A NEW TRIONYCHID TURTLE FROM THE BRITISH LOWER EOCENE

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ABSTRACT. A new trionychid turtle, *Eurycephalochelys fowleri* gen. et sp. nov., is described from a skull found in the Bracklesham Beds (Cuisian, Lower Eocene) of Sussex. Comparisons are made between this first known trionychid skull from the British Eocene, and other fossil and Recent members of the Trionychidae.

IN 1966 Mr. R. Fowler discovered the first known skull of a British Eocene trionychid in the Cakeham Beds of the Bracklesham Beds at East Wittering, Sussex.

Shell remains of trionychid turtles in the Lower to Upper Eocene deposits of England are fairly common and have been described as several new species of the genus *Trionyx* Geoffroy 1809. However, only a few indeterminate fragments of skulls have been found. Skull and shell have never been found together, so that the new specimen cannot be related to the previously described fossil forms. For this reason, and because of the considerable differences between this skull and Recent trionychid skulls, we have elected to place it in a new genus.

It may be that future finds of skulls associated with post-cranial material will enable at least some of the species of *Trionyx* based on British Eocene turtle shells to be transferred to the new genus; it may even be that *E. fowleri* will prove to be conspecific with one of those. Similarly it is possible that *Eurycephalochelys* may be congeneric with some genus of Eocene trionychid from elsewhere, known at present only from the remains of its shell.

Suborder CRYPTODIRA

Superfamily TRIONYCHOIDEA Fitzinger 1826

Family TRIONYCHIDAE Bell 1828

The following trionychid characters are seen in the new genus: Temporal region emarginate, with no contact between parietal and squamosal. Premaxillae fused. Postorbital small; naso-palatine foramen large; palatine fenestra present but small. Pterygoids make contact with maxillae and are separated from each other by basisphenoid. Quadrate encloses stapes.

Genus EURYCEPHALOCHELYS gen. nov.

Type species. Eurycephalochelys fowleri gen. et sp. nov.

Diagnosis. Quadrate condyle situated relatively far back, so that it lies well behind stapedial foramen, well behind level of foramen magnum, and more or less at level of back of basioccipital, with occipital condyle projecting only a short distance behind it. Forwardly directed flange of quadrate almost horizontal.

[Palaeontology, Vol. 13, Part 3, 1970, pp. 503–10, pl. 102.]

Internal maxillary foramen in medial wall of vertically rising part of maxilla. Jugal bar originates well below lowest point of orbital margin. Foramen magnum, and brain cavity immediately anterior thereto, wider than high.

Snout region short and broad, with distance from tip of premaxilla to front of orbit much greater than antero-posterior diameter of orbit. Maxilla very deep, depth probably much greater than vertical diameter of orbit. Postorbital bar narrow, slopes backwards and upwards. Area of quadrate exposed on dorsal surface not larger than area of prootic but of approximately equal size. Tympanic cavity shallow. Steep sides of choanal vault rounded.

Eurycephalochelys fowleri sp. nov.

Plate 102, figs. 1–5

Diagnosis. The only species of its genus.

Material. Holotype only, BMNH R8445, an almost complete skull without lower jaw. Cast in the collection of Mr. R. Fowler (Moschatel, Church Road, East Wittering, Sussex).

Occurrence. An oyster bed within the Cakeham Beds, Bracklesham Beds, Cuisian (Lower Eocene); foreshore at East Wittering, Sussex.

Measurements (in millimetres).

