IV Appendix

REPORT ON INVETEBRATE FROM KIRIMUN

By

Martin Pickford

National Museums of Kenya

Invertebrates are uncommon at the Kirimun localities in comparison with the abundant remains of vertebrates. During the 1980 expedition twenty gastropods and three insecta specimens were collected. In addition Pain et al. (1964) list three gastropods, two collected by the Harvard University 1963 expedition and one by the British-Kenya Miocene expedition of 1949. Verdcourt 1963, lists two specimens of Ligatella collected in 1949. During that expedition a total of five snails was found.

The insect remains occur as internal moulds of cocoons. All three specimens evidently hatched, since they each have a characteristic "open" end. Little can be said about the affinities of these specimens, except that they probably represent moth cocoons deposited in loose dry soil. They measure about 10 mm diameter 17 mm length (open end to apex.)

The gastropods belong to six genera, five of which are terrestrial, the fifth aquatic.

Most numerous is the genus Ligatella with thirteen specimens and one operculum. There are four examples of Limicolaria, three of Saulea, two of Burtoa cf nilotica, one of Maizania, and a single specimen which may represent Edouardia.

Ampullariidae

Saulea lithoides Pain and Beatty, 1964.

3 specimens of internal moulds - Kir 4 in the Kenya National Museum
MCZ 28018 in Harvard
MCZ 28017 in Harvard

Pain et al.(1964) describe and discuss the ecological significance of Saulea from Kirimun. The genus is restricted to West Africa in its modern range. It inhabits swamps in the coastal region of Sierra Leone. It's discovery in middle Miocene deposits of Kenya is thus of great interest. No new material of this genus was recovered in 1980.

Cyclophoridae

Maizania lugubrioides Verdcourt 1963

One specimen - Kir 1 in Nairobi

The species, M. lugubrioides is represented by a single internal mould collected in 1949. Its preservation suggests that it comes from Kirimun South, an indication not differing from the field catalogue. It is a large specimen most similar to M. lugubrioides of Verdcourt, 1963.

Maizania generally occurs today in rain forest to dry forest.

Pomatiasidae

Ligatella sp.

13 specimens - (Kir 2'49,
1 specimen of operculum - Kir 5, Kir 9'80,
Kir 167 - 176'80
Kir 41'80) all in the Kenya National Museum.

Verdcourt (1963) lists two specimens of Ligatella from Kirimun, as L. sp. A and L. sp. B. Both specimens are poorly preserved as are the eleven new specimens collected by the 1980 expedition. In addition a single circular disc with a central perforation and featherlike ornamentation was recovered, which is probably the operculum of Ligatella.

Ligatella is at present a genus typically of savannah grassland and greassy bushland, although it is also common in the Kibwezi dry forest of Southern Kenya. According to Verdcourt (1963) the fossil forms most closely resemble living species restricted to areas of less than 35" (890-mm) rainfall per annum.

Enidae

? Edouardia sp.

One specimen - Kir 177'80 in Nairobi

A single gastropod has the carinated edge usual in Edouardia. However, the poor condition of the specimen precludes certainty in the identification which must remain provisional until better material becomes available. The size of the specimen, which is incomplete, is compatible with E. (?) mfwanganensis Verdcourt. The material is rather poor for the purposes of ecological indication.

Achatinidae

Burtoa cf. nilotica

Two specimens - marked Kir S. in Nairobi

One undistorted and one slightly squashed snail internal moulds are characteristic of Burtoa. Both have slight traces of the Burtoa type of sculpture described by Verdcourt (1963, p. 14). On its own, Burtoa throws little light on the palaeoecoloty of the area in the middle Miocene since living representatives range in habitat from forest to savannah. However, as part of a fauna including Ligatella and Maizania it suggests drier forest conditions.

Limicolaria sp.

Four specimens - Kir 38-40'80, Kir 188'80 housed in Nairobi

Four internal moulds of snails most probably identifiable as Limicolaria were recovered by the 1980 expedition. All are considerably smaller than L. leakeyi Crowley and Pain, but are of comparable size to L. martensianq. Since Limicolaria is cosmopolitan in its habitat preferences, little of palaeoecological value can be obtained from these specimens.

Preservation

All the specimens are preserved as internal mould in calcified quartz sand/silt. Ligatella is similarly preserved, but the silt is finer and more calcareous.

Two separate localities yielded the material, the larger species from Kirimun South, while Ligatella, cf. Edouardia and the insect cocoons came from the western gully system of Shackleton's Kirimun site 1.5 km to the south of Kirimun south site. The fossiliferous horizon in Shackleton's Kirimun Site which yielded the snails is a pale-gray marl, probably deposited as an overbank silt and then altered pedogenically before burial. The insect cocoons provide good evidence of subaerial exposure of the bed and of its soft, friable and relatively dry condition after deposition, because unfossilised cocoons would be most unlikely to survive the hazards of transportation once they had hatched. The snails from this bed are all of terrestrial affinities.

The snails from Kirimun South Site are in coarser sandy silt of fluviatile origin. The exact locality of the Saulea specimens is not known to us, but judging from the photographs given in Pain et al. (1964) they could be from the same bed that yielded the Burtoa and Limicolaria specimens in 1980.

The operculum of ?Ligatella came from the surface of Kirimun South Site, and its detailed provenance is not known. It is however the only Ligatella known to come from this particular area of sediments.

Palaeoecology

Saulea provides good evidence of swampy to fluvial environments which is in agreement with the large numbers of turtles (both pelomedusid and Trionyx) fish and crocodiles found in the area. The strata are predominantly fluviatile in origin.

