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1999
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Palaeont. afr., **35**, 21-23 (1999)

THE TRIASSIC REPTILE *PALACRODON BROWNI* BROOM, SYNONYMY AND A NEW SPECIMEN

by

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ABSTRACT

Palacrodon browni Broom 1906 (=*Fremouwsaurus geludens* Gow 1992) is a small enigmatic diapsid reptile from the *Cynognathus* Assemblage Zone of South Africa and Antarctica whose dentition is very similar to that of coeval procolophonids.

KEYWORDS: *Palacrodon*, *Fremouwsaurus*, procolophonids, *Cynognathus* Zone.

INTRODUCTION

In 1906 Broom published a description of a small partial left jaw ramus with six teeth of a reptile from the *Cynognathus* zone which he called *Palacrodon browni*. The specimen was collected by Alfred ('Gogga') Brown of Aliwal North, and as with so many Brown localities, the exact provenance of the specimen could not be determined. With his usual intuitive flare, Broom placed the specimen in Rhynchocephalia (which at that time included sphenodontians). He also felt that the specimen was an adult as the last tooth in the dentary is fully formed. Hoffstetter (1955) and von Huene (1956) put *Palacrodon* in the Sphenodontidae. Malan (1963), added the important observation that the teeth in profile are pyramidal, with slightly concave sides, and pointed out the resemblance of the teeth to those of procolophonids; she also remarked on the fact that the *Palacrodon* jaw is far more slender than those of procolophonids, but this is a juvenile character also seen in procolophonids. She concluded that it "could be an aberrant procolophonid or lizard just as easily as an aberrant rhynchocephalian" (sphenodontid).

When examining this material recently I was surprised to find that there are two specimens: SAM-PK-5871 is a block containing the left lower jaw of the holotype, which in addition to the six cheek teeth already described shows evidence of the former presence of five smaller anterior teeth which have broken off, and a small shed thecodont tooth; SAM-PK-6215 is a fragment of right maxilla bearing six teeth – another two teeth have been lost (Figure 1D).

Gow (1992) described the partial skull of a small diapsid from Antarctica, ostensibly from *Lystrosaurus* zone equivalent rocks, as *Fremouwsaurus geludens* (Figure 1E). Comparison of this specimen with the holotype of *Palacrodon* (Figure 1D) shows that they are identical, which implies that *"Fremouwsaurus"* came in fact from *Cynognathus* Zone-equivalent rocks.

The lower, tetrapod bearing, part of the Fremouw Formation equates with the *Lystrosaurus* Zone of the Beaufort Group (Elliot *et al.* 1970a, Kitching *et al.* 1972), but Elliot *et al.* (1970b) noted the occurrence of *Dicroidium* in the upper part of the Fremouw. *Dicroidium* in South Africa occurs in the Early Stormberg Molteno Formation, which lies *above* the *Cynognathus* assemblage zone of the Beaufort. Hammer (1995) records a typical *Cynognathus* Assemblage zone fauna from 200 meters higher in the Fremouw Formation than the *Lystrosaurus* Zone localities. It therefore seems probable that *"Fremouwsaurus"* came from *Cynognathus* Zone equivalent rocks.

During a field excursion in September 1996, a student, Catherine Marshall, collected a partial right maxilla and right dentary, both with teeth, amongst the surface float at a Lower *Cynognathus* Zone locality known as Driefontein in the Paul Roux district. This locality may be expected to yield *inter alia* rhynchocephalians, sphenodontians, and procolophonids. It was while reading the rhynchocephalian literature that I realised that these little jaws, though slightly larger, were extraordinarily similar to Broom's *Palacrodon*, and also *"Fremouwsaurus"*.

DESCRIPTION OF NEW SPECIMEN

The material BP/1/5672(Figure 1A-C) consists of a right maxillary fragment bearing four acrodont teeth and a dentary fragment bearing five. It is not certain whether they belonged to the same animal, but they were found in close proximity and they fit well. They belonged to an individual/s larger than the holotype of *Palacrodon browni*. The bones are not very informative: the maxillary fragment has a few internal grooves which would no doubt serve to match it with a more complete specimen; the dentary has a pronounced Meckelian groove, while on the labial surface, apart from the usual nutrient foramina, there are pits below the four posterior-most teeth. The dentary teeth are not set back from the dorsal edge of the dentary, but swell beyond it as in procolophonids. The teeth, which are broadened labio-lingually, are closely packed together with firm mesiodistal contact, something not seen in procolophonids (some illustrations in Gow 1977 are