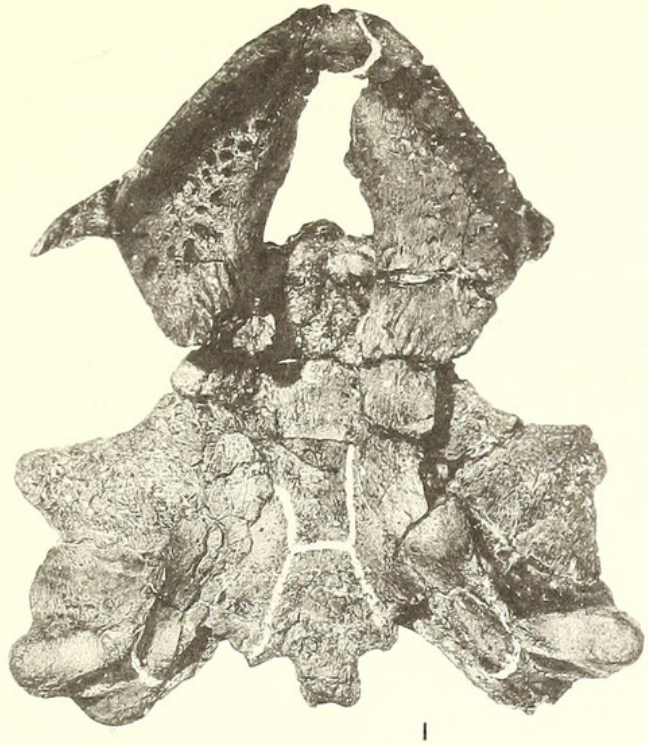
Actual length (premaxilla—occipital condyle)	157
Estimated total length, including supra-occipital spine	215
Maximum actual width (quadrate—quadrate)	132
Width across external nares	23
Tip of premaxilla—front of orbit	42
Minimum depth of maxilla beneath orbit	30
Maximum length of orbit	26
Estimated depth of orbit	26
Estimated length of anterior palatine foramen	8
Estimated length of intermaxillary suture	13
Estimated length of choanae	17
Width across choanae	20
Maximum width across maxillae in palatal view	87
Maximum dimension of articulating surface on quadrate	29

Condition of preservation. The specimen is an almost entire skull lacking the lower jaw. It has been slightly crushed dorso-ventrally at the posterior end and the whole bone surface is partially eroded, making sutures difficult to see.

The single, median premaxilla and the maxillae are almost complete. The frontals and prefrontals are lost. Both jugals are damaged; on each side the process reaching up towards the postorbitals is eroded and most of the jugal bar is missing. The parietals are complete posteriorly and laterally. The prootics, opisthotics, and quadrates are present on both sides with little distortion. Only the basal part of the supraoccipital is preserved, the sagittal crest having been lost. The squamosals are lacking but their suture scars on the quadrates are clearly visible. The palate is incomplete but the approximate

EXPLANATION OF PLATE 102

Eurycephalochelys fowleri gen. et sp. nov. BMNH R8445. Views of skull; 1, palatal; 2, occipital; 3, dorsal; 4, left lateral; all $\times\frac{1}{2}$. 5, quadrate showing the position of the stapedial foramen, $\times 1$.



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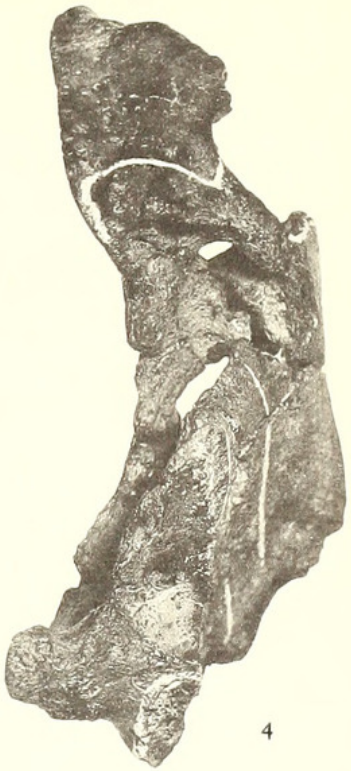

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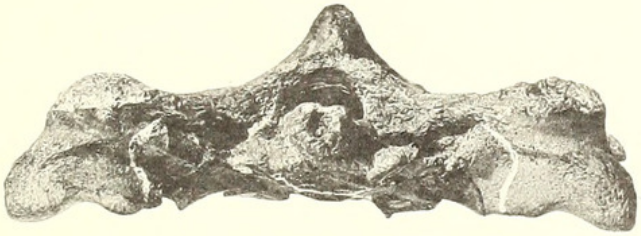

