcelaphins, antilopins, hippotragins, tragelaphins and possibly ovibovins in the sample. However, most of the sample is only attributable to tribe or genus and provides limited biochronological data. The calcified sediment alcelaphin specimens (n: 17) are a mix of isolated teeth, partial mandibles and maxillae, and while there are well-preserved crowns and nearly complete tooththrows in the sample, we prefer a more conservative classification of the specimens given the lack of associated horn cores and overlapping dental morphologies of extant and extinct alcelaphin lineages. There are, however, at least three different alcelaphin groups distinguishable: a larger, *Connochaetes*-sized Lichtenstein 1814 species (UCMP 80185-80189), a medium-sized, *Alcelaphus*-like de Blainville 1816 species (UCMP 80190-80203; many of which were originally attributed to *Alcelaphus lichtensteinii* Peters 1852), and a smaller species similar to *Damaliscus* Sclater and Thomas 1894 (UCMP 80205-80209). One alcelaphin right horn core, UCMP 80186, was originally catalogued as *Connochaetes taurinus* but the vertical orientation of the pedicle and cross-sectional morphology of the core is more comparable with *Damaliscus*. Hippotragins are represented in the deposits by two specimens (UCMP 80210 right mandible with deciduous third and fourth premolars; UCMP 80211 left maxilla with deciduous third and fourth premolars) that are likely derived from the same immature *Hippotragus* Sundevall 1846 individual. The two tragelaphin specimens (UCMP 80214, right maxilla with partial erupting third molar; UCMP 80215, left mandible with second and third molars) are very large and are either directly attributable to *Taurotragus oryx* Pallas 1767 (alt. *Tragelaphus oryx sensu* Kingdon and Hoffmann, 2013) or to the lineage. A single left mandibular first or second molar (UCMP 80184) was originally catalogued as cf. *Makapania broomi* Wells and Cooke 1956. Although the specimen preserves the gracile goatfold and U- to V- shaped buccal lophids that is consistent with an ovibovin or primitive alcelaphin, the specimen is much smaller than *M. broomi* specimens from Makapansgat Member 3 (Wells and Cooke, 1956) and resembles the smaller possible ovibovin specimens from Swartkrans (Vrba, 1976) and Haasgat (Adams, 2012).

The most diagnostic collection of bovid remains are the *Antidorcas recki* specimens described by Cooke (1996) in his study of sexual dimorphism in the species (UCMP 69519-69523 [incl. UCMP 69520A-C], 80167-80175); as well as additional *A. recki* remains not described by Cooke (1996) (UCMP 80182-80183 [in part]; UCMP 80266). This suggests a broad depositional age to as recent as 0.78 Ma. Simultaneously there is a collection of ten mandibular molars within the UCMP 80161 group (out of 16 total teeth allocated to the specimen number) resemble *Antidorcas bondi* Cooke and Wells 1951 in their hypsodonty relative to size; and a number of partial to nearly complete maxillae (UCMP 80176-80178), mandibles (UCMP 80179, UCMP 80182), a left male horn core (UCMP 80181), and several of the isolated teeth (UCMP 80161 and 80183 [in part]) specimens consistent with the extant *Antidorcas*

*australis/marsupialis* Hendey and Hendey 1968/Zimmerman 1780 lineage. While the isolated mandibular molars are only weak evidence for *A. bondi*, the collective *Antidorcas* sample does indicate the presence of minimally two antilopine populations in the Pit 3 deposits. When coupled with the suid specimens described above, the *Antidorcas* sample may support interpreting the Pit as representing a substantially time averaged faunal accumulation.

Finally, there are several identifiable smaller mammal remains however, none of these taxa contribute to biochronological interpretations of the deposits. This includes: a single hystricomorph right mandibular second molar (UCMP 89258) attributable to extant *Hystrix africaeaustralis* Peters 1852; a crushed cranium (UCMP 80229), right mandible (UCMP 80227), and maxillary premolar/molar (UCMP 80226) attributable to *Procavia transvaalensis* Shaw 1937 based on both the size and preserved dentition relative to specimens from the other South African deposits (Churcher, 1956); a right maxillary first incisor (UCMP 80228) consistent with smaller *Procavia* remains (*Procavia antiqua* Broom 1934 or *Procavia capensis* Storr 1780); and a collection of indeterminate Leporidae Fischer de Waldheim craniodental and postcranial remains (UCMP 80130-801340).

The only available record of non-UCMP faunas from Pit 3 are unidentified specimens of an indeterminate pantherine (Family Felidae: Order Carnivora) and a canid (Family Canidae: Order Carnivora) (Gommery et al., 2016). Given the indeterminate taxonomic attribution of these further fossil remains and the lack of published descriptions, these additional remains do not provide further faunal data on the biochronology

**Locality Name:** Pit 4, Garage Ravine Cave

**Peabody Locality Number:** 55-4

**UCMP Locality Number:** V67259

**Maximal biochronological age range:** <2.33 Ma

Only four specimens were processed from the Garage Ravine Cave, but the small sample is unique in the preservation of a nearly complete felid cranium with mandible (UCMP 69507) and nearly complete equid mandible (UCMP 69509). The felid specimen preserves the dorsoventrally crushed portions of most of the dorsal cranium, including the mandible in articulation. The specimen was described by Cooke in his unpublished report, who considered the specimen as *Panthera* aff. *leo* Linnaeus 1758 but noted that, from the limited set of measurable basicranial features, the specimen was larger than a single measured female *Panthera leo* and smaller than a male *Panthera tigris* Linnaeus 1758. With the apparently larger dimensions, Cooke speculated that the UCMP specimen could represent *Felis shawi* Broom 1948; a large extinct felid originally described from a single unprovenanced canine and later suggested to be present in the Kromdraai A deposits (Ewer, 1956; KA 67-70). However, later studies of fossil *Panthera* by Turner (1984, 1986, 1987) highlighted how the significant intraspecific variation in *P. leo* had impacted prior taxonomic attributions of specimens, and recent syntheses (e.g., Werdelin and Peigné, 2010) have advocated for more conservative treatment of the genus (with modern *Panthera* species restricted to deposits <2 Ma).

