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A PROTOSUCHID CROCODILIAN FROM THE FOREST SANDSTONE FORMATION (UPPER KAROO) OF ZIMBABWE

by

M.A. Raath

Bernard Price Institute for Palaeontological Research, University of the Witwatersrand, Johannesburg 2001

ABSTRACT

A protosuchid crocodilian is reported from the Forest Sandstone Formation (Upper Triassic) of the central Zambezi Valley, Zimbabwe. It is closely related to known protosuchians from terminal Karoo deposits in South Africa and it is provisionally referred to cf. *Notochampsa* sp.

INTRODUCTION

Vertebrate fossils were first reported from the vicinity of the confluence of the Angwa and Maura rivers in the central Zambezi Valley, Zimbabwe, by Raath *et al.* (1970). The local occurrence of prosauropod dinosaurs comparable with those recovered from the Forest Sandstone Formation in the Nyamandhlovu district north-west of Bulawayo (Bond 1955, Attridge 1963) suggest that the central Zambezi Valley deposits represent a local equivalent of the Forest Sandstone; thus these deposits are considered coeval with the upper part of the late Triassic Elliot Formation ("Red Beds") of South Africa (Bond 1955, Raath *et al.* 1970). Subsequent field work in the exposures of the Maura River has yielded more fossils, including the remains of several more prosauropod dinosaurs, parts of two specimens of the theropod *Syntarsus*, and the specimen which is reported here — a partial skeleton of a small crocodilian. It is registered as QG 49 in the palaeontological collections of the National Museums and Monuments of Zimbabwe, formerly stored in the Queen Victoria Museum, Salisbury, and now housed in the National Museum, Bulawayo.

Specimen QG 49 was recovered from the south bank of the Maura River, downstream of the bridge over the Maura River on the road north to Kanyemba and approximately halfway between that bridge and the confluence of the Maura and Angwa rivers (fig. 1). The locality co-ordinates to the nearest five seconds are 16°13′30″S; 30°05′30″E (Zimbabwe 1 : 50 000 Series, Mapsheet 1630 A1).

As with many of the fossils from this locality the bones of QG 49 are variably coated with the black, nodular crust of manganese-rich material reported by Raath *et al.* (1970). Its hardness and thickness hampers preparation of the fossils, and the blotchy discoloration it causes has made interpretation of the bones of QG 49 difficult.

DESCRIPTION AND PROVISIONAL IDENTIFICATION OF QG 49

The specimen consists of much of the skeleton of a protosuchid crocodilian (figs. 2, 3). The hind part of the skull is preserved, but poorly. It is so extensively eroded, fragmented, distorted and discoloured that virtually no cranial features can be recognised other than what is taken to be the right upper temporal opening and parts of the mandibular rami (fig. 2a, b). Although the postcranial skeleton is reasonably well articulated, few elements are clearly recognisable because of the nature of preservation. However, some elements are unmistakable (vertebral centra, osteoderms, coracoid) and they are sufficiently diagnostic to indicate the relationships of the fossil. Nash (1975: 232–233) notes that an elongate coracoid and a sculptured external surface of the dorsal osteoderms are among the features that are characteristic of Crocodilia. Specimen QG 49 bears these features (fig. 4a, b), and the coracoid (fig. 4a) is very similar to that of *Notochampsa* (Haughton 1924: fig. 18A) and of *Orthosuchus* (Nash 1975: fig. 12A). Other features of QG 49 that are closely similar to those described in *Orthosuchus* (Nash 1968, 1975) include the dorsal vertebrae, particularly the nature of the transverse processes, and the configuration of the dorsal ribs with their proximal expansions. Furthermore, the Zimbabwean specimen is comparable in size with the South African forms (table 1).

TABLE 1
Protosuchid crocodilians: comparison of bone measurements

Measurement (mm)	*Notochampsa istedana* *SAM 4013 (Haughton 1924)	*Orthosuchus stormbergensis* *SAM — K409 (Nash 1975)	QG 49
CORACOID:			
length	25	23	29
maximum breadth at glenoid end	—	12,8 (Nash 1968)	15
minimum width at mid shaft	3	—	6
maximum breadth at ventral end	15	11,2	11
DORSAL VERTEBRAE:			
range in length of preserved centra	?	7,4–10,5	8–11,7

*SAM: South African Museum, Cape Town.