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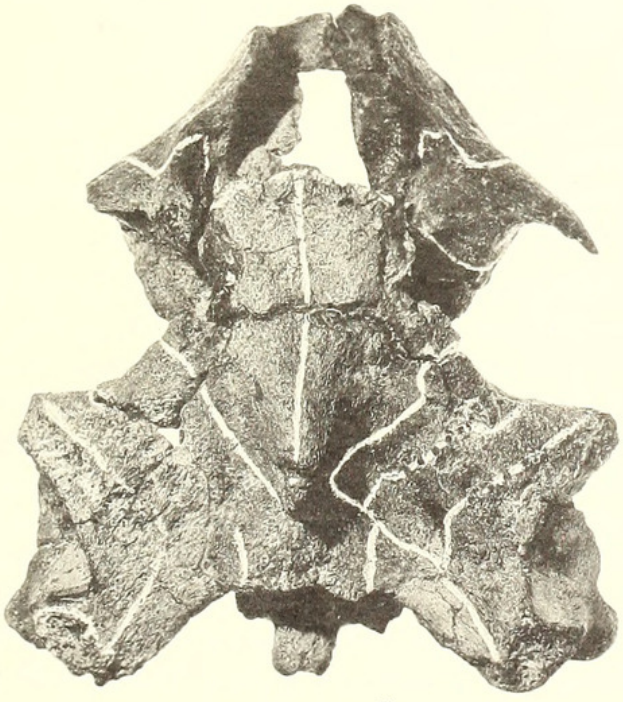

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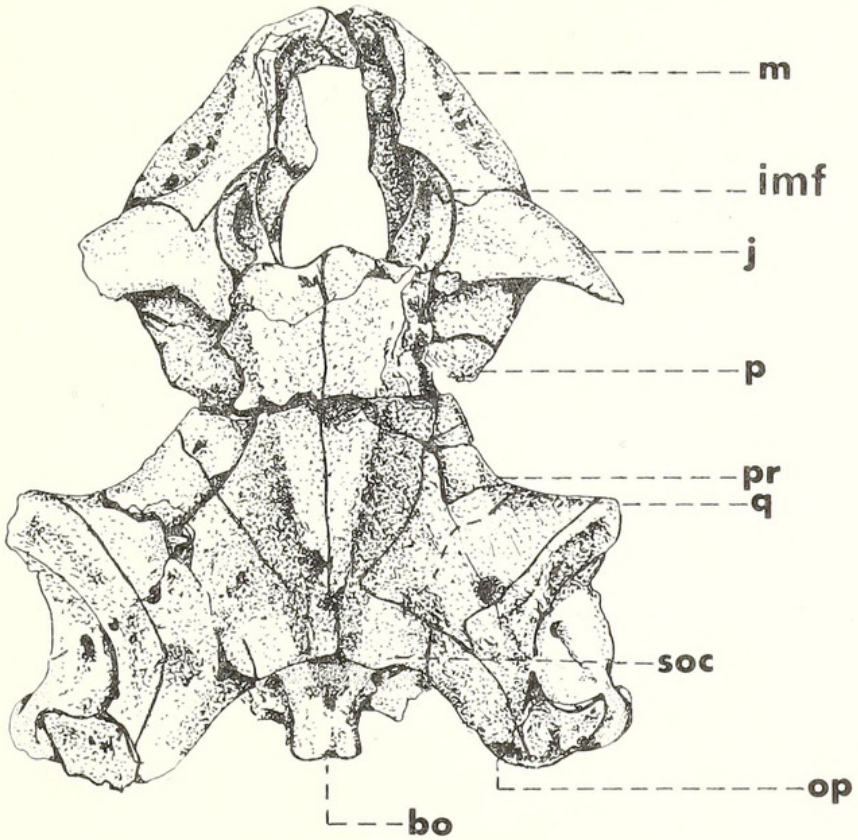
MOODY and WALKER, Trionychid turtle

margins of the anterior palatine foramen can be seen. The pterygoids are imperfect and only part of the basisphenoid remains. The ventral surfaces of the parietals are badly preserved whilst the articular areas of the quadrates are worn. Erosion of the occipital region has obscured the sutures.

Description. There is a large internal maxillary foramen (text-fig. 1) in the medial wall of the maxilla, bordered dorsally by the maxillary-jugal suture and antero-medially by a ridge which forms the inner edge of the orbital floor. This ridge sweeps upwards anteriorly to form an acute angle with the orbital rim.

