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PRELIMINARY REPORT ON A CLUTCH OF SIX DINOSAURIAN EGGS FROM THE UPPER TRIASSIC ELLIOT FORMATION, NORTHERN ORANGE FREE STATE

by

J. W. Kitching

ABSTRACT

A clutch of six dinosaurian eggs, containing foetal skeletons of as yet uncertain taxonomic affinity, from the Elliot Formation (Red Bed Stage), northern Orange Free State, seems to be the first record of fossil eggs of Upper Triassic age.

As preserved the eggs have a long axis of 65 mm, with a short axis of approximately 55 mm. The egg "shell" is exceptionally thin; fragments removed from one of the specimens have an estimated thickness of 0,5 mm.

Additional preparation work is at present being undertaken on a reasonably well-preserved skull in one of the eggs and a more detailed description of the specimen and possible parentage will appear at a later date.

INTRODUCTION

Up to the present time, dinosaurian egg remains have been described only from Upper Jurassic to Upper Cretaceous sediments (Colbert, 1961). Eggs from the Upper Jurassic are known from England (Van Straelen, 1928; Swinton, 1950), Spain (Van Straelen, 1928) and the Tendaguru Formation of Tanzania (Swinton, 1950; Colbert, 1961). The majority of specimens are from the Lower to Upper Cretaceous beds of Mongolia (Van Straelen, 1928; Granger, 1936; Brown and Schlaikjer, 1940; Colbert, 1961; Schwarz *et al.*, 1962), China (Colbert, 1961; Young, 1965), France (Dughi and Sirugue, 1957; Colbert, 1961), North and South America (Jepsen, 1931; Colbert, 1961; Jensen, 1966, 1970).

The eggs on record range in size from that of a hen to twice the size of that of an ostrich. They also vary in shape from elongate to oval or nearly spherical.

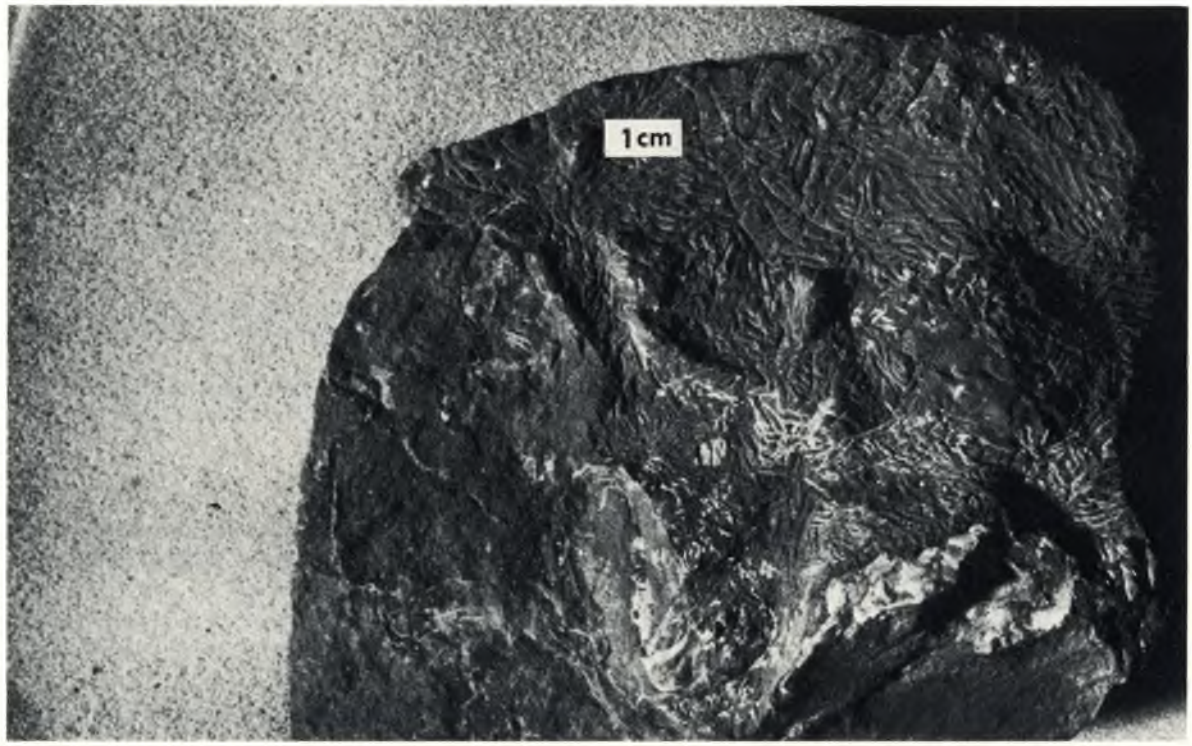
Traces of embryos have been recorded in eggs assigned to *Protoceratops* from Mongolia and more recently a nest with fifteen young belonging to a hadrosaurian ornithischian has been reported from the Upper Cretaceous beds in the Two Medicine Formation of Montana (Baird and Horner, 1979).