The terrestrial gastropods are important in the information they can impart on the possible environmental conditions near Kirimun during the middle Miocene. The fauna as a whole suggests dry forest as for example exists today in the Kibwezi area of Kenya. At Kibwezi, *Ligatella* and *Maizania* are common and occur alongside *Burtoa* and *Limicolaria*, as well as *Edouardia* and *Bloyetia*. The only taxon among this fauna not so far recorded from Kirimun is Bloyetia.

The indication is that Kirimun during the accumulation of the middle Miocene sediments was probably in a dry forest zone of less than 35" (890 mm) annual rainfall.

The modern fauna from Kirimun is completely different from the fossil one. *Helicarion* is common in patches of scrub forest while *Limicolaria* is abundant everwhere. Less common are *Bloyetia* and *Gonaxis*. Apart from *Limicolaria* none of these genera is known in the fossil state at Kirimun.

Table 1. Snails from Kirimun South and Shackleton's Kirimun Site

1949 Collection	1963 Collection	1980 Collection
2 Ligatella	2 Saulea	13 Ligatella
1 Maizania		1 ?Edouardia
1 Saulea		2 Burtoa
1 Unknown		4 Limicolaria
5	2	20

References

Verdcourt, B. 1963 The Miocene non-marine mollusca of Rusinga Island, Lake Victoria and their localities in Kenya. Palaeontographica, 121A : 1-37.

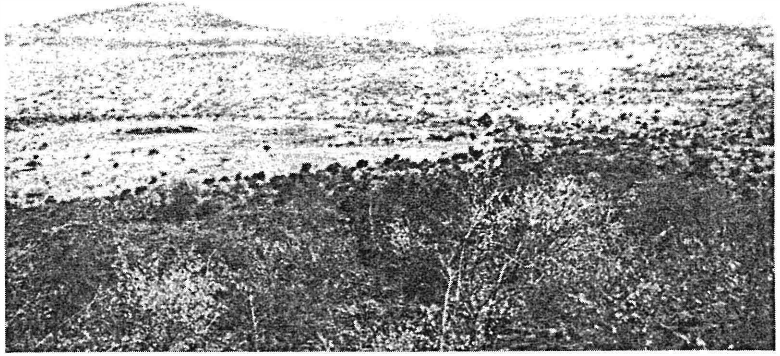
Pain, T. and Beatty, D. 1964 A new species of freshwater gastropod mollusc of the genus Saulea from the Miocene of Kenya. Breviora, 212 : 1-5.

Explanation of Plate 1

Fig. 1. South Kirimun (white coloured part) and Shackleton Kirimun (north view)

Fig. 2. Excavation Site C of South Kirimun (northeast view)

Fig. 3. North Kirimun over South Kirimun (south view)



1

2

3

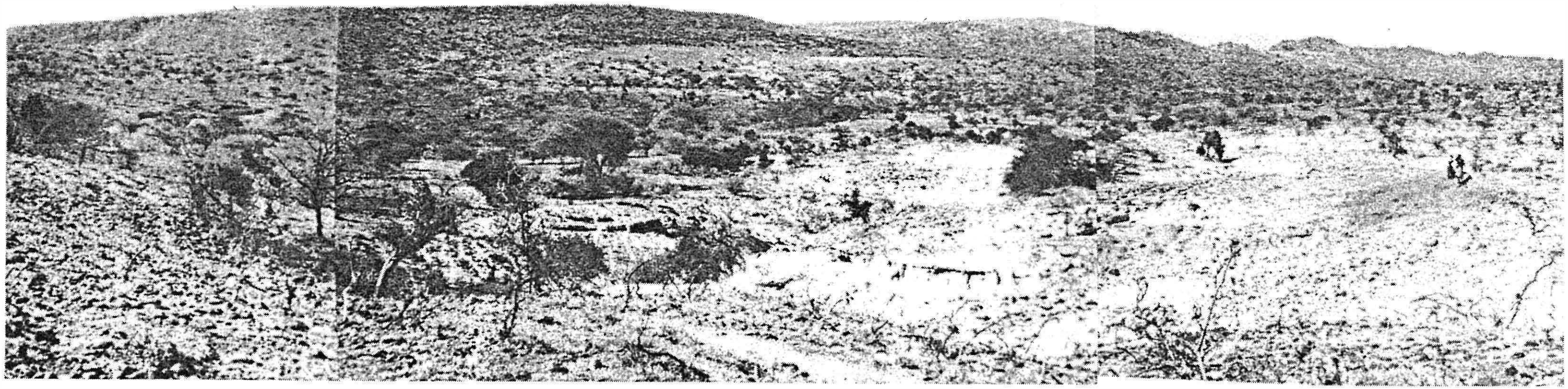


Plate 1

Explanation of Plate 2

Fig.1. South Kirimun (general view).

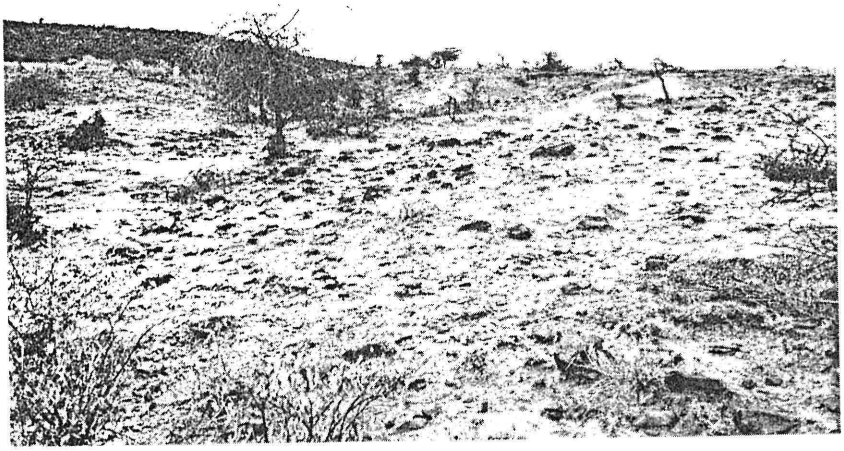
Fig.2. Site A of South Kirimun.

