CHAPTER 1

Background

1.1 HISTORY AND RATIONALE

Mammalian palaeontological and archaeological work in southern African has a history reaching back nearly two centuries, though this initially took the form of what Underhill (2011) calls a 'Victorian penchant [for] the recognition and collection of artefacts'. Probably the first published report of a fossil from South Africa was made in 1839 (Bain 1839; Seeley 1891), while T. H. Bowker excavated artefacts from near the mouth of the Fish River in 1857, and a Palaeolithic stone implement from Cape Town was sent to England in 1866 (Malan 1970). It was not until early in the twentieth century that palaeontological work began in earnest (e.g. Broom 1909a, 1909b and Péringuey 1911) published seminal works on the Stone Ages of South Africa. What might be described as the modern era began some 20 years later. South African mammalian palaeontology received a major boost with the report of *Australopithecus africanus* from Taung (Dart 1925), and by the second half of the 1930s Broom (e.g. 1936a, 1936b, 1937a, 1937b) had begun to describe material from the extremely rich limestone caves of the then Transvaal (now Gauteng), which continue to yield new forms (e.g. Berger *et al.* 2015; Fourvel 2018). The palaeontological importance of Namibia (then South West Africa) only began to be appreciated during the 1920s (e.g. Stromer 1921), but the importance of this country for Eocene and Miocene mammalian evolution has since become abundantly clear through the ongoing work of Martin Pickford and colleagues, especially Brigitte Senut, Jorge Morales and Pierre Mein. The systematic study of southern African archaeology has a similar history, beginning with the work of Goodwin and van Riet Lowe (e.g. 1929). However, archaeologists were not at first concerned with the faunal element, apart from human remains, which received attention from very early on (e.g. Shrubsall 1911). One of the earliest general faunal reports was that of Brain (1969) on material from Bushman Rock Shelter. From these beginnings there has developed exponentially a body of information on around 650 taxa collected from over 600 sites in more than 150 degree-squares dating from the Eocene onwards.

With such an ever-growing wealth of data it has become increasingly difficult, especially for non-specialists, to find information on specific taxa. Unannotated maps of large mammal distributions during the last 30 000 years have been published (Plug and Badenhorst 2001), but these required updating and their coverage expanding. In particular, the taxonomy of all included genera and species needed attention. The taxonomic data are often hard to locate, with incomplete citations to original descriptions and older publications difficult to find. Moreover, some groups have been updated and it is not always easy for non-specialists to track taxa through to their current nomenclature. To help solve these problems it seemed that the time was right to bring

together available taxonomic and distributional information on terrestrial mammalian species or genera recorded from palaeontological and archaeological sites in mainland southern Africa.

This compilation is also intended to complement others covering modern distributions (e.g. Skinner and Chimimba 2005) and historical records (e.g. Boshoff *et al.* 2016; Rookmaker 1989; Skead 2011) and, in so doing, extend knowledge of the distribution of many extant taxa into the past. Although there is some temporal overlap between the historical records and the late Holocene (Iron Age) archaeological records, a distinction can be made according to the source of the records. Thus, historical records are written reports of sightings of live or recently dead animals, mainly by early European travellers. Palaeontological and archaeological records, on the other hand, relate solely to excavated fossil and sub-fossil material. It is information from the latter sources that has been included here. Apart from any other consideration, it is hoped that making the historical evidence available will encourage neontologists to incorporate these data into their studies more regularly. Conservationists will also find it a useful source when they decide whether it is appropriate to re-introduce extirpated species onto a reserve.

1.2 SOUTHERN AFRICA

Mainland southern Africa is usually thought of in terms of countries, which, in this case, would include Botswana, Lesotho, Mozambique (southern half), Namibia, South Africa, Swaziland and Zimbabwe. However, political boundaries have been disregarded here because they have no biological significance. Instead, for the purposes of this study, southern Africa is taken to comprise mainland Africa south of the Kunene (Cunene) and Zambezi Rivers, that is, south of approximately 15°S (Figure 1.1). Among the various delimitations of southern Africa, this one was chosen because the significant barrier formed by these rivers is likely to have greatly influenced animal movements at various times during the period covered. For those wishing to know more about the major factors affecting mammalian distribution patterns, the geomorphological setting is provided by Partridge (2010), while Feakins and DeMenocal (2010) and Jacobs *et al.* (2010) describe the other major, and interlinked, influencing factors of climate and vegetation respectively.