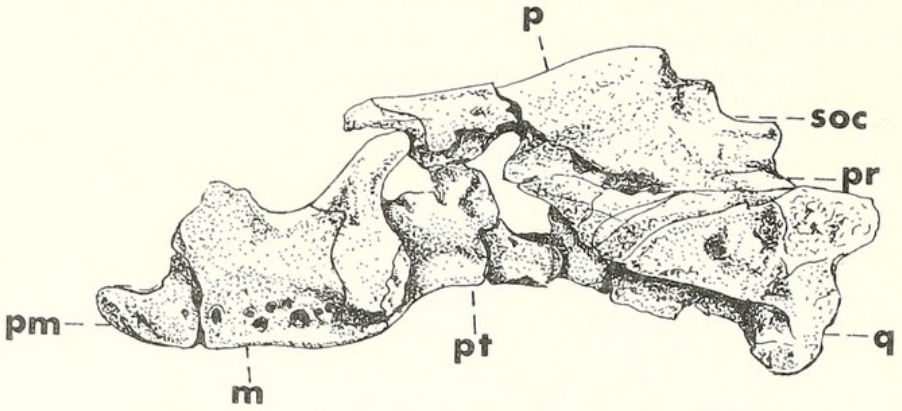


TEXT-FIG. 1. *Eurycephalochelys fowleri* gen. et sp. nov. BMNH R8445. Dorsal view of skull, $\times \frac{1}{2}$. *Abbreviations*: *bo*, basioccipital; *bs*, basisphenoid; *imf*, internal maxillary foramen; *j*, jugal; *m*, maxilla; *op*, opisthotic; *p*, parietal; *pm*, premaxilla; *pr*, prootic; *pt*, pterygoid; *q*, quadrate; *soc*, supraoccipital.

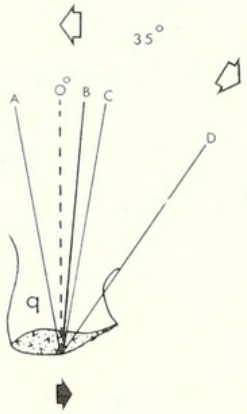
A dorsal view of the skull (text-figs. 1, 5A) shows that the lateral surface of the anterior region faces upwards as well as outwards, displaying a series of maxillary foramina a short distance above the cutting edge and running parallel to it. Posteriorly, the lateral surface of the parietal is rounded and slopes gently to the prootic. The area of that part of the quadrate which is normally exposed on the dorsal surface is not larger than the area occupied by the prootic, but is of approximately equal size. There appears to be no sutural contact between the prootic and opisthotic on the dorsal surface of the skull; however, the bone surface in this region is very eroded and the exact location of the sutures must remain in doubt.

A lateral view of the specimen (text-figs. 2, 5B) shows that the facial angle is steep and the flexure of the skull quite pronounced. The distance from the tip of the premaxilla

to the anterior edge of the orbit is greater than the antero-posterior orbital diameter. The maxilla is very deep, its depth probably exceeding the vertical diameter of the orbit. The jugal bar originates well below the lowest point of the orbital margin, being directed outwards and downwards as well as backwards. The postorbital bars, although worn, seem to have been narrow and slope backwards and upwards much as in *Cyclanorbis* Gray 1852.