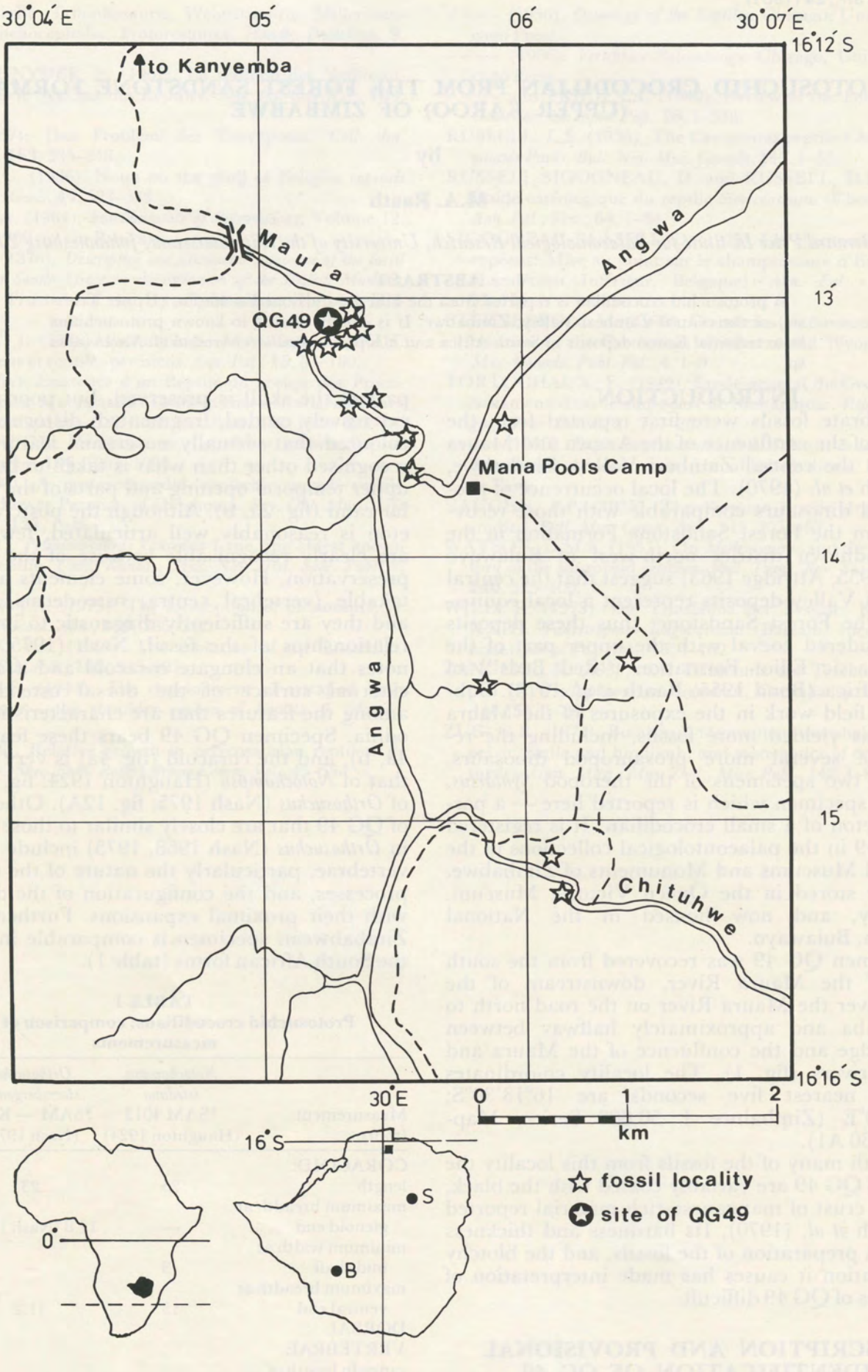