The UCMP 69509 equid mandible preserves most of both corpora with near complete dentition, but is mediolaterally crushed. The specimen was originally attributed by Cooke in his unpublished report to *Equus plicatus* van Hoepen 1932 (although the original specimen card in the UCMP collections states the specimen was assigned to *Equus kuhni* Broom 1928). Both of these previously proposed equid taxa were subsequently synonymised with the large-bodied extinct species *Equus capensis* and the preserved dentition exhibits the diagnostic hallmarks of this species (absence of protostylids, large hypolophids, parastylids that do not reach the lingual margin; Churcher, 1970; Churcher and Richardson, 1978; Bernor et al., 2010). In addition to this cranial specimen there is an isolated near complete *Equus* proximal phalanx (UCMP 89282) that exhibits strong volar tendon insertion scars and may also represent *E. capensis* in the deposits. The occurrence of this species in the Pit 4 deposits supports a depositional age of <2.33 Ma.

A small collection of additional fossil specimens from Garage Ravine Cave were described in Badenhorst et al. (2011), including an additional mandibular premolar fragment attributed to *Equus* cf. *capensis* as part of a collection of equid materials treated as either *E. cf. capensis* or derived from an indeterminate species of *Equus*. Several of the other element-wise taxonomic allocations published by Badenhorst et al. (2011) should be treated with caution as minimal justification is provided for their allocation; particularly the attribution of isolated and fragmentary postcranial remains. For example, a nearly complete astragalus (GR 5) is attributed to the extant eland (*Taurotragus oryx* Pallas 1767 (alt. *Tragelaphus oryx sensu* Kingdon and Hoffmann, 2013) based on a visual assessment of morphology as being unlike an extant buffalo and metrically compared to a single male and a single female astragalus of *T. oryx* (Badenhorst et al., 2011: 35). Similarly, a partial bovid distal tibia (GR 6) is attributed to *Alcelaphus/Connochaetes* because it is morphologically inseparable from tibiae of both *Alcelaphus buselaphus* Pallas, 1766 and *Connochaetes gnou* Zimmerman, 1780, and metrically compared to two individuals of each modern species (ibid.: 36-37). No independent diagnostic criteria are provided to support the attribution, and there is no consideration of potential morphological overlap in the distal tibia amongst fossil members of either of these genera, within the Tribe, or simply within the Family. Finally, a single distal metapodial is attributed to *Canis mesomelas* (reallocated to *Canis* cf. *mesomelas* in Gommery et al., 2016); again without discussion, measurement or diagnostic criteria (particularly for an indeterminate metapodial). The taxonomic treatment of this small collection of specimens is ultimately important given that *T. oryx*, *A. buselaphus* and *C. gnou* are temporally restricted to the Pleistocene (potentially all three only first co-occurring in middle to late Pleistocene deposits onwards; Gentry, 2010), which substantially restricts the depositional period for Pit 4. We do not, however, view these allocations as sufficiently established at present to inform on the biochronology of the Pit 4 deposits.

**Locality Name:** Pit 5, Smith(y) Cave

**Peabody Locality Number:** 55-5

**UCMP Locality Number:** V67260, V75139 (Loose Fill)

**Maximal biochronological age range:** <2.33 Ma

The only catalogued specimen from the Loose Fill component of the deposit is a right proximal third metatarsal (UCMP 89284) consistent with common zebra (*Equus* cf. *quagga* ssp.) in both overall size and morphology. As noted for Pits 1-4, the occurrence of *Equus* in the deposit establishes a maximal depositional age of younger than 2.33 Ma. The only other catalogued specimen is a single right mandible preserving a partial p3 to m1 (UCMP 89283) that is comparable to extant *Herpestes ichneumon* Linnaeus 1758; a species present (if rare) in African fossil assemblages from the 3.85-3.63 Ma Pliocene upper unit Laetoli deposits to the present (Werdelin and Deghani, 2011).

These deposits are currently treated by the HRU as part of the Aves Cave Complex (ACC; ACC 4) in addition to Pits 8 (ACC 1) and 14 (ACC 2) (Pickford and Gommery 2016). In contrast to these latter ACC components, however, no further faunal materials have been described from these deposits.

**Locality Name:** Pit 6, Baboon Cave

**Peabody Locality Number:** 55-6

**UCMP Locality Number:** V67261

**Maximal biochronological age range:** <2.33 Ma – 0.78 Ma

As implied by the site name, Pit 6 has one of the largest samples of cercopithecoid primates from the Bolt's Farm localities, with 18 catalogued specimens representing minimally both *Papio hamadryas robinsoni* Freedman 1957 (UCMP 56766-56777, 89285-89286; UCMP 56773 has a secondary

catalogue number as UCMP 177639) and *Cercopithecoides williamsi* Mollett 1947 (UCMP 56778). The UCMP 56778 *C. williamsi* specimen preserves a near complete set of maxillary dentition with premaxillae and nasals, and is the only documented *C. williamsi* individual outside of the Pit 23 deposits (see below). Both of these taxa occur across terminal Pliocene and Pleistocene African deposits, and do not provide strict biochronological limits on the Pit 6 deposits.