Fig.3. Site B of South Kirimun.

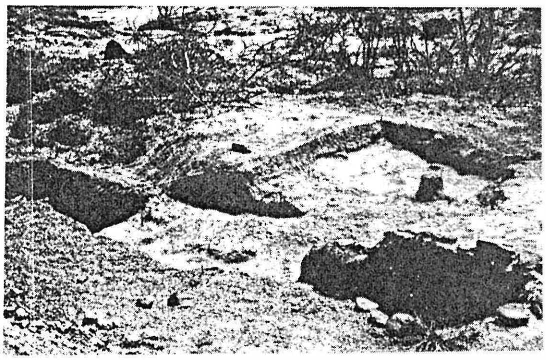
Fig.4. Site F of South Kirimun.

Fig.5. Site G of South Kirimun.

1

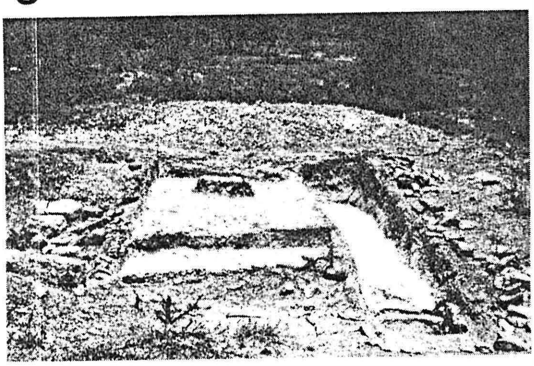


2



4

3



5

Explanation of Plate 3

Paraphiomys cf. *pigotti* Andrews from Site C of South Kirimun

Figs.1-4. Left maxillary fragment with $dP^4 \sim M^3$ (KSE-12-80)

Fig.1. Dentition in occlusal view. x5.

Fig.2. Occlusal view. x10

Fig.3. Labial view. x10

Fig.4. Lingual view. x10

Figs.5-7. Left maxillary fragment with dP^4 and M^1 (KSE-8-80)

Fig.5. Occlusal view. x10

Fig.6. Lingual view. x10

Fig.7. Labial view. x10

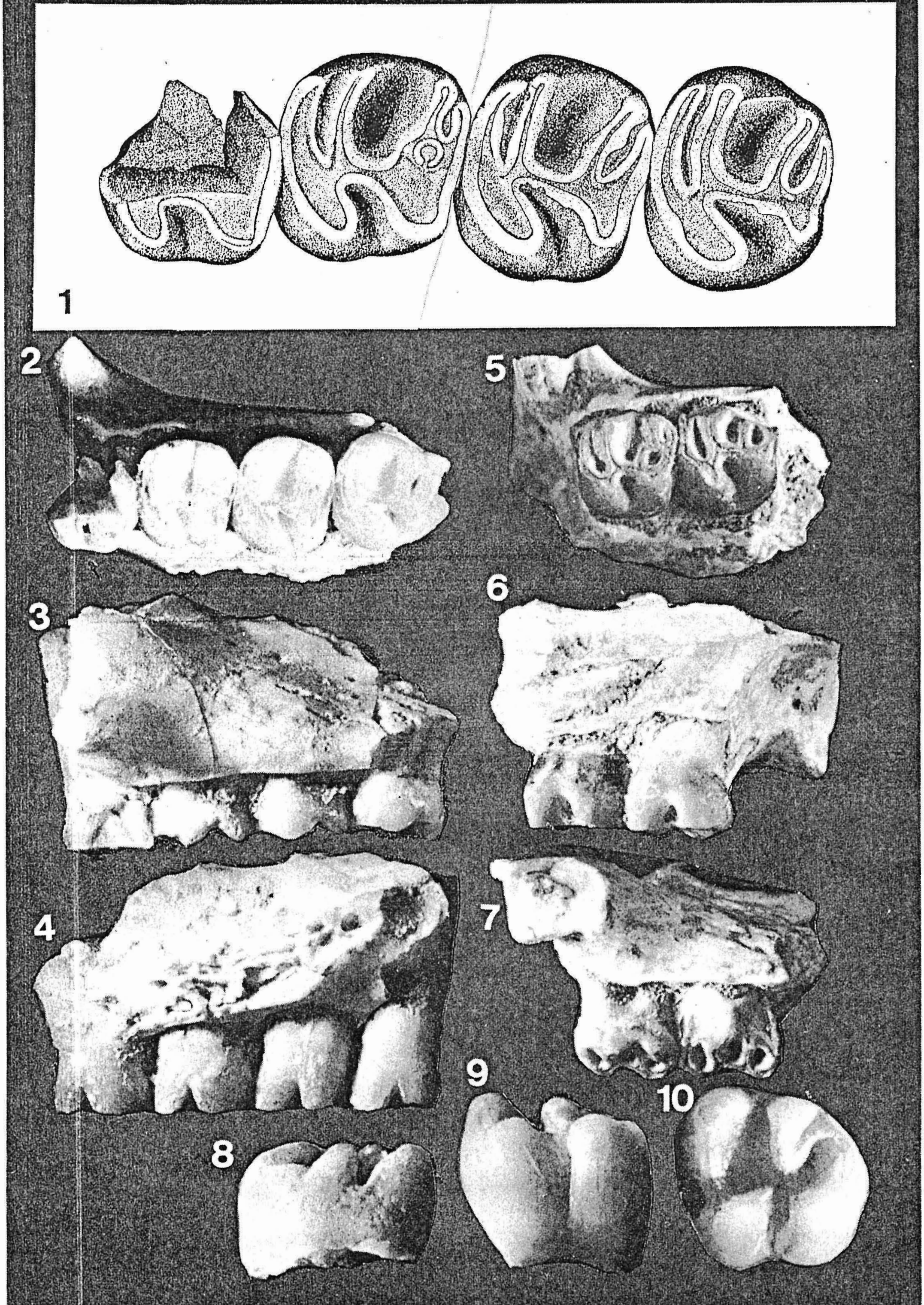
Paraphiomys sp. from Site C of South Kirimun