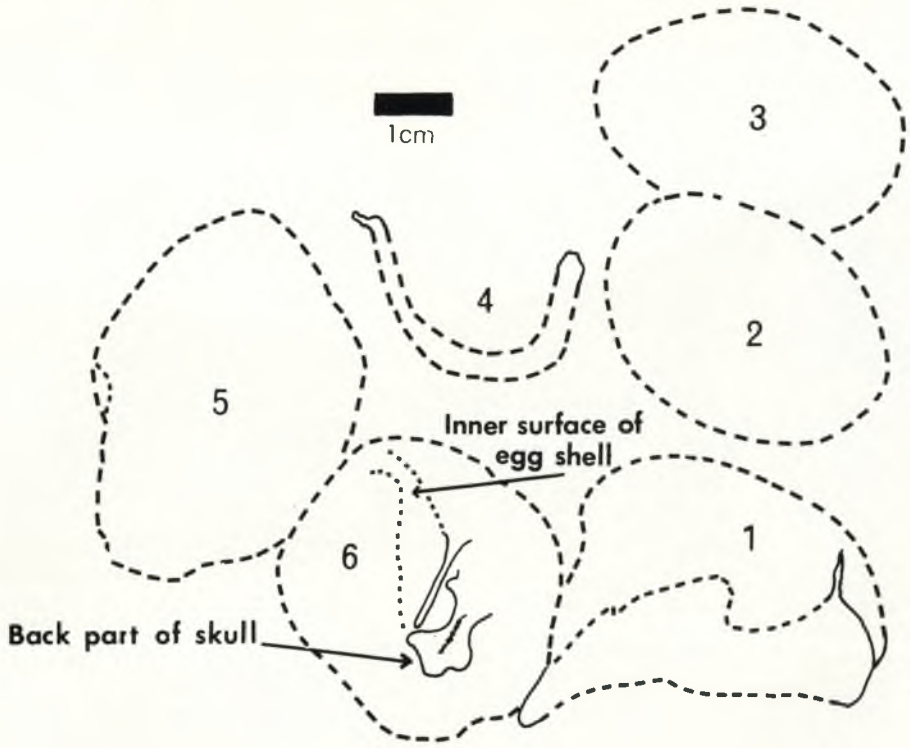
Figure 1. The road cutting locally known as Rooidraai in the Golden Gate Highlands Park, Clarens. (1) Marked contact between the Elliot and Clarens Formations. (2) Approximate horizon from which dinosaurian eggs were blasted.

Based on the remains of large capitosaurid amphibians, the fairly abundant prosauropod fauna, the advanced Therapsida (*Pachygenelus, Trity-lodon* and others), as well as on the lithology of the matrix, there seems to be no doubt that the eggs described here came from Upper Triassic sediments.

