A REVISION OF THE FOSSIL CHELID TURTLES (PLEURODIRA) DESCRIBED BY C.W. DE VIS, 1897

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With increasing knowledge of the morphology of Australian chelid turtles and major changes in taxonomy it has become necessary to assign, where possible, the fossil species described last century by C.W. de Vis. It was found that four of these, *Chelymys uberima*, *C. arata*, *C. antiqua* and *Pelecomastes ampla*, were synonymous, with *C. uberima* being the senior synonym. *Chelymys uberima* was determined to be a member of the *Elseya* whose affinities lie with the *Elseya lavarackorum* group of species. The paralectotypes of *Chelymys antiqua* were found to be a new species of the genus *Rheodytes* and sister to *R. leukops*. These specimens are described as a new species. *Chelodina insculpta* was found to be a valid taxon whose affinities probably lie with *C. expansa*. ❐ *Testudines, side-necked turtle, Chelidae, Miocene, Pleistocene.*

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The identification of fossil forms is an important addition to the understanding of the evolution and zoogeography of any species group. This is made difficult when the taxonomy of the extant forms is not well defined, as is the case for the Australian chelid turtles (Cogger et al., 1983; Thomson et al., 1997). With some recent advances on the skeletal morphology of chelids (Thomson & Georges, 1996; Thomson et al., 1997) it is now possible, and appropriate, to examine the fossil forms that have been described formally. For example, the recent description of a fossil turtle from Riversleigh, *Elseya lavarackorum* (White & Archer, 1994), and the subsequent discovery of a living population of this species (Thomson et al., 1997).

Fossil turtles in Australia have for many years been ignored due to the lack of detailed description of extant species. Rarely have skeletal diagnoses accompanied descriptions of the Australian chelid turtles, even those more recent. This makes the identification and placement of fossils difficult or impossible.

Apart from *Elseya lavarackorum* and *E. nadibajagu* Thomson & Mackness, 1999, only five other species of fossil chelid turtles have been described from Australia (Gaffney, 1981), all by C.W. de Vis (1897). Gaffney (1981) found that the available material was indeterminate below family or genus level was the last to revise the de Vis specimens. Three of the species, *Chelymys uberima*, *C. antiqua* and *C. arata*, were identified as *Emydura* sp. (= *Emydura* + *Elseya* of Gaffney, 1977); another, *Chelodina insculpta*, was identified as *Chelodina* sp.; and the last, *Pelecomastes ampla*, could not be identified to family (Gaffney, 1981). These species were all described from fragmentary material from the Darling Downs with no holotypes identified (de Vis, 1897) hence Gaffney (1981) set lectotypes from each set of fragments and placed the rest of the specimens as syntypes. The specimens were originally diagnosed using differences in sulci (de Vis, 1897) but it seems that they were actually arranged according to scute ornamentation (Gaffney, 1981). This is a highly variable character and I agree with Gaffney (1981) that it is of little phylogenetic significance.

In this paper the fossil turtles described by de Vis (1897) are reanalysed and, where appropriate, resurrected or placed in synonymy. They are placed in their correct genera using previously published diagnostic characters and their affinities and phylogenetic implications discussed. The purpose of this paper is to solve the nomenclatural problems associated with having described specimens of unknown affinity. It is not the purpose of this paper to present a review of the living genera with respect to the fossils.

METHODS

Turtles representing all extant Australasian species have been borrowed from museums, collected or otherwise obtained, and skeletonised