Figs.8-10. Left M_3 (KSE-154-80)

Fig.8. Lingual view x10

Fig.9. Labial view. x10

Fig.10. Occlusal view. x10


1
2
3
4
5
6
7
8
9
10

Explanation of Plate 4

Paraphiomys cf. *pigotti* Andrews from Site C of South Kirimun

Figs.1-3. Right maxillary fragment with $dP^4 \sim M^3$ (KSE-7-80).

Fig.1. Occlusal view x5

Fig.2. Lingual view x5

Fig.3. Labial view. x5

Figs.4-6. Left dP_4 (KSE-162-80)

Fig.4. Occlusal view. x10

Fig.5. Lingual view. x10

Fig.6. Labial view. x10

Figs.7-9. Right M_2 (KSE-153-80)

Fig.7. Occlusal view. x10

Fig.8. Labial view. x10

Fig.9. Lingual view. x10

Figs.10-12. Right dP_4 (KSE-9-80)

Fig.10. Lingual view. x10

Fig.11. Labial view. x10

Fig.12. Occlusal view. x10

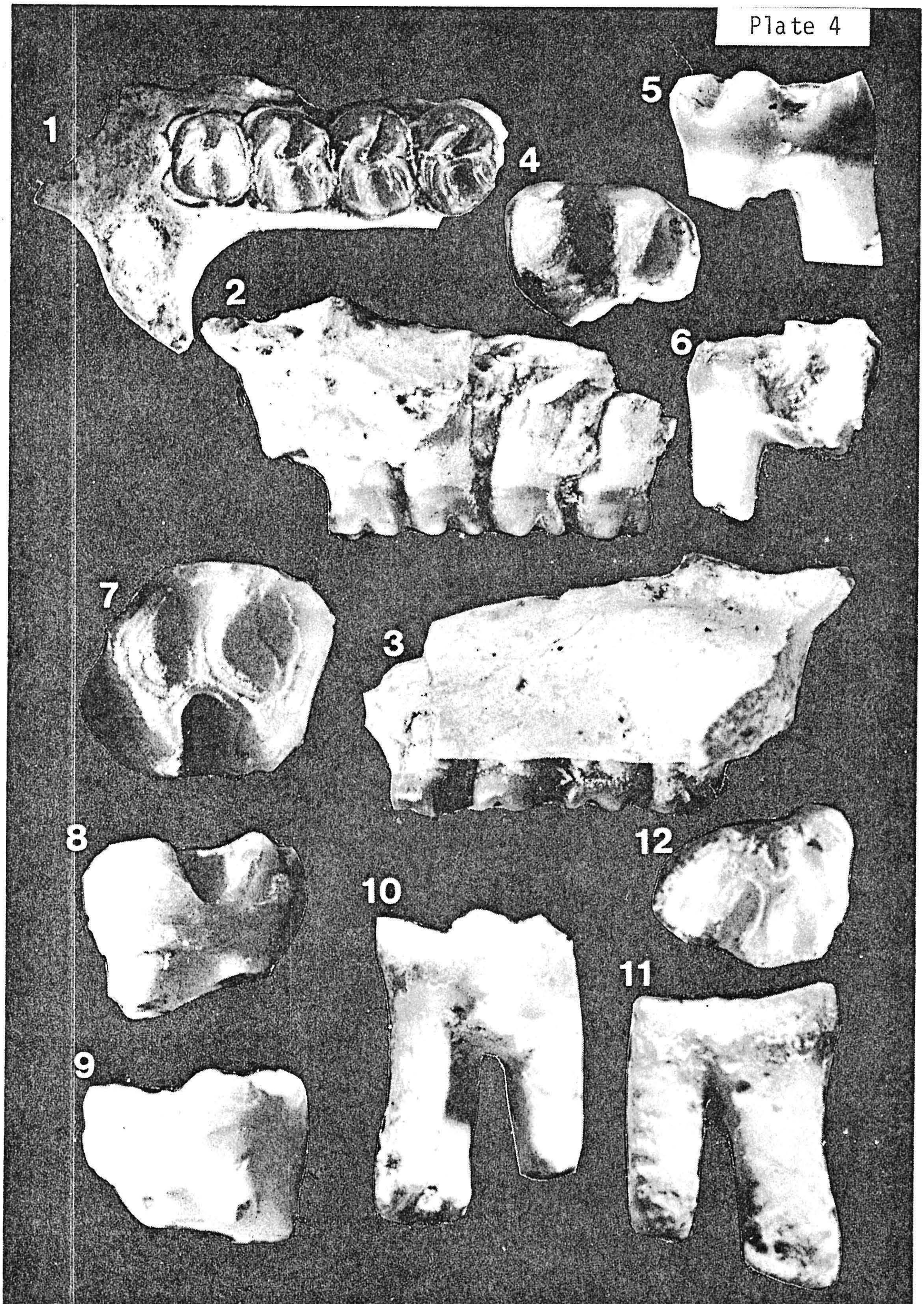


Plate 4
1
2
3
4
5
6
7
8
9
10
11
12

Explanation of Plate 5

Paraphiomys cf. *pigotti* Andrews from Site C of South Kirimun

Figs.1-3. Left mandible with I and $dP_4 \sim M_1$ (KSE-16-80)