As is the case for the UCMP Bolt's Farm Pit samples from Pits 1 and 3, the strongest biochronologic limits for Pit 6 come from the occurrence of *Antidorcas recki* and *Equus*. The partial, probable male, *Antidorcas recki* cranium with articulated mandible (UCMP 89305) is partially matrix obscured, but the exposed cranial and dental morphology is consistent with the substantial *A. recki* sample from Pit 3 (see above; Cooke, 1996). The large *Equus* craniodental and postcranial sample from Pit 6 is derived from minimally two species. Only two postcranial specimens (UCMP 89293 left cuboid; UCMP 89298 right distal humerus) exceed the dimensions of extant *Equus* and are consistent with *Equus capensis* postcrania from other South African localities (Churcher and Watson, 1993; Adams, 2012). Two isolated teeth (UCMP 89297 left mandibular premolar or molar; UCMP 89300 left maxillary third molar) are metrically and morphologically consistent with the extant *Equus quagga* ssp.; the UCMP 89302 axis is also directly comparable to extant specimens and may also represent a subspecies of *E. quagga*. The remaining 6 equid craniodental specimens (UCMP 89294-89295, 89299, 89302-89304) and UCMP 89296 (four small blocks preserving parts of an atlas and several cervical vertebrae) are not specifically identifiable but likely represent a mixture of both *E. capensis* and *E. quagga*.

Beyond these species, as is typical at many late Pliocene and early Pleistocene South African sites (e.g., Sterkfontein, Swartkrans, Kromdraai, Cooper's D, Haasgat) there are remains in the Pit 6 sample attributable to the extinct large-bodied *Procavia transvaalensis* (Churcher, 1956; Brain, 1981; Adams, 2012). The mandibular specimens (UCMP 89288 and 89292, partially processed in sediment blocks), maxillary specimens (UCMP 89289 and 89291, both rights), and partial cranium (UCMP 89290) are distinct in overall size from the smaller extinct *Procavia antiqua* and extant *Procavia capensis*. However, it is noteworthy that the maxillary remains and partial cranium are smaller than the large Swartkrans, Cooper's D and Kromdraai *P. transvaalensis* individuals (e.g., SK 110/111, CO 8, KA 48; Churcher, 1956) and more closely resembles the smallest *P. transvaalensis* individuals from Swartkrans (SK 207; Brain, 1981) and Haasgat (HGD 1116, 1121; Adams, 2012); as well as the Gondolin GD 2 specimens originally attributed to *P. antiqua* (which are more conservatively treated as *Procavia* sp. pending further analysis; Watson, 1993; Adams and Conroy, 2005). Finally, the two catalogued Pit 6 *Dinofelis barlowi* specimens (UCMP 88748 right scapula and UCMP 88749 right proximal femur) were on loan and unavailable for study during our work with the UCMP collections to confirm their generic or specific attribution that might bear on the biochronology of the deposits.

**Locality Name:** Pit 7, Elephant Cave, Bridge Cave

**Peabody Locality Number:** 55-7

**UCMP Locality Number:** V67262

**Maximal biochronological age range:** 4.4 Ma – 2.5 Ma (2.0 Ma)

The majority of UCMP Pit 7 specimens are avians or microfauna, and only the previously published UCMP 64610 elephantid partial left mandibular third molar can be confidently specifically attributed (Cooke, 1993). The specimen only preserves the distal ~6 plates of the talonid and was mechanically sectioned to demonstrate the internal enamel morphology. The UCMP specimen was originally assigned to *Elaphas ekorensis* Maglio 1970 by Maglio (1973) but was subsequently considered closest to *Elaphas recki brumpti* Dietrich 1916 (subspecies *sensu* Beden 1979) by Cooke (1993) because of the greater hypsodonty and slightly thinner enamel (~3.0-3.2mm average) of the specimen compared to typical *E. ekorensis* molars.

However, the validity of delimiting *E. recki* into anagenetic morphological stages or subspecies has been questioned by Maglio (1973), Kalb and Mebrate (1993), and even by Cooke (1993) in his

discussion of the South African record of *Elaphas*. Subsequent phylogenetic analyses of elephantids by Todd (2005, 2010) have argued that classically-defined *E. recki* is a polyphyletic grouping of different genera. The preserved morphology of UCMP 64610 with thick, largely unfolded enamel (with only some irregularity in the median area) and parallel-sided enamel figures without the true lozenge of 'classic' *E. recki* (Todd, 2005), is consistent with more primitive *Elaphas* species and specimens. As discussed by Cooke (1993), the UCMP specimen could ultimately represent either *E. ekorensis*, some of the more primitive specimens historically included within *E. recki* (e.g. 'Group II' specimens *sensu* Todd, 2005) or as a more primitive subspecies within the evolving *E. recki* lineage (e.g., *E. recki brumpti sensu* Sanders et al., 2010). Based on correlations with the east African record of *E. recki brumpti* this would place the Pit 7 depositional age as sometime in the terminal Pliocene and prior to 2.5 Ma, or if the Sterkfontein Member 4 *Elaphas* specimen represents the same subspecies, as potentially contemporaneous with that deposit (~2.6-2.0 Ma; Herries et al., 2013). We would emphasise, however, that the proboscidean record in South Africa is remarkably poor and the tempo and mode of evolution within these lineages (including regional first and last appearance dates) is far from confidently established.

Other than the *Elaphas* specimen, there are three associated bovid craniodental specimens from the Pit. The UCMP 89370 and 89372 indeterminate alcelaphin maxillae were originally attributed to *Alcelaphus lichtensteinii* and *Damaliscus* sp., respectively; however, given the preservation of only a few teeth in each specimen and a lack of associated horncores, we would advocate a more conservative tribe-level attribution. The remaining bovid (UCMP 89371) is a left mandibular first or second molar that was originally catalogued as an indeterminate *Alcelaphus* specimen. The specimen has a well-developed goatfold and pinched (V-shaped) buccal lophids that resemble the smaller possible ovibovin/*Makapania* documented from Swartkrans (Vrba, 1976) and Haasgat (Adams, 2012) and so cannot support the prior catalogued attribution.