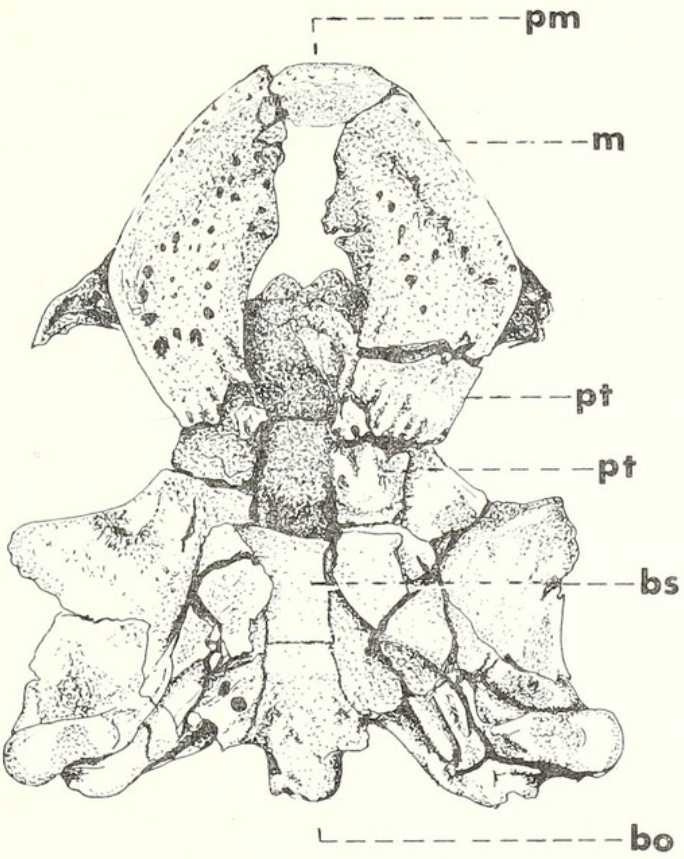
TEXT-FIG. 2. *Eurycephalochelys fowleri* gen. et sp. nov. BMNH R8445. Left lateral view of skull, $\times \frac{1}{2}$. Abbreviations as in text-fig. 1.



TEXT-FIG. 3. Diagram showing position of stapedial foramen (A–D) in various trionychids relative to quadrate condyle. A, *Chitra*; B, *Trionyx*, *Lissemys*, *Cyclanorbis* and ? *Pelochelys*; C, *Cycloderma*; D, *Eurycephalochelys*.

The most important feature of the skull, shown clearly in this view, is the position of the articular region of the quadrate in relation to the stapedial foramen. The articulation lies well behind and below the stapedial foramen, so that a line connecting the two would form an angle of 35° with the perpendicular (in other trionychids it lies almost immediately beneath it) (text-fig. 3); it lies well behind the level of the foramen magnum (instead of anterior to it); and it lies more or less at the antero-posterior level of the back of the basioccipital, with the occipital condyle projecting only a short distance behind it (instead of at the level of the front of the basioccipital, with the occipital condyle projecting far behind it). The forwardly directed flange of the quadrate, which rises to meet the quadratojugal, is almost horizontal (instead of oblique).