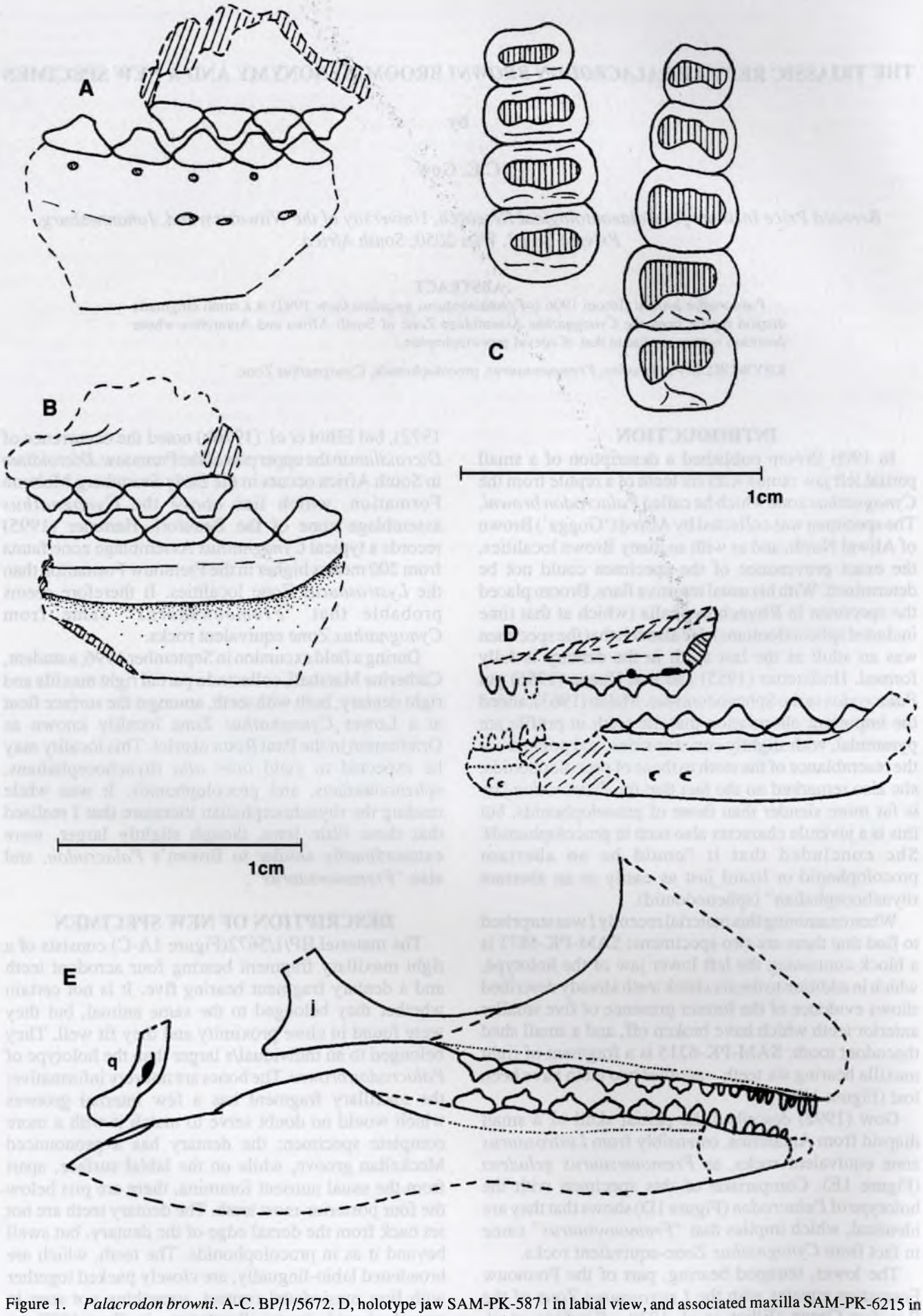

Figure 1. *Palacrodon browni*. A-C. BP/1/5672. D, holotype jaw SAM-PK-5871 in labial view, and associated maxilla SAM-PK-6215 in buccal view. E, holotype of *Fremouwsaurus geludens*. (Note: larger scale applies only to C.)

misleading in this respect). Mesial and distal slopes of the teeth are slightly concave; the transversely broadened tips are lightly abraded, which reveals that the enamel is extremely thin. The upper and lower teeth probably intermeshed at rest, while some propalinal movement was possible during the feeding cycle. Upper teeth have a slight distal shelf and all but the first have a very slightly developed mesial shelf, both shelves running almost the full width of the tooth. Upper wear facets are transversely concave: lower wear facets are more flat in the linguolabial plane; they have a marked mesio-distal convexity, and a noticeable tendency for the facets to extend down the distal slope in more posterior teeth. The teeth decrease in size from back to front, which indicates that the missing more anterior, incisiform, teeth would have been considerably smaller.

DISTINGUISHING *PALACRODON* JAWS AND TEETH FROM THOSE OF PROCOLOPHONIDS

The teeth of *Palacrodon* are very similar to those of *Cynognathus* Zone procolophonids in being acrodont, and having similar morphology, occlusion and wear; however, they can be distinguished by 1) mesiodistal contact between cheek teeth in mature specimens, and 2) mesial and distal crown surfaces are concave.

SYSTEMATIC PALAEONTOLOGY

Diapsida *incertae sedis*

Holotype *Palacrodon browni* Broom 1906

Synonym *Fremouwsaurus geludens* Gow 1992

Refered material: SAM-PK-6215, a right maxilla with teeth, and BP/1/5672, right maxillary and dentary fragments with teeth.

Diagnosis. Small diapsid reptile with breached lower temporal bars and acrodont dentition. Teeth small and peg-like anteriorly, becoming broad posteriorly with crowns biconcave in profile. Posterior cheek teeth of mature individuals having broad mesial and distal contacts with their neighbours.

SUMMARY

Palacrodon (=*Fremouwsaurus*) is an extremely rare component of the *Cynognathus* Assemblage Zone fauna. Its diapsid nature is established on the basis of: jugal with posteroventral spur, quadrate with curved lateral profile and foramen, and absence of quadratojugal (Gow 1992). Although the diagnostic premaxillae and palatines are unknown, the animal cannot be a sphenodontid as in sphenodontids the quadrate foramen lies between the quadrate and quadratojugal.

Palacrodon is characterised by the following: procolophonid-like dentition, but differing in that adjacent cheek teeth contact each other and their mesial and distal slopes are concave. In addition to small size, the following are here regarded as juvenile characters: i) narrow (shallow) dentary, and ii) teeth set back from the lateral margins of the jaws, with iii) distinct ridges on the dentaries and maxillae for the attachment of soft tissue.

ACKNOWLEDGEMENTS

The Director and Staff of the South African Museum are thanked for the loan of the holotype of *Palacrodon*. Catherine Marshall found the new specimen.

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