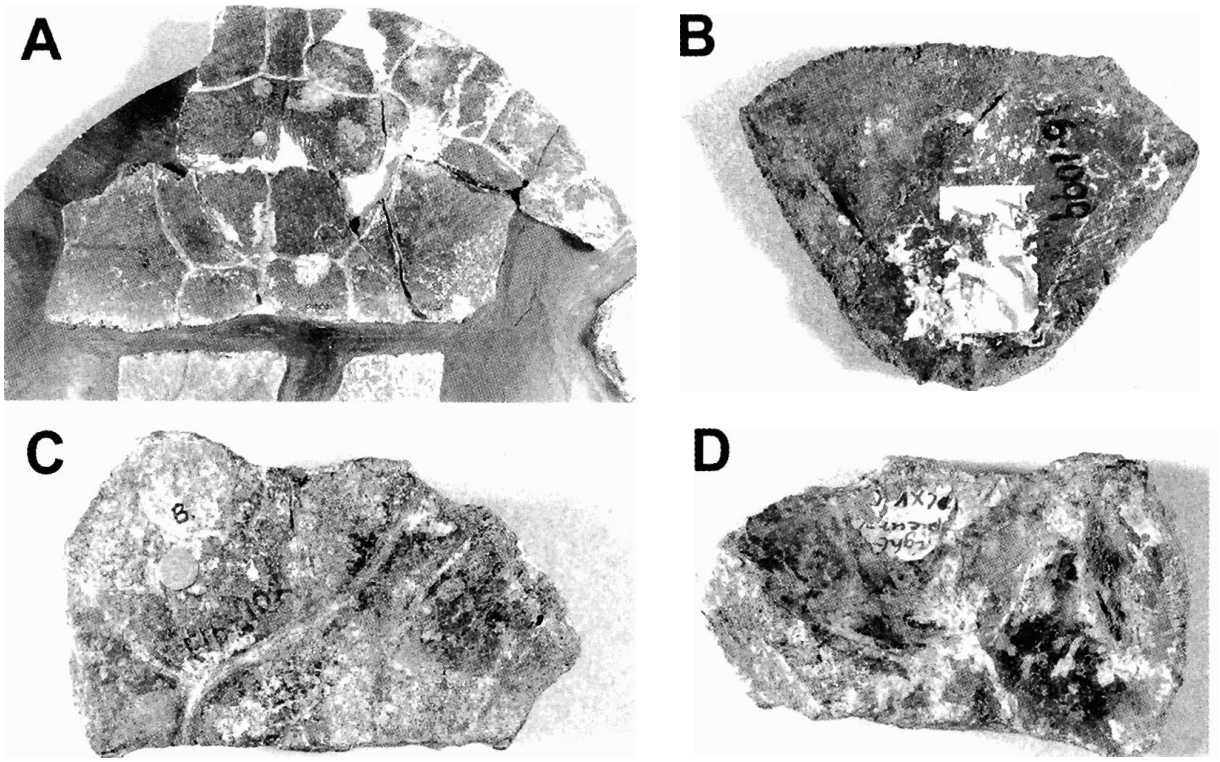

FIG. 1. A, Lectotype of *Elseya uberima*, QMF9040, showing the enlarged first vertebral. B, Lectotype of *Elseya arata*, QMF16-1099B, now synonymised with *Elseya uberima*. C-D, dorsal and ventral views of the Lectotype of *Pelecomastes ampla*, QMF1102D, now synonymised with *Elseya uberima*; ventral view shows the large deviation of the anterior bridge strut from the rib/gomphosis.

as per methods outlined in Thomson et al. (1997). This turtle collection of some 350 specimens is housed at the University of Canberra. Characters described in Thomson et al. (1997) were used for diagnosis and the fossils were then assigned to genus and their affinities demonstrated. A complete list of specimens examined can be found in Thomson et al. (1997). Further specimens with locality data will be presented in a future major analysis of the *Elseya* genus.

SYSTEMATICS

Elseya uberima (de Vis, 1897)

Chelymys uberima de Vis, 1897: 3.
Chelymys antiqua de Vis 1897: 4.
Chelymys arata de Vis 1897: 5.
Pelecomastes ampla de Vis 1897: 6-7.

MATERIAL. HOLOTYPE: none set (de Vis, 1897). LECTOTYPE: QMF9040 by subsequent designation (Gaffney, 1981) (Fig. 1A). PARALECTOTYPES: QMF1104, 1105 by subsequent designation (Gaffney, 1981). LECTOTYPE of *Chelymys arata* QMF16-1099B by subsequent designation (Gaffney, 1981) (Fig. 1B). LECTOTYPE of *Pelecomastes ampla* QMF1102D by subsequent designation (Gaffney, 1981) (Fig. 1C-D). LECTOTYPE of *Chelymys antiqua* QMF16-1106E by subsequent designation (Gaffney, 1981).

HORIZON. Pliocene or Pleistocene.

LOCALITY. Darling Downs, Queensland, Australia.

DISCUSSION. Material consists of: QMF9040, nuchal, right peripherals 1-3, left and right pleural 1, articulated; QMF1104, numerous unarticulated carapace fragments including peripherals and pleurals; QMF1105, numerous unarticulated plastral fragments.

