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RADIOGRAPHIC PATHOLOGY IN MANDIBLES OF *ANTECHINOMYS LANIGER* FROM HORSESHOE CAVE, WESTERN AUSTRALIA

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ABSTRACT

Jaw fragments of *Antechinomys laniger* (Gould) were radiographed. It was found that the cave population contained mature animals and a number of older individuals with dentitions at the end of their functional period due to excessive wear.

A number of mandibles of *Antechinomys laniger* (see Archer 1977 for revision of the genus) collected by Dr M. Archer from Horseshoe Cave (N59), on the Western Australian Nullarbor, in February 1970, have been radiographed. One is Queensland Museum number J23103; the others have no acession numbers. Jaw fragments were radiographed from both sides using fine grain photographic film and a modified dental radiographic apparatus with the aluminium filter removed (Miller and Radnor 1970).

RESULTS

Judging by the presence or absence of teeth, and the wear on the occlusal surface, individuals were either mature adults or old adults.

MATURE ANIMALS: The jaw fragments mostly contained the post-canine dentition: P_{1-3} and M_{1-4} were present. When viewed bucco-lingually all teeth appeared to be two rooted: the premolars slightly shorter than the molars. The premolar cusp pattern was also simpler.

With increasing occlusal tooth wear, presumably associated with increase in age, it may be observed (Plate 1) that the cheek teeth have migrated occlusally so that the distance between root-apex and lower border of mandible has increased. There is also an increase in the distance between the bifurcation of the root and the tip of the alveolar crest in some teeth. The roots, however, appear to be otherwise correctly seated in their bony sockets so that one may assume this to be biological rather than artefactual, but probably pathological. The most likely cause is that it is due to the loss of bone, associated with periodontal inflammation, during life.

The horizontal distance between the distal surface of M_4 and the ascending ramus of the mandible was larger in animals with the most wear. This implies that some type of physiological mesial drift has taken place with age. This is a process which is more marked in macropodids, namely molar migration.

OLD ADULT ANIMALS: Partially edentulous jaws were of two kinds. One type had lost teeth almost certainly *post mortem*. The sockets were clearly visible on the radiographs. The remaining teeth were incompletely embedded in bone, and this would facilitate *post mortem* loss of teeth. The sockets of all teeth were at a comparable level however, implying similarities in the teeth and their supporting structures *ante mortem*.

One jaw (J23103) had considerable *ante mortem* tooth loss (Plate 1A). It so happened that C_1 and a fragment of I_3 were also present. Only three molars were still in the jaw. M_4 was severely worn and extruded to a certain degree. Bone loss around the distal root and bifurcation was considerable, with cratering behind the tooth and an inflammatory sclerosis in the bone behind M_4 as indicated by increased radiodensity. M_3 and M_2 were severely worn but their bony support within normal limits. M_1 was lost but its socket was still visible although abnormal in outline. The mesial part was much wider than normal and rounded in outline and the distal slightly so. A dark oval area can be seen on the radiograph related to the mesial root which on the bone was an open buccal sinus

about 2 mm in diameter. This should be termed a sinus and not a cloaca, the latter term is usually associated with the much more severe inflammatory changes and bone necrosis of osteomyelitis when the marrow cavity is also severely effected by the inflammatory process and the periosteum has been stripped from the bone, due to the presence of migrating pus, to subsequently give rise to a new bone known as an involucrum. The remaining cheek teeth P_{1-3} were missing but odd irregularities in bone density indicate that they had been present but were lost sometime *ante mortem*.

The most distal missing tooth is identified as M_1 because no space is found behind the terminal molars to accommodate another tooth, and the socket depth indicates a root length similar to the other molar teeth. When the tooth row is complete (P_1–M_4), the premolar root length is distinctly shorter than that of the molars. This may be observed on other specimens on the radiograph.

DISCUSSION

Although inflammatory jaw bone diseases are relatively common in animals in captivity they are rare in wild animals (Colyer 1936, Potkay 1977). Such is the importance of the dentition that a defect such as these usually results in the death of the animal.

This cave population (Horseshoe Cave N59) contained a number of older individuals with dentitions at the end of their functional period due to excessive wear and one with considerable tooth loss, one quadrant being almost nonfunctional. It is most unusual to find populations with this degree of nonfunction. One might ask whether these were the remains of old individuals killed by some predator and subsequently dumped or maybe stored in the cave. Associated with this it is likely that the oldest specimens were the longer lived females at the end of the breeding season. From their dentitions alone they would be incapable of much extension of their life span. This is relatively recent material (pers. comm. M. Archer) so one might expect the post cranial skeleton to be present if natural death had occurred. The finding of mostly dentary fragments also argues for the effects of a predator on exhausted animals at the end of the short life span.