Colbert (1961, p. 213) states that "no fossil eggs have as yet been found in Triassic sediments" and



(a)



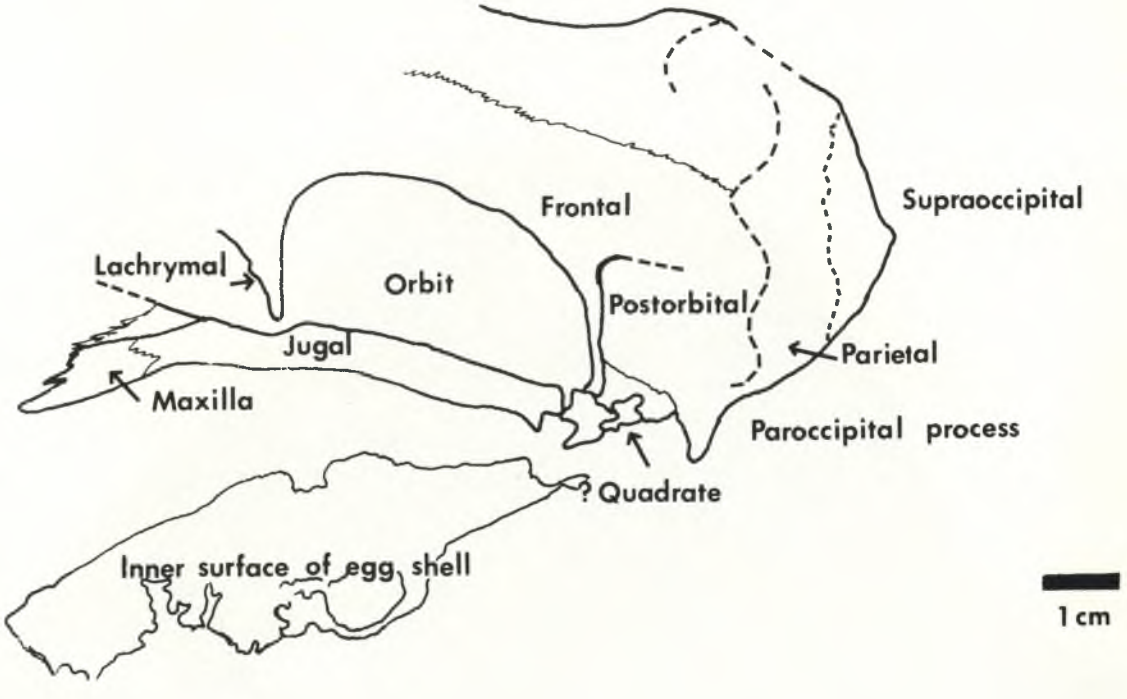
(b)

Figure 2a. Foetal remains visible in eggs numbers 1, 5 and 6 while one juvenile in egg number 4 seems to have hatched prior to fossilisation.

b. Graphic Interpretation.



(a)



(b)

Figure 3a. Partially exposed skull showing dinosaurian features.
b. Graphic Interpretation.

no contradictory references could be found in the available literature.

DESCRIPTION

The eggs are embedded in a block of hard reddish-brown sandy mudstone, blasted from a road-cutting locally known as Rooidraai (Red Bend) in the Golden Gate Highlands National Park, some 17 km east of Clarens, Orange Free State. From the lithology of the matrix it seems evident that the specimen came from a horizon approximately 3–4 metres below the very marked contact between the Elliot Formation (Red Bed Stage) and very silty sandstone of the Lower Clarens Formation (Cave Sandstone stage). This marked contact can frequently be seen where the above formations are exposed in the Orange Free State, eastern Cape Province, Natal and in parts of Lesotho.

The horizon which yielded the eggs overlies what can be termed the *Tritylodon* Assemblage Zone (Kitching, unpublished) because of the fair abundance of this genus in the sediments.

Prior to the discovery of the eggs and the description of two specimens of a small thecodont, *Clarencia gracilis* Brink (1959), the present author had on a number of occasions noted the occurrence of isolated long bones of the prosauropod, *Massospondylus*, weathering out of the face of the now much widened road-cutting. Part of an articulated dinosaur is still embedded in this face.

In three of the eggs, foetal remains in an advanced stage of development are clearly visible while one juvenile seems to have hatched prior to fossilisation of the other eggs, leaving in the matrix a shapeless egg "shell". From the partial remains of another two eggs exposed on the side of the block, it seems evident that there could have been more eggs in the clutch.

Dinosaurian features that can at present be distinguished on the partially exposed skull include the very short parietal region, the position of the post-orbital, the parietal/supraoccipital suture, the position and shape of the lachrymal which forms the posterior border of the antorbital fenestra and a small area of the maxilla-jugal junction.