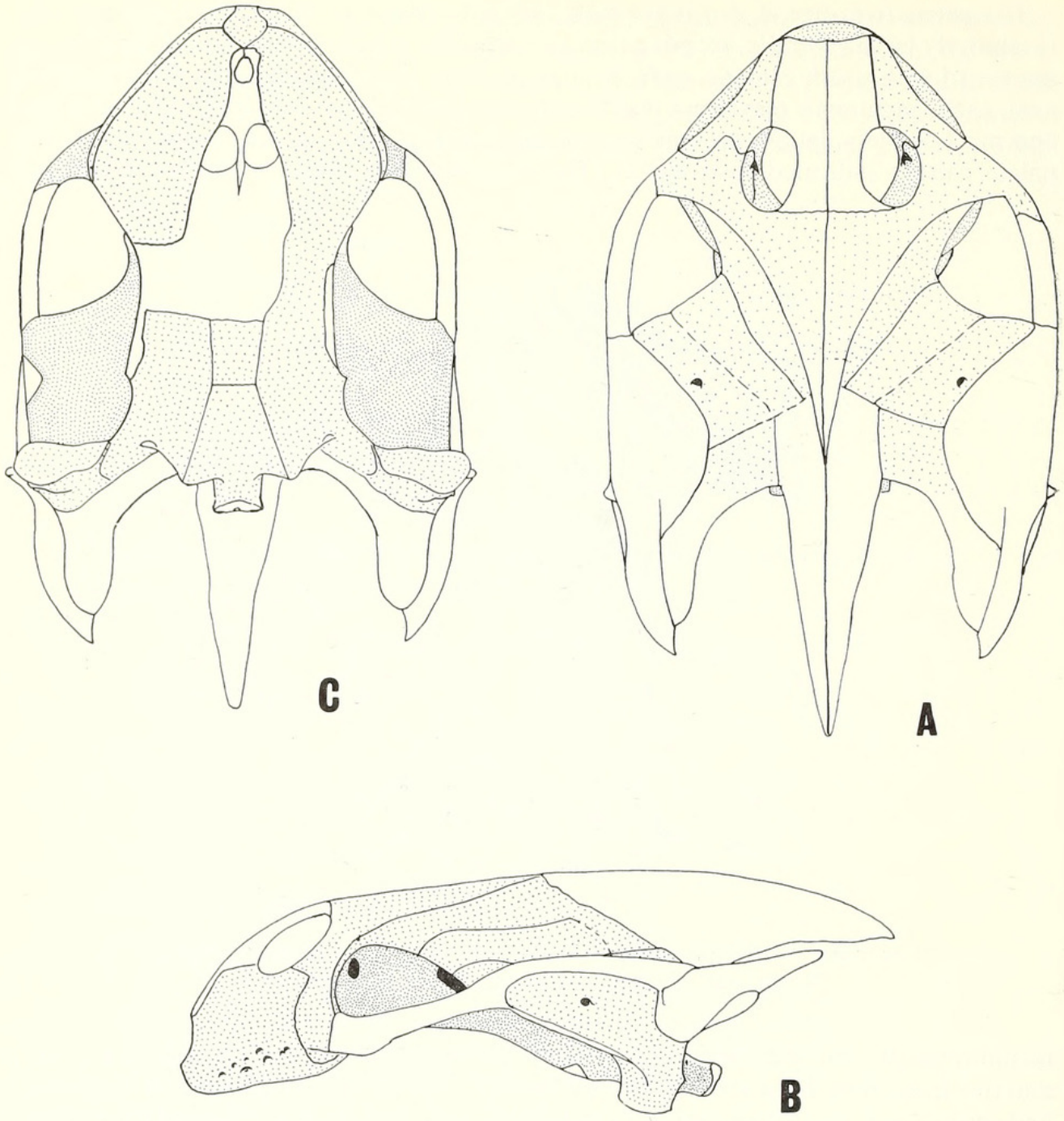
The palate (text-figs. 4, 5c) is the least complete region of the skull. The premaxilla is relatively large ventrally, forming the central portion of the blunt snout. The maxillae are broad with gently sloping surfaces running from the cutting edge to the triturating area, each reaching its maximum width at the level of the jugal bar. Although the vomer and most of the palatines are missing, the approximate form of the central area of the palate can be indicated (text-fig. 5). The intermaxillary suture would have been of



TEXT-FIG. 4. *Eurycephalochelys fowleri* gen. et sp. nov. BMNH R8445. Palatal view of skull, $\times\frac{1}{2}$. Abbreviations as in text-fig. 1.

medium length, but somewhat shorter than the length of the choanae, which are more anterior in position than in *Trionyx*. The lateral slope into the choanal vault is rounded and quite steep. The suture between the basioccipital and the basisphenoid lies anterior to the articular surfaces of the quadrates, whereas in related trionychids it lies as far back as the condyles or even slightly posterior to them.

The occiput cannot be described in great detail because of the damage caused by weathering. There is evidence of an ascending process on the pterygoid running up towards the opisthotic, but it is not possible to say whether those two elements actually met; the prootic fenestra would nevertheless have been at least partly divided. The shape of the foramen magnum and the brain cavity immediately anterior to it is wider than high; other genera of this group show the reverse condition. The only clearly traceable suture in this view is that between the quadrate and the pterygoid, which is normal in position.



TEXT-FIG. 5. *Eurycephalochelys fowleri* gen. et sp. nov. BMNH R8445. Reconstruction of skull; A, dorsal; B, lateral; C, palatal.

Remarks. The main characters of the genus *Eurycephalochelys* which separate it from other trionychids are listed in the first paragraph of the diagnosis. In some details it resembles *Trionyx*, in others *Cyclanorbis* or *Cycloderma* Peters 1854. The palate is superficially like that of *Trionyx*, but in *Eurycephalochelys* the choanae are further forward, their anterior margins lying far in front of the widest part of the maxilla; indeed, in this feature *Eurycephalochelys* comes midway between *Trionyx* and *Cyclanorbis*. The choanae are longer than the intermaxillary sutures in *Eurycephalochelys*, *Cyclanorbis*, and