Fig.1. Occlusal view. x5

Fig.2. Lingual view. x5

Fig.3. Labial view. x5

Afrocricetodon sp. from Site C of South Kirimun

Figs.4-6. Right M^3 (KSE-155-80)

Fig.4. Occlusal view. x10

Fig.5. Posterior view. x10

Fig.6. Labial view. x10

? *Megapedetes* sp. from Site C of South Kirimun

Figs.7-9. Left M_1? (KSE-161-80)

Fig.7. Occlusal view. x10

Fig.8. Posterior view. x10

Fig.9. Lingual view. x10

Rodentia, fam., gen. et sp. indet. from Site C of South Kirimun

Figs.10-13. Right talus (KSE-388-80)

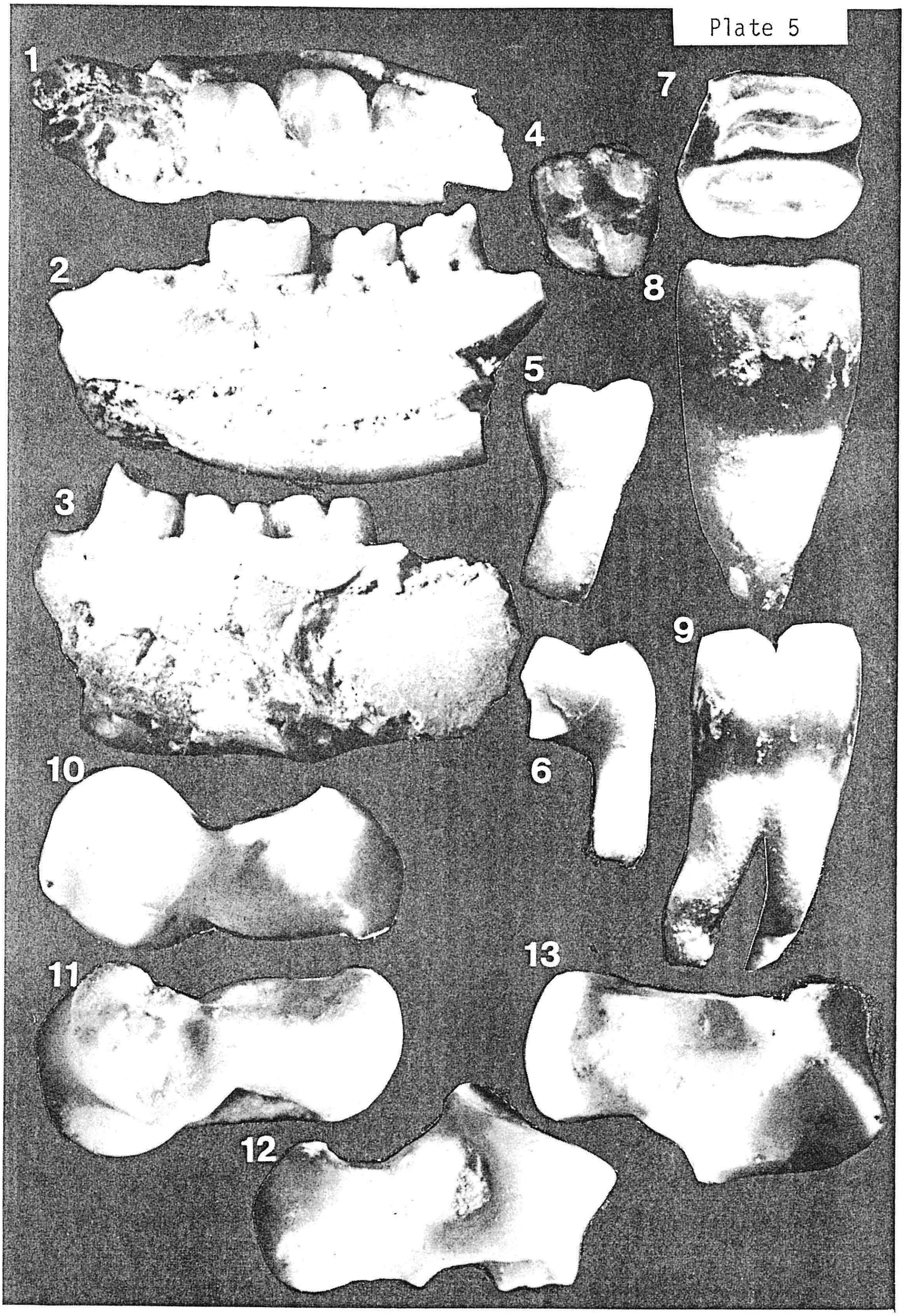
Fig.10. Lateral view. x10

Fig.11. Lateral view. x10

Fig.12. Lower view. x10

Fig.13. Upper view. x10

Plate 5



Explanation of Plate 6

Rodentia, fam., gen. et sp. indet. from Site C of South Kirimun

Figs.1-6. Upper incisor

Fig.1. Right upper incisor (KSE-19-80). Labial view. x5

Fig.2. Left lower incisor (KSE-165-80). Labial view. x5

Fig.3. Left upper incisor (KSE-20-80). Labial view. x5

Fig.4. Left upper incisor (KSE-167-80). Labial view. x5