The "wrinkled" and to a certain degree flattened state of the eggs suggests that they were leathery with a certain amount of elasticity as in those of some modern-day reptiles. Microscopically the outer surface shows a very finely roughened surface with minute, well-spaced respiratory pores.

As preserved the eggs have a long axis of 65 mm, with a short axis of approximately 55 mm. The egg "shell" is exceptionally thin. Fragments removed from one of the specimens have an estimated thickness of 0,5 mm.

A partially exposed and reasonably well-preserved skull measuring 10 mm across the squamosals and 7 mm from the anterior border of the orbit to the supraoccipital is in the process of being prepared. Due to the frail state of the bone and hardness of the matrix this will be a long and tedious task, complicated by the fact that parts of the skeleton overlie the anterior portion of the skull.

At the present time it is as yet impossible to assign the specimens to a particular order or to any of the known dinosaurs from the Elliot and Clarens Formations.

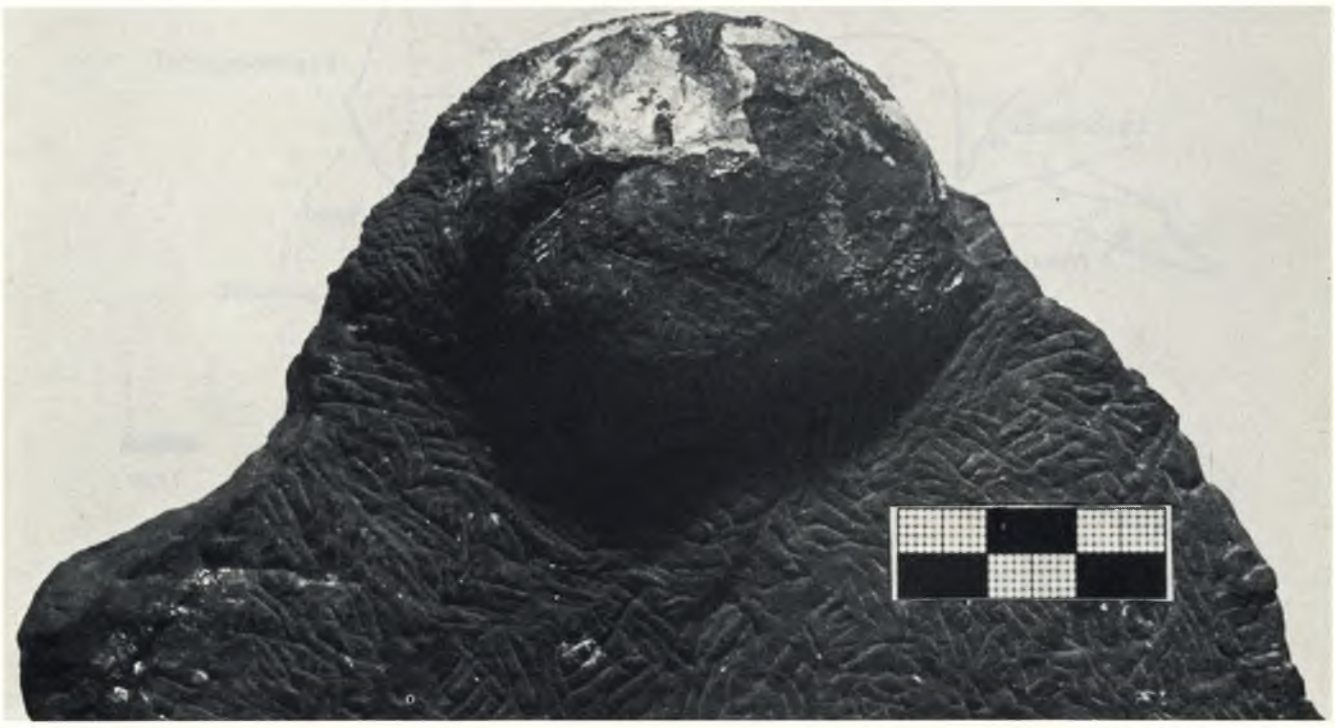


Figure 4. Almost complete egg which has retained much of its original shape.

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