It is worth noting that a further, unnumbered Pit 7 specimen (both in the UCMP collection and in the recent Monson et al. [2015] Supplementary Table 2) is a heavily occluded suid second molar (likely maxillary). While the specimen appears more mesiodistally elongate than extant *Phacochoerus* and resembles some heavily worn *Metridiochoerus* Hopwood 1926 second molars, it is ultimately too incomplete and occluded to attribute to genus or species (or contribute to biochronological assessment of the deposits).

A tabulated listing of carnivore specimens recovered from Pit 7 (renamed as 'Bridge Cave') has been provided in Gommery et al. (2016), but without a formal systematic palaeontology, figures or primary descriptions it is difficult to ascertain how to align these specimens with the previously excavated UCMP faunal assemblage. Although many of the carnivores tabled by Gommery et al. (2016) are from lineages present from the terminal Miocene/Pliocene (e.g., *Felis sylvestris*, cf. *Homotherium*) some of the species (e.g., *Suricatta suricatta*) are only known from  $\leq 1.8$  Ma South African deposits; and both pantherines (e.g., *Panthera leo*, *Panthera pardus*) may either indicate a <2 Ma depositional age (if confidently placed into either species) or could represent pre-2 Ma (but not specifically diagnostic) larger and smaller *Panthera* (if a more conservative approach to members of the genus is followed as advocated by Werdelin and Peigné, 2010). Ultimately, as we note above in reference to the approach used by these authors to the Pit 4 faunas, without presentation of the elements that underlie these identifications it is impossible to assess how the occurrence of these taxa in Pit 7 has been established and how that may shape the biochronological interpretation of the deposit.



**Locality Name:** Pit 8, Rodent Cave

**Peabody Locality Number:** 55-8

**UCMP Locality Number:** V75269

**Maximal biochronological age range:** Unknown

The only faunal remains from Pit 8 in the UCMP collections are microfauna and two fragmentary fossils, listed by Monson et al. (2015) as an indeterminate equid tooth (UCMP 235454) and a fourth premolar and first molar (UCMP 89372; position uncertain from catalogue) attributed to *Damaliscus* sp. (Family Bovidae, Order Cetartiodactyla). Neither of these specimens were directly evaluated during our survey of the UCMP faunal materials.

The listing of carnivore specimens provided by Gommery et al. (2016) includes a column for the Pit 8 deposits (alternatively termed Aves Cave II; Gommery et al., 2012), but only a single listing for *Panthera* sp. (number of specimens and remains unknown) is provided. Across these two very small described samples there is no unambiguous biochronological information about depositional formation that can be interpreted.

**Locality Name:** Pit 10, Grey Bird Pit

**Peabody Locality Number:** 55-10

**UCMP Locality Number:** V67263

**Maximal biochronological age range:** <3.7 Ma

This site was destroyed by the action of quarrying in the 20<sup>th</sup> Century. Therefore, there is no possibility of relocating it or obtaining further faunal samples for analysis or geological samples for dating purposes.

The Pit 10 deposits are primarily known for yielding the type specimen of *Ictonyx bolli* Cooke 1985 (TM/BF 201; subsequently subsumed into *Prepoecilogale bolli* Petter and Howell 1985). Outside of this single South African locality this species only occurs in late Pliocene (~3.7-2.5 Ma) Laetoli upper bed deposits in Tanzania and Ahl al Oughlam deposits in Morocco (Werdelin and Peigné, 2010; Werdelin and Dehlgani, 2011). Most of the specimens are avians and microfauna and only a small number of larger mammal specimens exist in the sample; none of which provide interpretable biochronological data. A mandibular condyle and partial ascending ramus (UCMP 89384) was catalogued as *Papio* sp., but lacking diagnostic features even attribution of this specimen to the Order Primates is considered tentative. A purported baboon (*Papio* sp.) right proximal femur (UCMP 177650) but the preserved morphology (with only a partial metaphyseal surface and adhering diaphysis) more closely resembles a class II bovid than a primate. There is a small sample of indeterminate bovid craniodental specimens, but other than the undiagnostic alcelaphins there is only a single generically identifiable *Antidorcas* sp. Sundevall 1847 left maxilla with an erupting M3 (UCMP 89431; may represent *Antidorcas recki*) from the locality.

**Locality Name:** Bushman Outcrop, Breccia Outcrop, Milo A

**Peabody Locality Number:** N/A

**UCMP Locality Number:** N/A

**Maximal biochronological age range:** 3.04-2.58/2.0 Ma

A small faunal assemblage was described by Gommery et al. (2012). As is the case with some of the faunal remains described for Pits 4 and 7 summarised above, some of the fossil specimens attributed