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LITERATURE CITED

ARCHER, M., 1977. Revision of the dasyurid marsupial genus *Antechinomys* Krefft. *Mem. Qd Mus.* **18**: 17–29.

COLYER, J.F., 1936. 'Variations and diseases of the teeth of animals'. (John Bale, Sons and Danielson: London).

MILLER, W.A. and RADNOR, C.J.P., 1970. Tooth replacement patterns in young *Caiman sclerops*. *J. Morph.* **130**: 501–10.

POTKAY, S., 1977. Diseases of marsupials. *In* HUNSAKER, D. (ed.) 'The biology of marsupials'. (Academic Press: London).

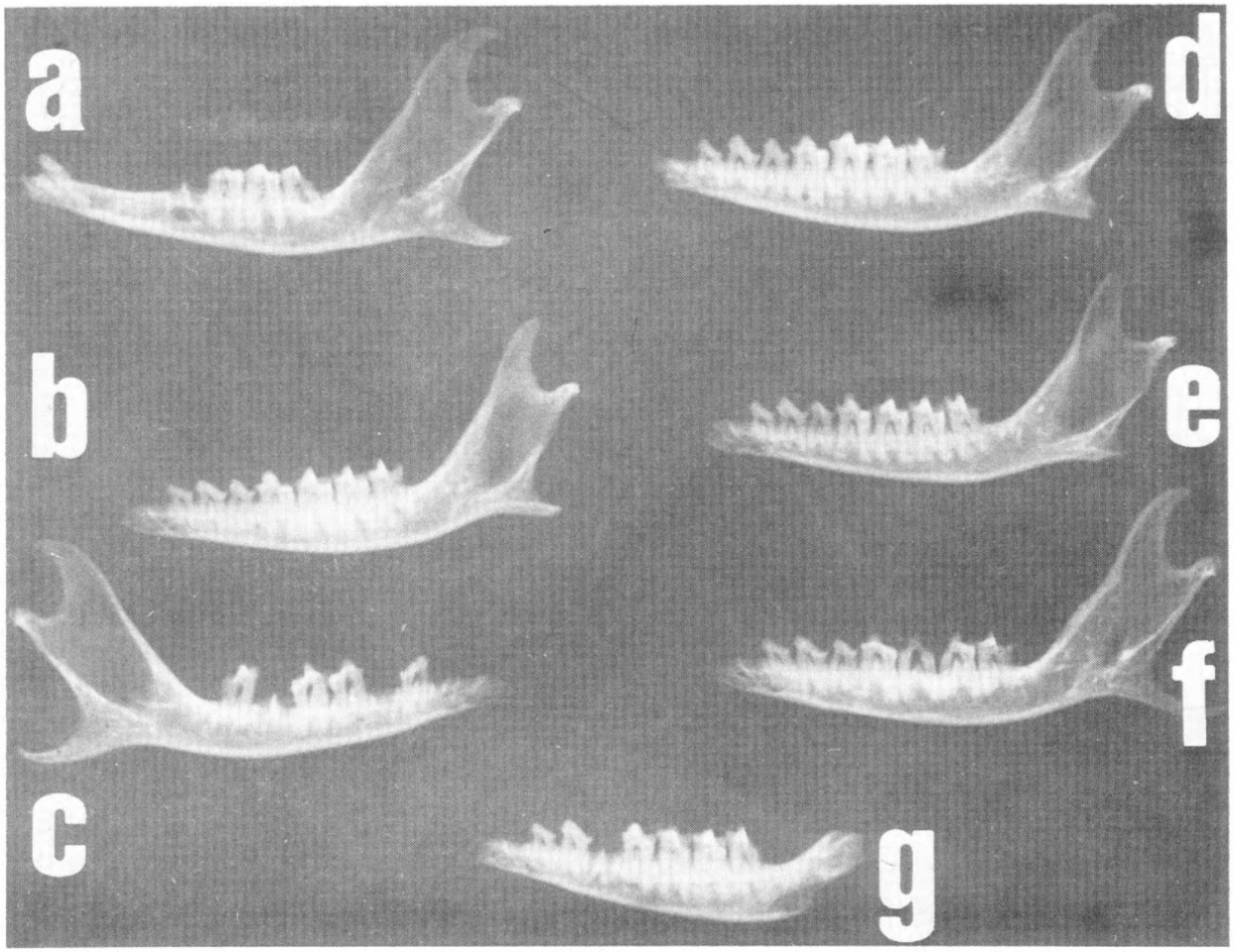

PLATE 1

Radiographs of seven dentaries of *Antechinomys laniger* collected by Dr M. Archer at Horseshoe Cave. All of right side except C. Compare D with F to appreciate movement of teeth away from lower border of the bone with increased wear on the cheek teeth. Shorter tooth roots of premolar teeth are evident. A is J23103.