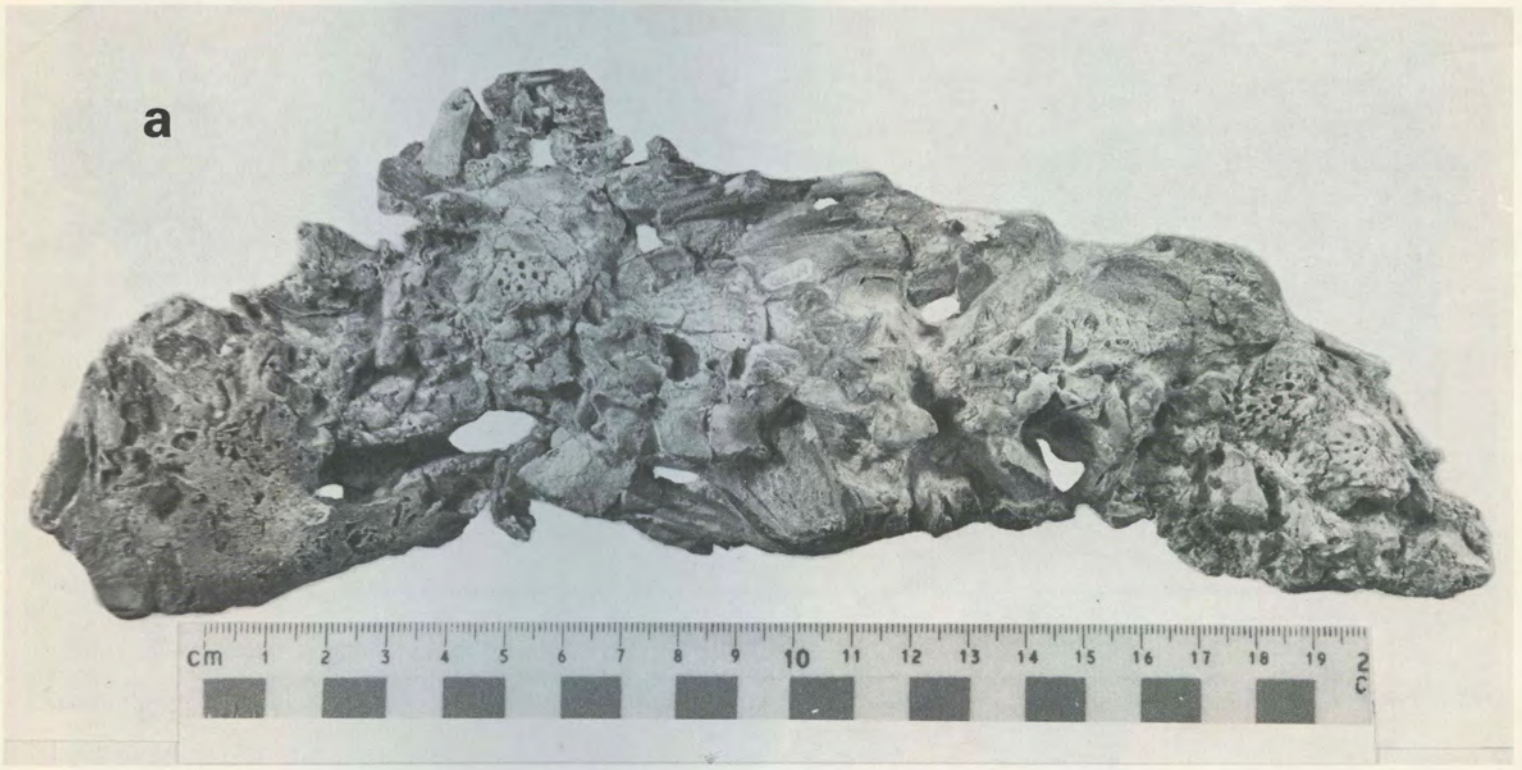