The lectotype assigned by Gaffney (1981) is suitably diagnostic and can be recognised as an *Elseya* without difficulty. The first vertebral scute is significantly wider than the second (Fig. 1A), a character found only in the *Elseya* and *Chelodina* (see Thomson et al., 1997). The *Chelodina* have either an anterior bridge strut restricted to the peripheral bones and not continuing on to the pleural bones, e.g. *C. longicollis* group except *C. novaeguineae* (see Thomson, in press; Thomson et al., in press), or the strut continues on to the pleurals but not contributed to

by the rib gomphosis, although it crosses it in some species, is wide throughout its length with a significant enlargement at the medial end, e.g. *C. expansa* group and *C. novaeguineae* (see Thomson, in press; Thomson et al., in press). The structure of the anterior bridge struts in *Chelymys uberima* is consistent with neither of the *Chelodina* conditions and is similar in structure to that described for the *Elseya lavarackorum* group (Thomson et al., 1997) (Fig. 2.). The structure of the first pleural and the indentation at the nuchal region places this species in the *Elseya lavarackorum* group of species. The fact that this species has a cervical scute is not unusual among fossil *Elseya*, particularly those from western flowing drainages. Specimens in the South Australian Museum from Lake Palankarina and Lake Ngapakaldi all exhibit this feature and may represent an entire extinct radiation of *Elseya* turtles.

The four species synonymised above are, in this paper, recognised as a single diagnosable taxon, with *C. uberima* being the senior-most available name (page priority). The genus *Chelymys* has been synonymised in recent years with *Emydura* (Cogger et al., 1983), the genus *Pelecomastes* is considered here a junior synonym of the genus *Elseya*, Gray 1867.

These species were differentiated largely by shell ornamentation (Gaffney, 1981), an unsatisfactory method since this character can vary significantly even within a single population of turtles. The lectotype of *Chelymys antiqua* is not easily diagnosable. Based on the morphology of the pygal bone of extant species it would be attributed to almost any short-necked taxon in that the posterior suture of the ilium is in close proximity to the vertebral column. The *Elseya latisternum* group and *Pseudemydura* have a triangular suture on the pygal (unpublished data) ruling out these taxa. This pygal is either *Elseya* or *Emydura* but without the eighth pleural it is impossible to identify further (Thomson & Mackness, 1999). As there are no other diagnostic features between these specimens, all are considered as a single diagnosable taxon and assigned to *Elseya*.

Rheodytes devisi sp. nov.

ETYMOLOGY. This species is named for C.W. de Vis who described most of the material presented in this paper as well as many other taxa within Australia.

MATERIAL. HOLOTYPE: QMF16-1106B (Fig. 3A-B). PARATYPES: QMF16-1106A, C-D.