from Milo A are based on uncertain diagnostic criteria or without supporting metric data which would lend confidence to their taxonomic allocations (e.g., MA 1, cf. *Tragelaphus* sp. second phalanx; MA 2, *Hippopotamus* sp. second phalanx). A single maxillary molar attributed to cf. Alcelaphine sp. established the only bovid craniodental specimen other than a single indeterminate maxillary molar enamel fragment (MA 4). Of particular significance, however, is the suid maxillary third molar (MA 3) attributed to a primitive *Metridiochoerus andrewsi* (Stage 1 *sensu* Harris and White, 1979; alt. *Potamochoeroides hypsodon*). The shared morphology between the MA 3 specimen and specimens from Makapansgat Member 3 (and strong contrast with *M. andrewsi* specimens described from later Pleistocene South African deposits from Swartkrans, Gondolin and Kromdraai and can be viewed as provide a maximal biochronological estimate of between 3.03-2.58 Ma for the specimen based on current age estimates for Makapansgat Member 3 (Herries et al., 2013). It is important to note, however, that the actual last appearance date of this more brachyodont *M. andrewsi* group can only be inferred by the significantly more derived Stage III *M. andrewsi* (*sensu* Harris and White, 1976) the most have evolved prior to the formation of deposits like Swartkrans Member 1 and Gondolin GD 2 (Herries et al., 2006; Adams, 2010). Gondolin GD2 is dated to somewhere between 1.95 and 1.78 Ma, but likely closer to 1.8 Ma (Herries et al., 2006b; Adams et al., 2007; Herries and Adams, 2013). As such, although the Milo A specimen is most comparable to those from Makapansgat, a depositional age as late as 2.2-2.0 Ma cannot be ruled out simply due to a lack of comparable South African suid fossils from this evolutionary lineage during the earliest Pleistocene. Finally, we note that the occurrence of hyaenids in Milo A is listed in Table 1 of Gommery et al. (2016) but is apparently based solely on attribution of a coprolite.

**Locality Name:** Pit 11, X Cave

**Peabody Locality Number:** N/A

**UCMP Locality Number:** N/A

**Maximal biochronological age range:** Unknown

This site was re-discovered by and re-named by Thackeray et al. (2008) as X Cave. Up to 52 breccia blocks were extracted in 2008. While spatial data indicates Pit 11 as recognised by Peabody (unpublished) and Cooke (1991) correlates to X Cave, no significant material was described in the UCMP collections as such much of the work conducted has been relatively recent.

The faunal assemblage from the X Cave deposits has presented through a listing of carnivore materials provided in Gommery et al. (2016) and an analysis of bovids by Van Zyl et al. (2016). The carnivores listed from the sampled X Cave deposits consist primarily of extant species or lineages (e.g., *Panthera leo* and *P. aff. leo*, cf. *Caracal*, cf. *Suricata*, *Canis* cf. *mesomelas*, cf. Hyaenidae) across the commonly encountered carnivore families within the terminal Pliocene and Pleistocene South African karstic deposits and provide limited biochronological information. The potential identification of *Crocota ultra* Ewer 1954 from unspecified 'dental remains' X, an extinct hyaenid currently only known from the early Pleistocene Kromdraai A and Cooper's Cave deposits in South Africa and the Koobi Fora KBS, Okote and Upper Burgi Members (1.869 Ma – ~1.4 Ma) would suggest a depositional date after 2 Ma (and potentially prior to ~1.4 Ma; McDougall and Brown, 2006; Werdelin and Peigné, 2010; Kuhn et al., 2016). However, as noted above regarding the information presented by Gommery et al. (2016), the lack of description, photographs or elemental information does not provide clear support for the occurrence of these carnivore families, genera or species.

In contrast, the more comprehensive analysis of bovid specimens concluded that the X Cave deposits formed after 1.07-0.99 Ma based on the first appearance date of *Connochaetes gnou* in the Cornelia-Uitzoek deposits (Brink et al., 2012; van Zyl et al., 2016). However, there are several issues with both this biochronological interpretation and the underlying bovid analysis itself that may prohibit any interpretation of the depositional age of the X Cave deposits without strong caveats. First, most of the ten species/genera identified are not described relative to clear diagnostic criteria for establishing a taxonomic identification and many are established solely through postcranial remains. As discussed

above in reference to a similar approach used with the Pit 4bovids, the lack of well-justified morphological criteria or adequate samples for metric comparisons for sub-family taxonomic allocation of postcrania raises substantial concerns over the validity of the alpha taxonomy of the study. Second, the five partial limb specimens (XC 51, 129, 236-238) allocated to *Connochaetes* sp. (without justification) is immediately noted as not being potentially attributable to *Connochaetes gnou* because the species underwent body size reduction during the Pleistocene (van Zyl et al., 2016: 48); yet in the subsequent discussion (ibid.: 70) the authors state *Connochaetes gnou* occurs in the X Cave deposits and indicates a post-1.07-0.99 Ma depositional age. This internal inconsistency in faunal description and discussion compounds the issues in the approach used for alpha taxonomy, and ultimately signals caution in relying on the bovid analysis as it currently stands.

**Locality Name:** Pit 14, Aves Cave, Aves Cave I (ACI)

**Peabody Locality Number:** 55-14

**UCMP Locality Number:** V67264

**Maximal biochronological age range:** 3.03-2.58 Ma/2.0 Ma

The Pit 14 faunal assemblage is one of the smallest in the UCMP Bolt's Farm collections, yet contains some of the most biochronologically informative suid specimens in the sample. These craniodental specimens (UCMP 69511-69516; UCMP 89491) were previously described by Cooke (1993) as representing *Potamochoeroides shawi* (alt. Stage I *Metridiochoerus andrewsi sensu* Harris and White, 1976; *Potamochoeroides hypsodon sensu* Pickford, 2013) analogous to those from Makapansgat Member 3. Although the Makapansgat Member 3 deposits represent the first definitive appearance date for this species in South Africa, it also represents the most definitive last appearance date of this more primitive suid population. As noted above in reference to the Milo A fossil suid the actual last appearance date of this more brachyodont *M. andrewsi* group can only be inferred by the presence of advanced Stage III *M. andrewsi* (*sensu* Harris and White, 1976) suids in deposits just younger than 2 Ma. As a result, the depositional timing of these Pit 14 suids could be constrained to between 3.03-2.58 Ma; but could have been interred as late as 2.2-2.0 Ma depending on the persistence of the population on the South African landscape during the Pleistocene.