Figure 1. Map of fossil localities on the Maura River (adapted from Raath *et al.* 1970: fig. 1).



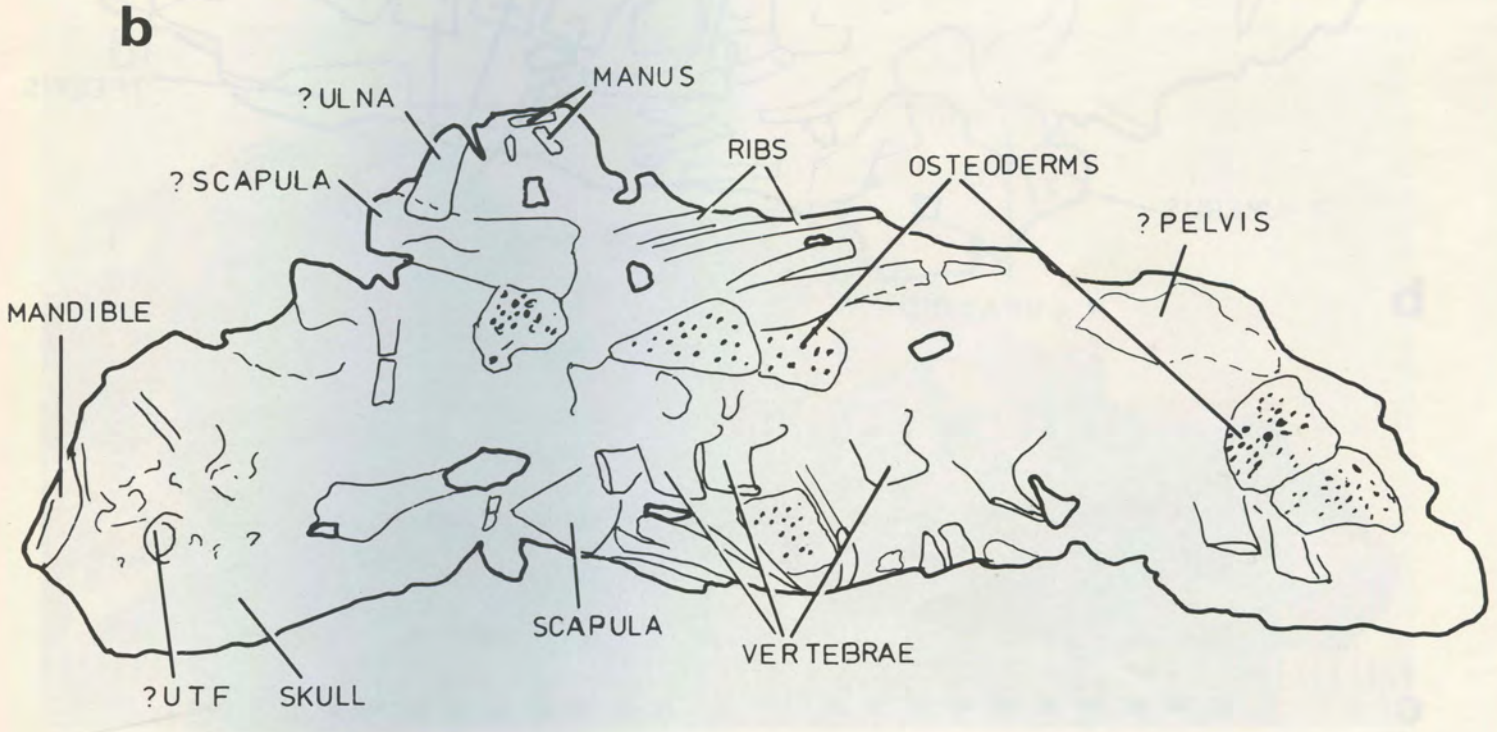
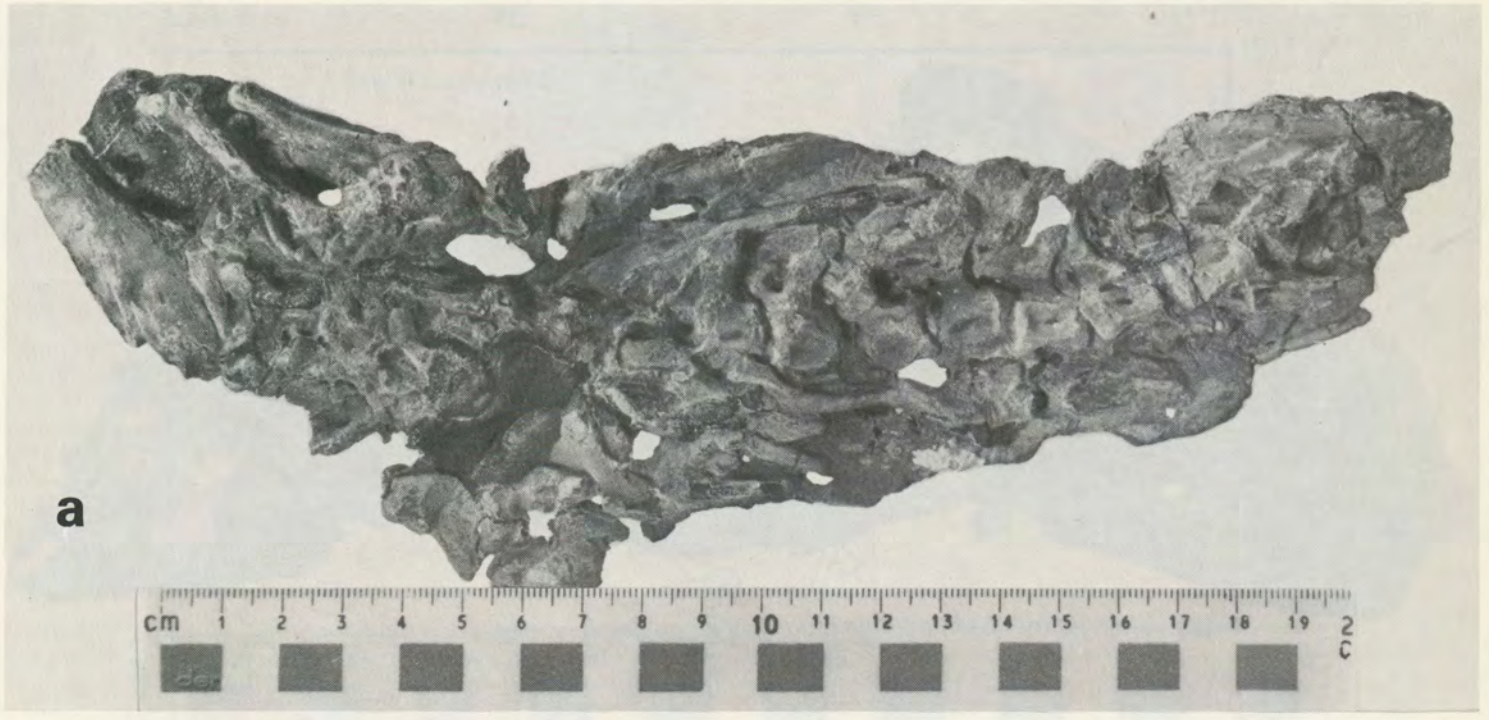