1.3 MAMMALS

The full taxonomy of animals has a great many levels, as can be seen in *The Taxonomicon* (http://taxonomicon.taxonomy.nl). However, it is usual (and conventional) for general purposes to disregard ranks higher than Class Mammalia when considering the mammals. Below this level one may include as many or as few ranks as required. Here, only the supra-generic ranks of Order and Family (with suborder and subfamily where these are recognised) are given, both because many workers do not include a complete taxonomy and because further levels are not normally necessary in non-taxonomic works. Only taxa identified to species or genus in the palaeontological and archaeological samples are included. Details for the lowest level of identification are given in the text so that genera are only listed separately when material was not identified to species level. Identifications above the generic level have been disregarded pending more precise identification. Thus, although an author may have listed the family Canidae (dogs), for

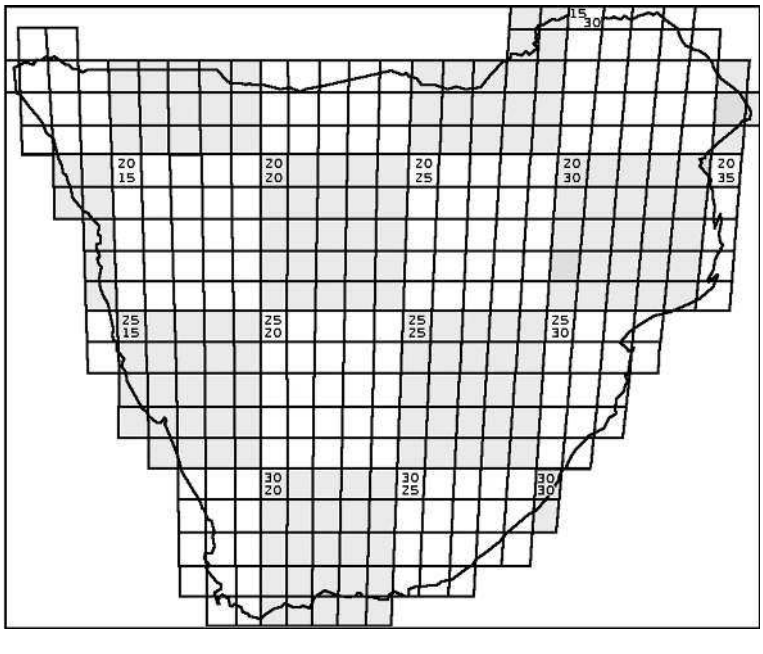


Figure 1.1 Southern Africa base map marked in degree squares and shaded in five-degree squares. Numbers in the top left-hand corner of each five-degree block indicate degree latitude above and longitude below of the degree square in that corner. As an example, 2015 indicates the square is 20°S 15°E.

example, this will not appear as a separate record. Extinct taxa are identified by the conventional symbol †. Author and citation details are given for genera and species but not higher taxa. Common names, which are included for extant species, follow Wilson and Reeder (2005). Listed synonyms comprise those given in the literature from which data were collected for this study and are intended as an aid to updating and correlating faunal lists, not as full taxonomic synonymies. The database relies on published records of taxa so far represented in the fossil record, that is, material excavated or otherwise recovered from palaeontological and archaeological sites. Unless there is reason for doubt, in which case a comment is included under the taxon description, published identifications have been accepted as accurate. Unpublished data, apart from personal records, have been omitted, partly because not all are in the public domain.

The order of presentation is based on Wilson and Reeder (2005), augmented as necessary for extinct and newly erected taxa. General works consulted include Allen (1939), Bronner *et al.* (2003), Ellerman *et al.* (1953), McKenna and Bell (1997), Roberts (1951) and Werdelin and Sanders (2010). The latter generally provide the most recent treatments of modern and fossil mammalian taxa in Africa, and these have been followed except in cases where subsequent changes have been published. Volumes of certain journals, such as the *Proceedings of the Zoological Society of London*, were originally numbered by year, although the year of publication was the following year. On occasion, this has caused some confusion in the citation, but it would appear that the volume year, rather than the publication year, is now generally accepted for this purpose.