Other than a single cf. *Raphicerus* Hamilton Smith in Griffith 1827 right juvenile mandible, the only identifiable large mammal remains from Pit 14 are two hyaenid teeth (UCMP 88738 right mandibular p4 and UCMP 88739 left maxillary P3) that were originally catalogued as *Hyaena bellax*, a species that (as noted for Pit 3) was subsequently subsumed into *Pachycrocuta brevirostris* (and could indicate any deposition period from the terminal Pliocene to within the early to mid-Pleistocene).

**Locality Name:** Pit 15, No Name, "Aves cave" in Thackeray et al. (2008)

**Peabody Locality Number:** 55-15

**UCMP Locality Number:** V73105

**Maximal biochronological age range:** N/A

This pit currently consists of a small (<1m) ditch in the ground, with no obvious *in situ* deposits or ex-situ dumps.

Thackeray et al., (2008) listed 24 blocks removed from this locale during 2006. However, from the map provided in Thackeray et al. (2008) we deduce that what they sampled as Pit 15 was really the adjacent Pit 14.

**Locality Name:** Pit 16, Equine Pit, Milo B

**Peabody Locality Number:** 55-16

**UCMP Locality Number:** V67265

**Maximal biochronological age range:** <2.33 Ma – 0.99 Ma

The equid sample from Pit 16 is the largest from a single Bolt's Farm locality, and includes the only provenienced probable tooth of *Eurygnathohippus* van Hoepen 1930 (UCMP 69467 right mandibular premolar or molar) from the Complex (Cooke, unpublished report, 1991). As a fragmentary crown with minimal occlusal wear, the specimen lacks clear morphological hallmarks of the tribe; however, the specimen is extremely small relative to typical mandibular teeth of fossil and extant *Equus* (both deciduous and permanent) and we agree with Cooke that the specimen probably represents *Eurygnathohippus*. Most of the equids are identifiable as *Equus capensis* by their simple plicae, long protocones with lingual depressions, and/or their greater linear dimensions relative to extant *Equus quagga* ssp. (Bernor et al., 2010). Only a handful of isolated teeth (UCMP 89525 mandibular premolar/molar, UCMP 89531 block with partial maxillary incisors, UCMP 89533 indeterminate canine, and UCMP 89534 maxillary premolar/molar) and an intermediate phalanx (UCMP 89538) cannot be confidently assigned to *E. capensis* based on their preserved morphology, but there is simultaneously no indication of that these specimens would necessitate an additional species of *Equus* in the Pit 16 assemblage.

As noted above, the occurrence of *Equus* in the Pit limits the age of the deposits to after 2.33 Ma, while the apparent last appearance date of *Eurygnathohippus* in South Africa in the ~1.07 Ma -0.99 Ma Cornelia-Uitzoek deposits provide a probable lower boundary on the deposits that included that specimen (Brink et al., 2012). The remaining Pit 16 faunas consist of groups with minimal chronological limits. Of the smaller mammals there is a single *Procavia transvaalensis* right maxillary molar (UCMP 89521) and a partially processed lagomorph cranium (UCMP 89499) that, while originally catalogued as *Pedetes* sp. Illiger 1811 cannot be confidently identified below the Order Lagomorpha Brandt 1855. The Pit 16 bovids are predominately isolated indeterminate alcelaphin teeth (UCMP 89539-89543, 89545-89546, 89548-89549) that were catalogued as either *Damaliscus* sp. (UCMP 89539) or as *Connochaetes taurinus* Burchell 1824. As isolated dentition, however, we advocate a more conservative retention of these specimens as indeterminate large class II-III alcelaphins. There are, however, several additional large alcelaphin teeth and partial mandibles (UCMP 89553-89556) that were originally catalogued as *Pelorocerus helmei* Lyle 1931 (subsequently synonymized with *Megalotragus priscus* Broom 1909; see Gentry, 2010) that we agree (based on both size relative to extant *Connochaetes* Lichtenstein 1814 and the simpler occlusal pattern) represent *Megalotragus priscus*. The small antilopine sample (UCMP 89550-89552; right maxillary third molar, right indeterminate mandibular molar, and right partial maxilla with deciduous premolar row, respectively) is attributable to *Antidorcas* Sundevall 1847 and appear more consistent with *Antidorcas recki* Schwarz 1932 than other fossil or extant springbok species. Three indeterminate tragelaphins craniodental specimens likely represent minimally two different species. The UCMP 89547 specimen is a partial left mandible preserving parts of the deciduous third and fourth premolars and is similar in overall size and morphology to extant *Tragelaphus angasii* Gray in Angas 1848. The UCMP 89557 (partial left mandibular third molar) and UCMP 89558 (complete left mandibular third molar) were both originally catalogued as *Strepsiceros* sp. Hamilton Smith 1827 and likely represent either a tragelaphin similar to extant *Tragelaphus strepsiceros* Pallas 1766 (alt. *Strepsiceros strepsiceros sensu* Groves and Grubb, 2011); or possibly a smaller *Taurotragus* cf. *oryx* (alt. *Tragelaphus oryx sensu* Kingdon and Hoffmann, 2013).