Figure 2. QG 49, cf. *Notochampsa* sp., from Zimbabwe:
(a) dorsal view
(b) graphic interpretation of (a).



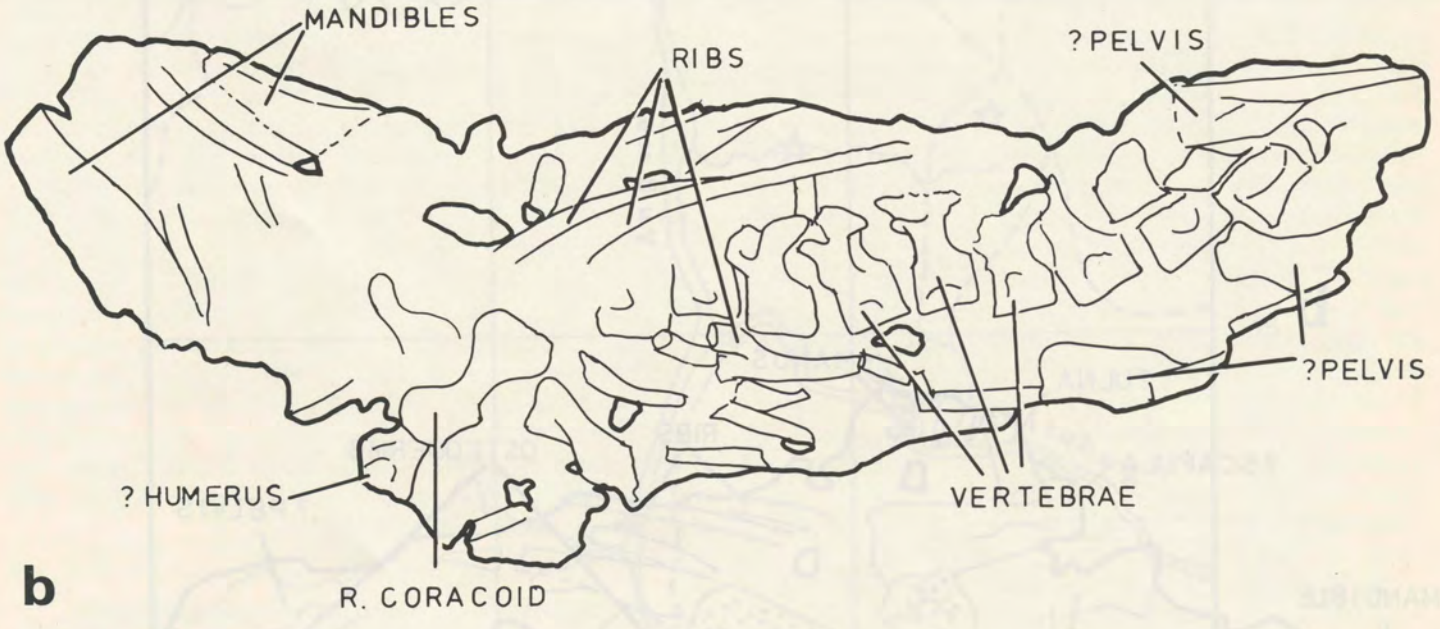


Figure 3. QG 49, cf. *Notochampsa* sp., from Zimbabwe:
(a) ventral view
(b) graphic interpretation of (a)
(c) same as (a), stereopair.