Fig.5. Left upper incisor (KSE-166-80). Labial view. x5

Fig.6. Left upper incisor (KSE-164-80). Labial view. x5

Figs.7-14. Lower incisor

Fig.7. Right lower incisor (KSE-22-80). Labial view. x5

Fig.8. Left lower incisor (KSE-17-80). Labial view. x5

Fig.9. Right lower incisor (KSE-168-80). Labial view. x5

Fig.10. Left lower incisor (KSE-18-80). Labial view. x5

Fig.11. Right lower incisor (KSE-169-80). Labial view. x5

Fig.12. Left lower incisor (KSE-171-80). Labial view. x5

Fig.13. Right lower incisor (KSE-170-80). Labial view. x5

Fig.14. Left lower incisor (KSE-172-80). Lingual view. x5

Figs.15-16. Left tibia (KSE-101-80). Distal part.

Fig.15. Anterior view. x5

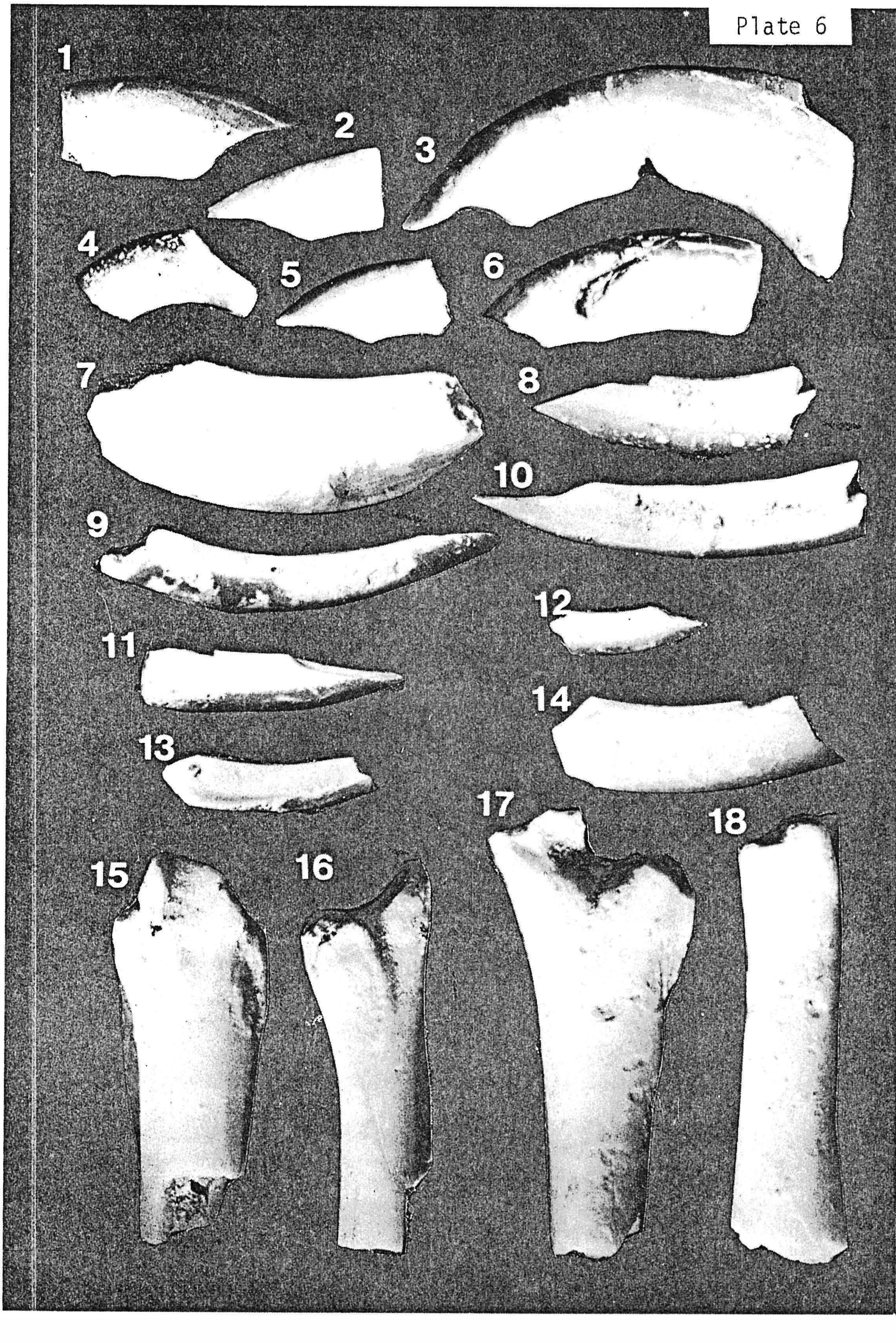
Fig.16. Side view x5

Figs.17-18. Right humerus (KSE-102-80). Distal part.

Fig.17. Posterior view x5

Fig.18. Side view. x5

Plate 6



Explanation of Plate 7

Rodentia, fam., gen. et sp. indet. from Site C of South Kirimun

Figs.1-5. Cross section of upper incisor (rough sketch of broken end).