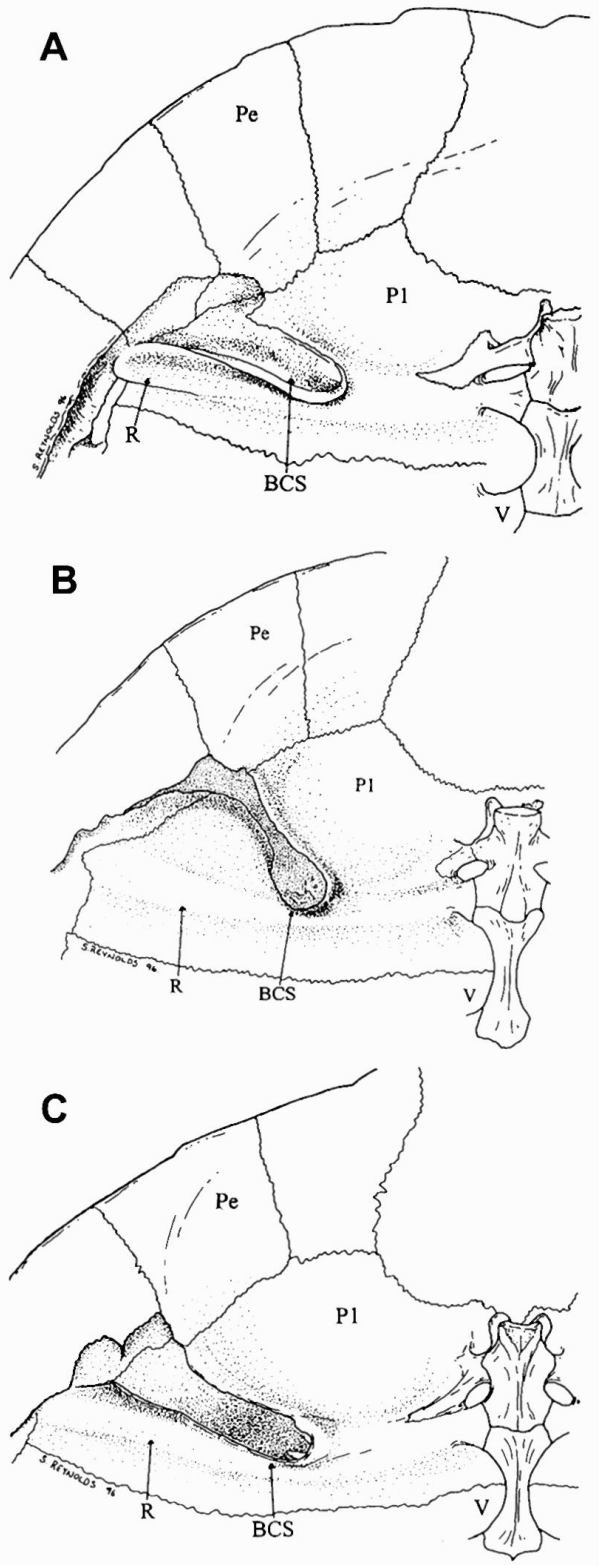

FIG. 2. Comparative diagrams of representative short-necked genera. A, *Elseya latisternum*; B, *Elseya dentata*; C, *Rheodytes leukops*; showing the angle between the rib/gomphosis (R) and the anterior bridge strut suture (BCS) on the first pleural (P1). (From Thomson et al., 1997).

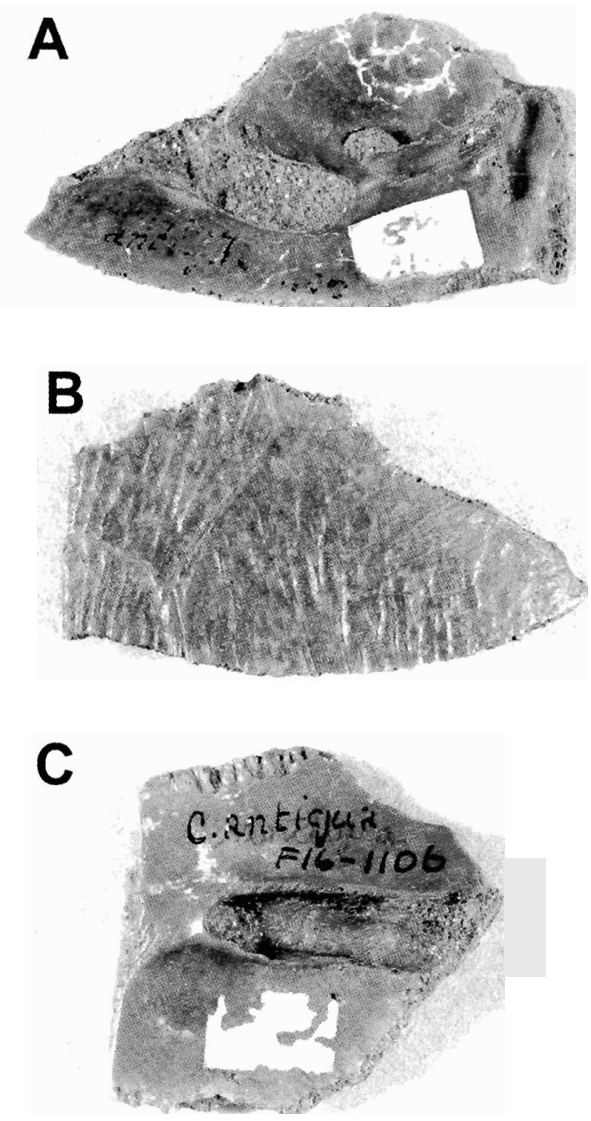

FIG. 3. Ventral and dorsal views of *Rheodytes devisi*, the ventral views showing parallel sutural edges and low angle of the anterior bridge strut. A-B, Holotype, QMF16-1106B; C, Paratype QMF16-1106C.

HORIZON. Pliocene or Pleistocene.

LOCALITY. Darling Downs, Queensland, Australia.