1.4 SITES

There is an exponential increase in the number of samples from the earliest to the latest epoch, despite the fact that the epochs are of decreasing duration through time (Table 1.1). Some sites have produced material dated to more than one epoch so that the total number of sites is slightly lower than that of the samples. Location of the sites is based on published information in most cases. Although precision of coordinates varies, it is generally adequate for the construction of the distribution maps. In all cases latitude is given before longitude. Thus, as an example, 2925:2228 is 29°25′S; 22°28′E. When more precise coordinates are unavailable, 3218BB or 3218, for example, indicate the quarter degree or degree square in which a site is located. In some cases, several different latitudes and longitudes have been found for one site, but these are generally within a few seconds of each other. Primary sources should be consulted.

Table 1.1 Boundaries of Cenozoic epochs from the Eocene upwards, according to Cohen *et al.* (2013, updated), and number of sites providing data in each epoch. The Oligocene is not yet definitively represented in southern Africa.

Epoch	Date (Ma)	No. sites
Holocene	<0.0117	417
Pleistocene	0.0117–2.58	204
Pliocene	2.58–5.333	23
Miocene	5.333–23.03	25
Oligocene	23.03–33.9	1?
Eocene	33.9–56.0	5

1.5 MAPPING

For the purposes of mapping taxa, distribution is recorded at the level of one-degree squares, that is, one degree of latitude by one degree of longitude. This has been done even where more precise localities are recorded because of the size of the database and the area covered. There are 350 degree-squares in the region (Figure 1.1), and excavations in 153 of these have so far yielded remains of mammals. Only type localities for fossil genera and species occurring within southern Africa are listed, and these are shown in black on the distribution maps. The faunal lists for each site are those given in the references cited, except where they have been updated as necessary (see text for more information).

1.6 DATING

Sites have been dated to various levels of precision from a few decades in later sites to epochs in earlier sites. Epochs are intermediate-level groupings in the International Chronostratigraphic Chart (Cohen *et al.* 2013, updated). This level is convenient for present mapping purposes even where greater dating precision for individual sites is available. The period spanned by epochs is progressively shorter towards the present

(Table 1.1). So far, the Oligocene, which lies between the Eocene and the Miocene at 33.9–23.03 Ma, is not yet conclusively represented. If, however, Sallam and Seiffert (2016) are correct in proposing that *Protophiomys algeriensis* is of Oligocene rather than Eocene age, it would be the first material of this age recovered from southern Africa.

In most cases there is no problem with assigning a site to a particular epoch. However, confusion can arise over assignment of some sites, notably in the Cradle of Humankind, that have been labelled informally as Plio-Pleistocene. This practice, which arose at a time when the boundary between the two epochs was placed at 1.80 Ma, has been continued by some palaeoanthropologists even though it is no longer useful in view of the revised boundary of 2.58 Ma (Cohen *et al.* 2013, updated), which allows almost all the Cradle sites to be placed within the Pleistocene.

CHAPTER 2

The Eocene

2.1 EOCENE MAMMALS

The Eocene mammalian fauna is notable for its high proportion of extinct forms. Of the eight Orders represented, Cimolesta, Embrithopoda and Creodonta are extinct, as are all of the genera and species and most of the families. Many new species were recently described from the region (Pickford 2015a–2015f, 2018a), thereby adding significantly to the known fauna of the epoch. Despite this, the diversity of taxa known from each Order is much lower than is the case with younger material. Whether this results from the paucity of sites (see below) remains to be seen. The Order Rodentia (rodents) is by far the most diverse, with eight families. Only Afrosoricida (tenrecs and golden moles) and Hyracoidea (hyraxes) have more than one, and, at three each, this is the most diverse at the family level they have been in the region. A fruit bat possibly belonging to the subfamily Propottininae has been described from Black Crow (Pickford 2018b) but not assigned to genus or species. It is significant in that it is the only member of the suborder Megachiroptera so far recovered from the region, although it cannot be included in the lists until a full identification has been published.

ORDER: †CIMOLESTA

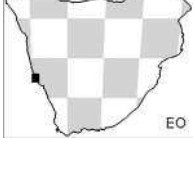
FAMILY: †TODRALESTIDAE

†Namalestes gheerbranti Pickford, Senut, Morales, Mein and Sanchez, 2008. *Geol. Surv. Namibia Mem.* 20: 468.
Type locality: Black Crow.