**Locality Name:** Pit 23, Tit Hill Pit

**Peabody Locality Number:** 55-23

**UCMP Locality Number:** V4888

**Maximal biochronological age range:** 3.03-2.58 Ma - <2.0 Ma

The recovery of several relatively complete primate and carnivore crania from Pit 23, coupled with the potentially unique taphonomic history, has made this single deposit more widely-published and discussed in the literature than any of the other fossil specimens from the Complex (Brain, 1981). A substantial collection of *Dinofelis* craniodental and postcranial specimens (UCMP 58889, 64443-64447, 69506, 69508, 80286-80288, 80309-80310, 88754-88801, 88802 [part], 89189-89190) has been collectively attributed to *Dinofelis barlowi* given the recovery of a partial cranium (TM BF 55-22 and TM BF 55-23) and several diagnostic specimens described by Cooke (1991). The recovery of this species in the Pit is consistent with deposition ~2.7 – 1.98 Ma given the occurrence within South African deposits and the current last appearance date in the Malapa deposits (Werdelin and Lewis, 2001; Lacruz et al., 2006; Herries et al., 2009; Werdelin and Peigné, 2010; Herries and Shaw, 2011; Pickering et al., 2011; Kuhn et al., 2012).

The primate sample is diverse, with the identification of *Cercopithecoides williamsi* (including the UCMP 56784/BF 42A cranium in the Evolutionary Studies Institute collections, Johannesburg; UCMP 56782-56783; UCMP 56787), *Parapapio whitei* Broom 1940 (UCMP 56785/BF 43 cranium in the ESI collections; UCMP 56794-56796; synonymised with *Parapapio broomi* Jones 1937 by Heaton, 2006; Jablonski and Frost, 2010), and *Papio hamadryas robinsoni* (UCMP 56786-56787, 56792-56793, 56797). Although the two papionin genera *Parapapio* and *Papio* both occur within the Sterkfontein Member 2 and 4 deposits, this is currently the only known occurrence of *Parapapio* and *P. h. robinsoni* in the same South African deposit (Jablonski and Frost, 2010). Both *C. williamsi* and *P. broomi* are well-represented within the 3.03-2.58 Ma Makapansgat Member 3 deposits (Herries et al., 2013) and persist into early Pleistocene South Africa deposits; whereas the recovery of *P. h. robinsoni* indicates incorporation of at least some post-2.5 Ma and potentially post-2.0 Ma specimens given the occurrence of this species in other deposits in the region (e.g., Swartkrans Members 1-3, Sterkfontein Member 5, Drimolen Main Quarry, Kromdraai A and B; Herries et al., 2009; Jablonski and Frost, 2010; Adams et al., 2016).

**Locality Name:** Pit 25, Gazelle Pit

**Peabody Locality Number:** 55-25

**UCMP Locality Number:** V67267

**Maximal biochronological age range:** <2.33 Ma – 0.78 Ma

Despite the originally attributed pit name, only a single left mandible (UC 89563) can be attributed to *Antidorcas recki*. A partial left humerus (UC 89564) catalogued as ‘?Gazelle’ cannot be confidently taxonomically attributed below the Family level. Only two other catalogued Gazelle Pit specimens have biochronological relevance. The UC 89562 left p2 was originally catalogued as *Equus* cf. *plicatus* and later considered by Cooke (1991) to represent extinct large-bodied *Equus capensis* (as *E. plicatus* has been synonymised; see Churcher, 1970; Bernor et al., 2010). The UC 88751 left mandible preserving the canine and m1 crowns was originally catalogued by Cooke (unpublished; pg. 26) as possibly representing *Canis mesomelas pappos* Ewer 1956. As diagnosis of mandibular specimens to this subspecies requires evaluation of features not preserved on this specimen (lengths of premolars and second molars relative to the m1; Ewer, 1956:113), we considered the specimen more conservatively attributable as *Canis mesomelas* Schreber 1775. As is the case with several of the Bolt’s Farm Pits, the recovery of *Equus* and *Antidorcas recki* can only provide a broad depositional age estimate between 2.33 Ma and 0.78 Ma.

**Locality Name:** Jackal Cave

**Peabody Locality Number:** 55-Jackal Cave

**UCMP Locality Number:** V67269

**Maximal biochronological age range:** N/A

Only a single, partially processed specimen (UCMP 89567; see also Monson et al., 2015: Figure 3) is catalogued in the UCMP collections. Neither the Jackal Cave locality nor the specimen was mentioned in Cooke's unpublished report on the UCMP collections, but the specimen is attributed in the UCMP catalogue as *Canis mesomelas* Schreber 1778 (and echoed by Monson et al., 2015). While the exposed portions of the cranium and left maxillary dentition are sufficient to attribute the specimen to *Canis* Linnaeus 1758, in the current state of preparation we feel attribution to species is premature given the diversity of canid species at South African Pliocene and Pleistocene deposits (as would any biochronological interpretation thereof; see also Ewer, 1956; Werdelin and Peigné, 2010).

**Locality Name:** New Cave

**Peabody Locality Number:** 55-New Cave

**UCMP Locality Number:** V67268

**Maximal biochronological age range:** N/A

Neither the New Cave locality nor processed specimens are discussed in Cooke's unpublished report although specimens from the deposit have been briefly noted by Monson et al. (2015). The UCMP 89566 left lower molar (m1 or m2) was catalogued as *Alcelaphus* sp., but as an isolated indeterminate position alcelaphin tooth we would advocate a more conservative attribution to the Tribe level (*contra* Monson et al., 2015). Similarly, UCMP 89565 represents a collection of 7 alcelaphin teeth (one right and four left maxillary molars, one left m3, and one probable right p3) that were catalogued as the extant *Damaliscus pygargus* Pallas 1767 (*sensu* Rookmaaker, 1991; alternatively *Damaliscus dorcas* Pallas 1766; see discussion in Gentry, 2010:790) that are more confidently considered a medium-sized alcelaphin (large Class II – small Class III bovid) given the diversity of fossil alcelaphin species with overlapping dental morphology. Although Monson et al. (2015) have listed an isolated left maxillary third premolar they attribute *Equus burchelli* Boddaert 1785 (alt. *Equus quagga burchelli*) this was not a specimen catalogued from New Cave prior to their publication or located during our analysis of the UCMP collections in 2007 or 2013; nor do Monson et al. provide a catalogue number for the specimen in their Supplementary Table 2. If this specimen is accepted as derived from the New Cave deposits, it would indicate deposition after 2.33 Ma.