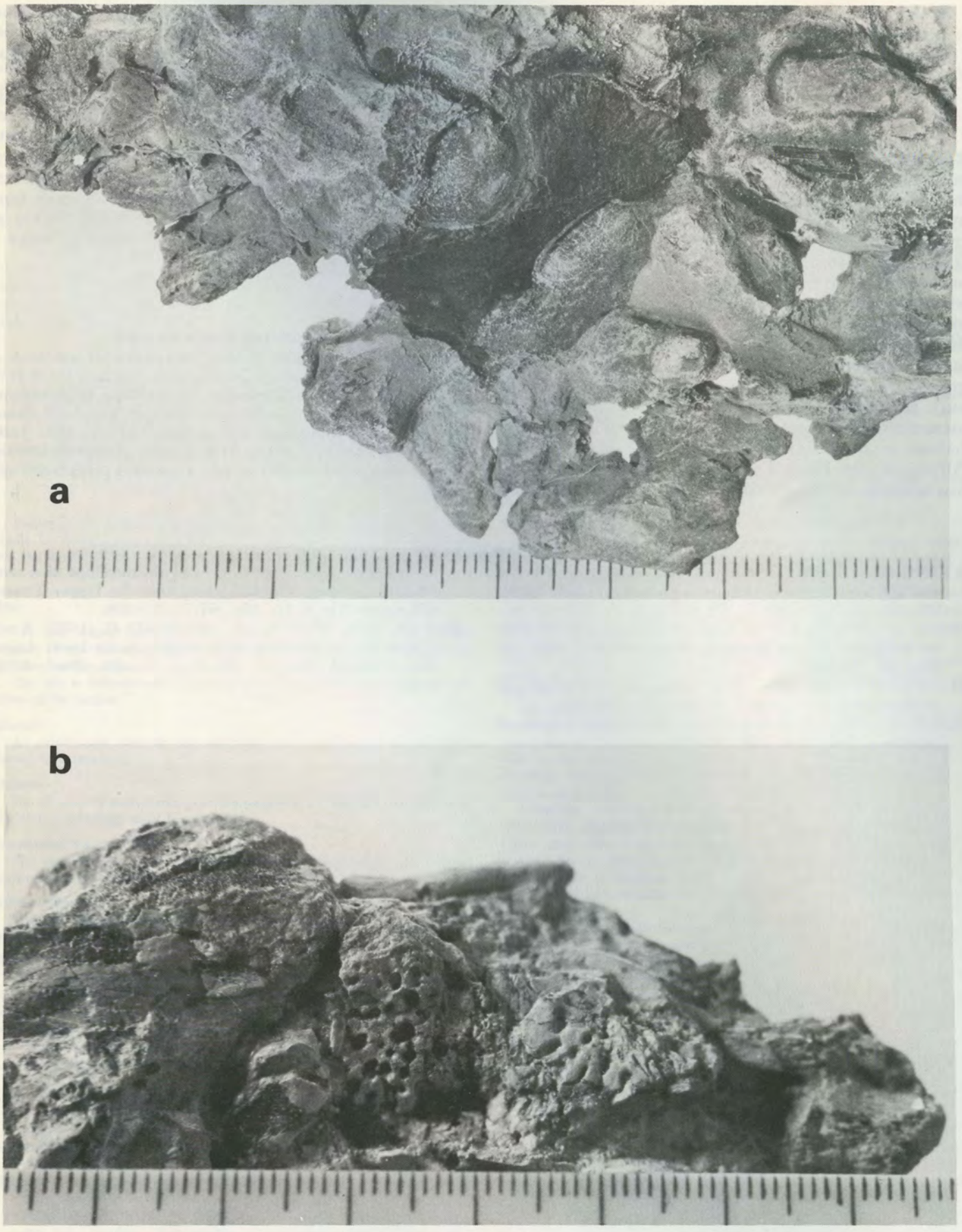


Figure 4. QG 49, cf. *Notochampsa* sp., from Zimbabwe:
(a) right coracoid (centre, darker) (scale in mm)
(b) characteristic external surface texture of dorsal osteoderms (visible at right hand end in fig. 2a) (scale in mm).

Notochampsa was collected from the lower Clarens Formation (formerly known as the Cave Sandstone) in the Barkly East District, South Africa, and *Orthosuchus* from the upper Elliot Formation (formerly known as the Red Beds) of the Qacha's Nek area in Lesotho. Other specimens of protosuchid crocodilians have subsequently been recovered from upper Elliot Formation exposures in a number of places in South Africa, and some of these specimens are currently the subject of study by Dr. C.E. Gow and A. Busbey. Wherever these crocodilians are found they are associated with a fauna consisting predominantly of medium-sized prosauropods (cf. *Massospondylus*). In a few places tritylodontid and tritheledontid cynodonts, rare morganucodontid mammals (cf. *Erythrotherium*, *Megazostrodon*) and coelurosaurian theropods (*Syntarsus*) have been recovered from a similar stratigraphic horizon. This association of protosuchids with prosauropods in both countries supports the view that the Forest Sandstone Formation of Zimbabwe is a stratigraphic equivalent of the South African upper Elliot Formation and perhaps of the lower levels of the Clarens Formation. The diversity of the South African fauna suggests that thorough examination of these exposures in Zimbabwe may yet yield a more diverse tetrapod fauna than has been recorded there hitherto.

In view of the poor preservation and absence of generically diagnostic features, it is not considered possible to identify QG 49 to generic level with confidence. However, because it bears several resemblances to *Notochampsa istedana* (Haughton 1924) (and to the very similar, possibly even congeneric, form described by Nash (1968, 1975) as *Orthosuchus stormbergensis*), it is proposed to refer it provisionally to cf. *Notochampsa* sp.

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