ORDER: AFROSORICIDA
Suborder: Tenrecomorpha

FAMILY: POTAMOGALIDAE

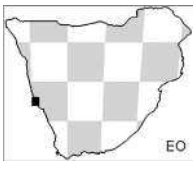
†Namagale grandis Pickford, 2015. *Comm. Geol. Surv. Namibia* 16: 119.
Type locality: Eocliff.



FAMILY: TENRECIDAE

†Arenagale calcareus Pickford, 2015. *Comm. Geol. Surv. Namibia* 16: 140.
Type locality: Eocliff.

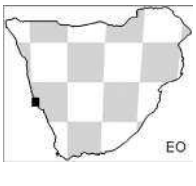
†Sperrgale minutus Pickford, 2015. *Comm. Geol. Surv. Namibia* 16: 130.
Type locality: Eocliff.



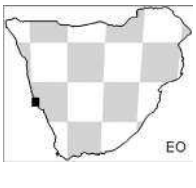
Suborder: Chrysochloridea

FAMILY: CHRYSOCHLORIDAE

†Diamantochloris inconcessus Pickford, 2015. *Comm. Geol. Surv. Namibia* 16: 109.
Type locality: Black Crow.



†Namachloris arenatans Pickford, 2015. *Comm. Geol. Surv. Namibia* 16: 148.
Type locality: Eocliff.

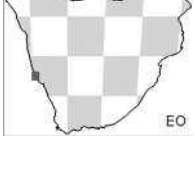


ORDER: MACROSCELIDEA

FAMILY: MACROSCELIDIDAE

Subfamily: †Myohyracinae

†Myohyrax Andrews, 1914. *Quart. J. Geol. Soc. Lond.* 70: 171.



ORDER: †EMBRITHOPODA

FAMILY: †ARSINOITHERIIDAE

†Namatherium blackcrowense Pickford, Senut, Morales, Mein and Sanchez, 2008. *Geol. Surv. Namibia Mem.* 20: 479.
Type locality: Black Crow.
Additional references: Gheerbrandt *et al*. (2018); Sanders *et al.* (2010b).

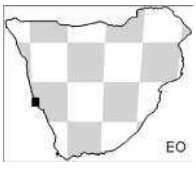
ORDER: HYRACOIDEA

FAMILY: †GENIOHYIDAE

†Namahyrax corvus Pickford, Senut, Morales, Mein and Sanchez, 2008. *Geol. Surv. Namibia Mem.* 20: 474.
Type locality: Black Crow.
Comments: this taxon was originally assigned to Namahyracidae but is now placed in Geniohyidae by Pickford (2018c).
Additional references: Pickford (2015e).

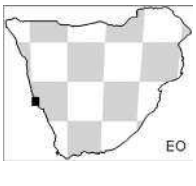
FAMILY: PROCAVIIDAE

†Rupestrohyrax palustris Pickford, 2015. *Comm. Geol. Surv. Namibia* 16: 206.
Type locality: Eoridge.



ORDER: PRIMATES

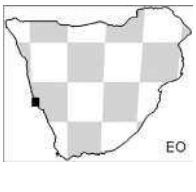
†Notnamaia bogenfelsi Pickford, Senut, Morales, Mein and Sanchez, 2008. *Geol. Surv. Namibia Mem.* 20: 487.
Type locality: Black Crow.
Synonyms: *Namaia.*
Additional references: Pickford and Uhen (2014).



Suborder: Strepsirrhini

FAMILY: LORISIDAE

†Namaloris rupestris Pickford, 2015. *Comm. Geol. Surv. Namibia* 16: 196.
Type locality: Eocliff.



ORDER: RODENTIA

FAMILY: †PARAMYIDAE

Subfamily: †Reithroparamyinae

†Namaparamys inexpectatus Mein and Pickford, 2018. *Comm. Geol. Surv. Namibia* 18: 40, 41.
Type locality: Black Crow.

Suborder: Sciuravida

FAMILY: †CHAPATTIMYIDAE

Subfamily: †Protophiomyinae

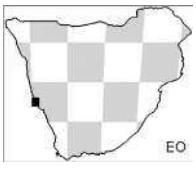
†Protophiomys algeriensis Jaeger, Denys and Coiffait, 1985. In: Luckett and Hartenberger, *Evolutionary Relationships Among Rodents*: 569.
Comments: these *Protophiomys* specimens may be Oligocene (Sallam and Seiffert 2016) or even Miocene in age (Marivaux *et al.* 2014).