**Locality Name:** Waypoint 160

**Peabody Locality Number:** N/A

**UCMP Locality Number:** N/A

**Maximal biochronological age range:** N/A

Both isolated macro- and micromammals from the Waypoint 160 deposits have been noted across a series of publications (Senegas and Avery, 1998; Senegas and Michaux, 2000; Senegas, 2002; Gommery et al., 2008; Thackeray et al., 2008; Gommery et al., 2016). The only macromammal remains identified from Waypoint 160 are attributed to *Panthera* cf. *leo* (unknown element and number; Gommery et al., 2016) and cercopithecoid craniodental and postcranial specimens. The entire sample of cercopithecoid specimens (largely partial postcranial elements and two isolated partial teeth) were originally attributed to *Parapapio* sp. (Gommery et al., 2008); subsequently revised to cf. *Parapapio* sp. (Gommery et al., 2014:6) and most recently referred to with the ambiguous phrase 'temporally

related to the genus *Parapapio*' (Gommery et al., 2016).

The temporal relationship of the Waypoint 160 cercopithecoid specimens to the genus *Papio* arises from an interpreted late Pliocene (4.5-4.0 Ma) depositional age based on the occurrence of a novel murid rodent (*Euryotomys bolti*) that is morphologically intermediate between *Euryotomys pelomyoides* (Pocock, 1976) from Langebaanweg E Quarry deposits and the earliest known true Otomyinae from Makapansgat (both the Grey Bone Breccia of Member 3 and Rodent Corner; Sénégas and Avery, 1998; Denys, 1999). However, constructing a limited depositional age for the Waypoint 160 specimens from the presence of this murid is problematic. For one, the age of the Rodent Corner micromammal faunas from the Makapansgat Limeworks as older (>3.0 Ma) than the Grey Bone Breccia (3.05-2.56 Ma) is tentative, and itself based on the deposits yielding a diachronic mix of species recovered at both the Pliocene Langebaanweg EQ and early Pleistocene deposits of Sterkfontein, Swartkrans, and Kromdraai (Denys, 1999; Hopley et al., 2006; Herries et al., 2013). And critically, other than the intermediate morphology of *E. bolti* relative to specimens from the temporally and geographically disparate Langebaanweg and Makapansgat sites, all that is currently known about the origin, duration, and biogeography of the species comes from the Waypoint 160 sample. As a result, there is effectively no first or last appearance date for *E. bolti* that independently informs on the age of the Waypoint 160 deposits. We also note that the biochronological interpretation of Waypoint 160 is further complicated by the suggested occurrence of *Panthera* cf. *leo* at the deposit; a taxonomic group only considered identifiable after 2 Ma (Werdelin and Peigné, 2010; Gommery et al., 2016).

**Locality Name:** Brad Pit A and B

**Peabody Locality Number:** N/A

**UCMP Locality Number:** N/A

**Maximal biochronological age range:** N/A

This area currently under excavation, was first identified as two localities by Gommery et al., (2012). Subsequent excavations have removed material, resulting in two separate areas merging to become one site simply called Brad Pit.

Although no primary element descriptions or counts of fossil specimens from the Brad Pit A or B deposits has been provided in the literature, a tabulated listing of carnivore species from the two deposits was provided by Gommery et al. (2016). The carnivores from Brad Pit B are limited to three taxa (indeterminate hyaenid, *Panthera* cf. *pardus*, cf. *Panthera*), all of which are also listed as recovered from the Brad Pit A deposits. There is a diverse range of felids as well as canids and a hyaenid in the Brad Pit A sample, but as ultimately the specimens are only attributed as comparable to species or genera (e.g., cf. *Dinofelis*, cf. *Megantereon*, cf. *Homotherium*, *Panthera* cf. *leo*, cf. *Caracal*, *Vulpes* cf. *chama*), many of which are modern lineages, it cannot provide definitive biochronological limits for the Brad Pit deposit sample.

The most recent publication from the Bolt's Farm Complex has noted the recovery of some mammalian and avian faunas from the Brad Pit B deposits (Pavia et al., 2017). While mentioning the recovery of primate specimens attributed to *Parapapio* sp., and indeterminate antelope, and microfauna none of the Brad Pit B mammals have been listed or described to date. Although a provisional biochronological age of 3.5-3.0 Ma for the Brad Pit B '*Parapapio* spot' is suggested, this is based on unspecified, and currently unpublished and undescribed, microfaunal remains reported through a personal communication that cannot be independently verified or evaluated at this time.

### *3.0 PITS WITH LITTLE TO NO BIOCHRONOLOGICAL SIGNIFICANCE*

**Locality Name:** 12, 12B, 13, 17-22, 24

Pits 12 (12A Senegas 2002), 12 B (Senegas 2002) and 13 (Thackeray et al., 2008) do not present any important palaeontological material and subsequent studies on them have been limited. According to Cooke (1991 pp.21) pits 17-22 “yielded no worthwhile material” Additionally, “Pit 24 yielded some rodent breccia a fragment of indeterminate baboon cranium and a piece of a small carnivore” (Cooke 1991 pp.21). Additionally of pits 17-22 Cooke (1991 pp.21) noted that they “were not mapped as they yielded no worthwhile material”. Pit 24 is noted as having rodent breccia and yielding an indeterminate baboon cranial fragment and a small piece of carnivore bone (Cooke 1991). There is no evidence that Pit 24 has been studied subsequently.



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