Fig.1. Right upper incisor (KSE-19-80). Posterior end. x10

Fig.2. Left upper incisor (KSE-20-80). Posterior end. x10

Fig.3. Left upper incisor (KSE-164-80). Posterior end. X10

Fig.4. Left upper incisor (KSE-166-80). Posterior end. x10

Fig.5. Left upper incisor (KSE-167-80). Anterior end. x10

Paraphiomys cf. *pigotti* Andrews from Site C of South Kirimun

Fig.6. Cross section of left lower incisor (KSE-16-80). Rough sketch of anterior broken end.

Rodentia, fam., gen. et sp. indet. from Site C of South Kirimun

Figs.7-16. Cross section of incisor (rough sketch of broken end).

Fig.7. Left lower incisor (KSE-16-80). Posterior end. x10

Fig.8. Left lower incisor (KSE-18-80). Posterior end. x10

Fig.9. Right lower incisor (KSE-22-80). Posterior end. x10

Fig.10. Left lower incisor (KSE-87-80). Posterior end. x10

Fig.11. Left upper incisor (KSE-165-80). Posterior end. x10

Fig.12. Right lower incisor (KSE-168-80). Posterior end. x10

Fig.13. Right lower incisor (KSE-169-80). Posterior end. x10

Fig.14. Right lower incisor (KSE-170-80). Anterior end. x10

Fig.15. Left lower incisor (KSE-171-80). Posterior end. x10

Fig.16 Left lower incisor (KSE-172-80). Anterior end. x10

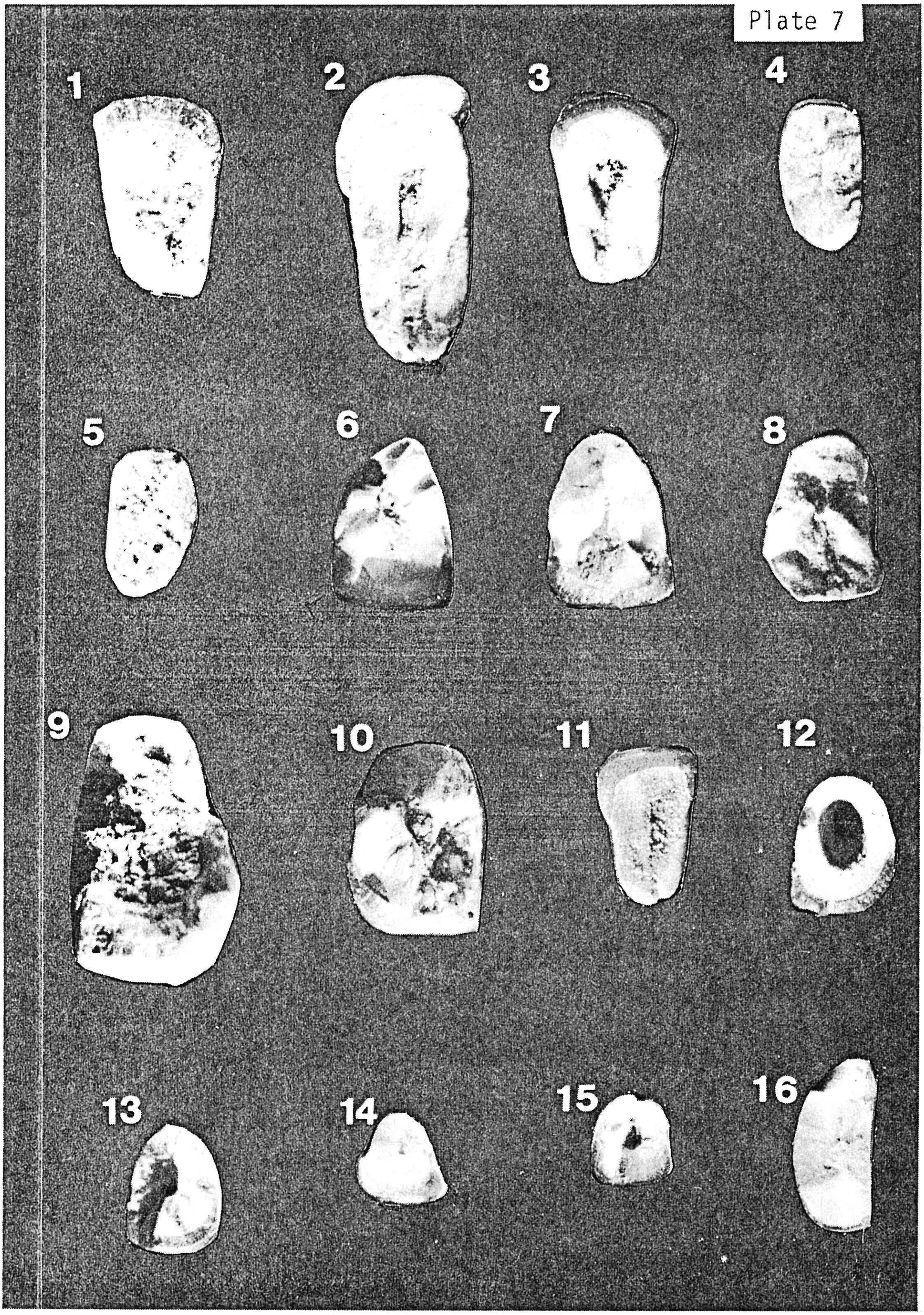


Plate 7
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

Explanation of Plate 8

Carnivora, fam., gen. et sp. indet. from Site C of South Kirimun

Figs.1-3. Left upper canine (KSE-27-80)

Fig.1. Anterior view. x4

Fig.2. Labial view. x4

Fig.3. Lingual view. x4

Deinotheriidae, gen. et sp. indet. from GR6371

Figs.4-5. Right M_3 fragment ? (KIR-2487-80)