Suborder: Anomaluromorpha

FAMILY: †ZEGDOUMYIDAE

†Glibia namibiensis Pickford, Senut, Morales, Mein and Sanchez, 2008. *Geol. Surv. Namibia Mem.* 20: 488.
Type locality: Black Crow.
Comments: this species is considered to belong to the genus *Zegdoumys* by Marivaux *et al.* (2011, 2015).

†Tsaukhaebmys calcareus Pickford, 2018. *Comm. Geol. Surv. Namibia* 18: 50, 51.
Type locality: Black Crow.



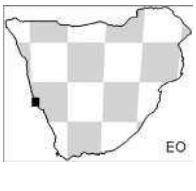
Suborder: Hystricomorpha

FAMILY: †DIAMANTOMYIDAE

Subfamily: †Metaphiomyinae

†Metaphiomys schaubi Wood, 1968. *Bull. Peabody Mus. Nat. Hist.* 28: 58.

†Prepomonomys bogenfelsi Pickford, Senut, Morales, Mein and Sanchez, 2008. *Geol. Surv. Namibia Mem.* 20: 490.
Type locality: Silica North.



FAMILY: †BATHYERGOIDIDAE

†Bathyergoides Stromer, 1923. *Sitz. Math.-Physik. Klasse Bayer. Akad. Wiss. München* 1923(II): 263.
Type locality: Sperrgebiet.

FAMILY: †MYOPHIOMYIDAE

Subfamily: †Phiocricetomyinae

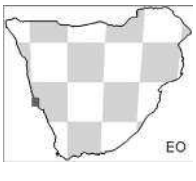
†Silicamys cingulatus Pickford, Senut, Morales, Mein and Sanchez, 2008. *Geol. Surv. Namibia Mem.* 20: 489.
Type locality: Silica North.

†Talahphiomys lavocati Wood, 1968. *Bull. Peabody Mus. Nat. Hist.* 20: 45.
Synonyms: *Phiomys*.
Additional references: Jaeger *et al.* (2010).

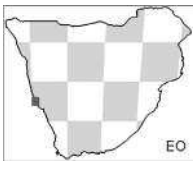
FAMILY: THRYONOMYIDAE

†Apodecter stromeri Hopwood, 1929. *Amer. Mus. Novit.* 344: 3.
Type locality: Lüderitz Bay (south of) (?Langental: Mein and Pickford [2008c]).

†Gaudeamus Wood, 1968. *Bull. Peabody Mus. Nat. Hist.* 20: 68.



†Namaphiomys Mein and Pickford, unpublished.
Comments: *Namaphiomys* is a *nomen nudum*, awaiting publication, according to M. Pickford (pers. comm. 2016).

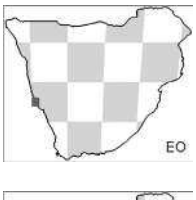


†Phiomys phiomyoides Wood, 1968. *Bull. Peabody Mus. Nat. Hist.* 20: 41.

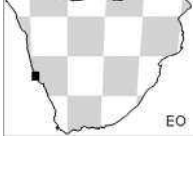
FAMILY: †TUFAMYIDAE

Comments: Pickford (2018f) places this family within the Infraorder Hystricognathi (Suborder Ctenohystrica according to Huchon *et al*. [2000, 2002]) but Hystricognathi is included in the Suborder Hystricomorpha by Wilson and Reeder (2005), whose arrangement is followed here.

†Efeldomys Mein and Pickford 2008. *Geol. Surv. Namibia Mem.* 20: 257.
Type locality: Elisabethfeld.
Additional references: Pickford (2018f).
Comments: this genus was originally placed in Bathyergidae but is now transferred to Tufamyidae (Pickford, 2018f).



†Tufamys woodi Pickford, 2018. *Comm. Geol. Surv. Namibia* 19: 75.
Type locality: Eocliff.



ORDER: †CREODONTA

FAMILY: †HYAENODONTIDAE

Subfamily: †Hyainailourinae

†Pterodon De Blainville, 1839. *Ann. Franç. Etran. Anat. Physiol.* 3: 23.
Additional references: Holroyd (1999); Lewis and Morlo (2010).