Fig.4. ?Lingual view. x1

Fig.5. Occlusal view. x1

Figs.6-8. Right M_2 fragment (KIR-2502-80)

Fig.6. Labial view. X1

Fig.7. Anterior view. X1

Fig.8. Occlusal view. X1

Gomphotheriidae, gen. et sp. indet. from South Kirimun

Figs.9-11. Cheek teeth fragment (KIR-222-80)

Fig.9. Lateral view x1

Fig.10. Lateral view x1

Fig.11. Occlusal view x1

Procaviidae, gen. et sp. indet. from Site C of South Kirimun

Figs.12-13. Left M^2 (KSE-163-80)

Fig.12. Occlusal view x5

Fig.13. Labial view x5

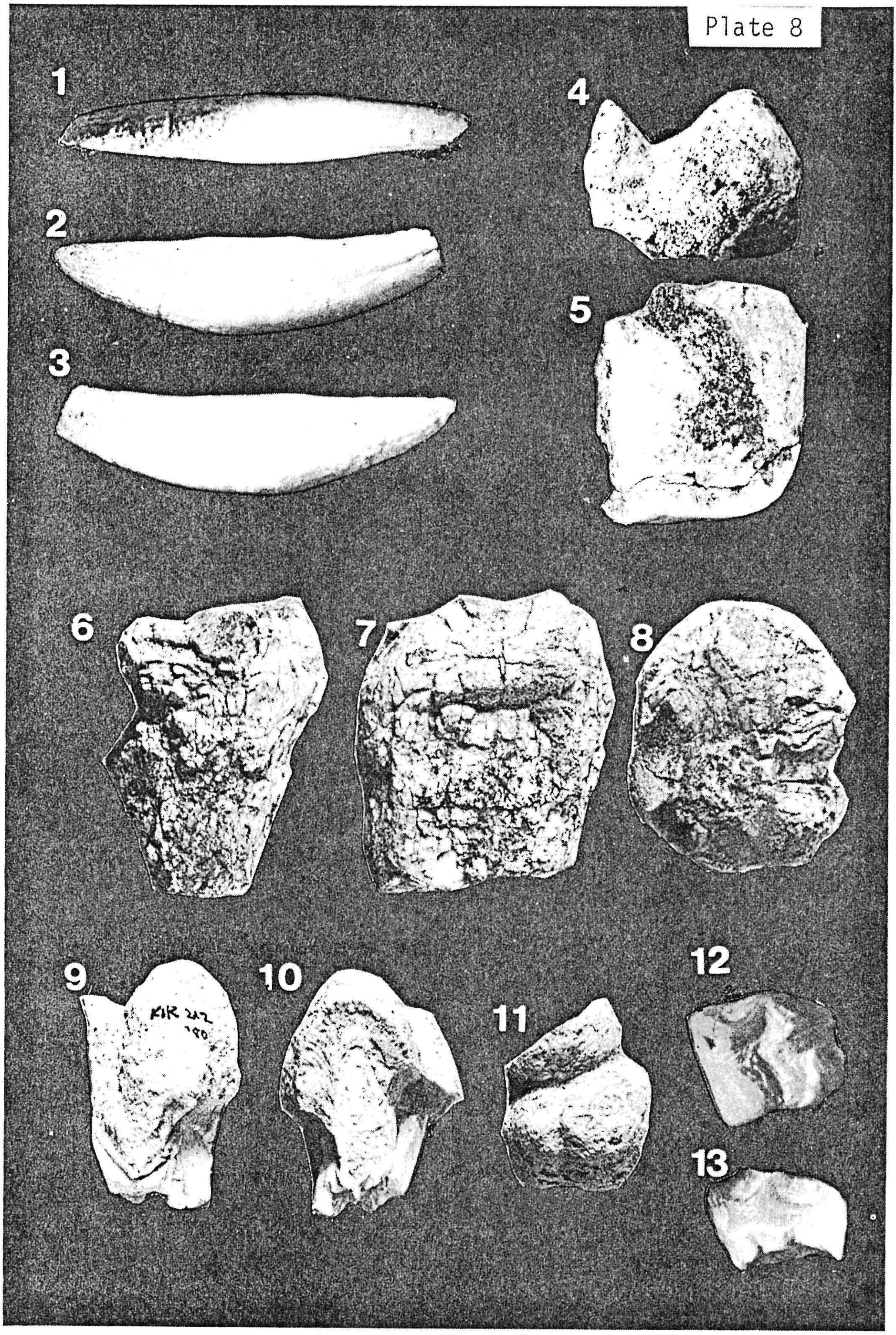


Plate 8
1
2
3
4
5
6
7
8
9
10
11
12
13

Explanation of Plate 9

<u>Brachypotherium</u> <u>heinzelini</u> Hooijer from Site C of South Kirimun

Figs.1-2. Right I_2 (KSE-6-80).

Fig.1. Upper view x1

Fig.2. Labial view x1

Figs.3-5. Right P_2 (KSE-37-80).

Fig.3. Occlusal view x1

Fig.4. Labial view x1

Fig.5. Lingual view x1

Fig.6. Left M^2 fragment (KSE-47-80) Occlusal view x1

Figs.7-9. Left P_3 (KSE-34-80).

Fig.7. Occlusal view x1

Fig.8. Labial view x1

Fig.9. Lingual view x1

Figs.10-12. Left P_4 (KSE-35-80)

Fig.10. Occlusal view x1

Fig.11. Labial view x1

Fig.12. Lingual view x1

Plate 9