DIAGNOSIS. The genus *Rheodytes* can be diagnosed by the presence of a 10-15° angle between the anterior bridge strut and the rib/gomphosis of pleural one, and by the parallel sutural edges of the bridge strut with intervening deep socket like sutural surface (Thomson et al., 1997) (Fig. 2C). This combination of characters is unique to this genus and is present in both specimens of first pleurals in the type series (Fig. 3B-C). The species *Rheodytes devisi* is diagnosed by its thicker, better formed, carapacial bones. Deeper insertion of the anterior bridge strut suture and the failure of the anterior bridge strut to either break through, or come close to breaking through, the pleural surface.

DISCUSSION. Material consists of: QMF16-1106B, right first pleural, almost complete (Fig. 3A-B); QMF16-1106C, distal section of a right first pleural (Fig. 3C); QMF16-1106D, left partial pleural of indeterminate position but likely from the seventh pleural.

Rheodytes leukops is an inhabitant of the Fitzroy River in eastern Queensland, whereas *R. devisi* is found in the western flowing drainages of the Darling Downs. Among the extant taxa *Rheodytes leukops* can be identified by its extremely thin shell, to the point that the ilium and bridge strut often break through the carapace, all other genera have thicker shells ranging from the *Elseya latisternum* group through to the *Emydura* and *Elseya* groups. *R. devisi* has a thick shell much like other short-necked species and hence it can be diagnosed from its congener *R. leukops*. The species are allochronic and allopatric and appear to have inhabited different environments.

Chelodina insculpta de Vis, 1897

Chelodina insculpta de Vis, 1897.

MATERIAL. HOLOTYPE: none set (de Vis, 1897). LECTOTYPE: QMF1109A by subsequent designation (Gaffney, 1981) (Fig. 4). PARALECTOTYPES: QMF16-1107, F1109B-G by subsequent designation (Gaffney, 1981).

HORIZON. Pliocene or Pleistocene.

LOCALITY. Darling Downs, Queensland, Australia, restricted (this study).

DISCUSSION. Material consists of: QMF16-1107 (fig. V in de Vis, 1897), numerous carapace fragments including parts of pleurals and peripherals. Most of these are not particularly diagnostic. There is a partial articulated 6th and 7th pleural from the left side that has characters diagnostic of *Chelodina*. The fragment listed as D in de Vis' figure V is actually a 7th pleural not a 6th. QMF1109a-g (fig. VI in de Vis, 1897), various plastral units which can clearly be diagnosed as *Chelodina* using the lectotype, QMF1109A (Gaffney, 1981). This would appear, however, to represent at least two animals as sutural surfaces are preserved yet there is no match between the anterior and posterior halves of the plastron.

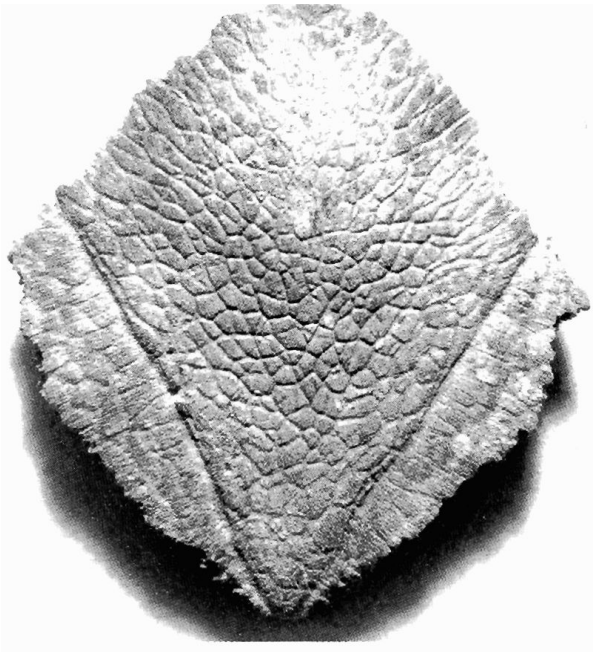

FIG. 4. Ventral view of Lectotype of *Chelodina insculpta*, QMF1109A, showing large area of the intergular scute on this unit.

The material available is diagnosable to genus using the scute sulci arrangements of the lectotype, an entoplastron in which there is clearly a large intergular which is separated from the margin anteriorly by the gulars a unique feature of the *Chelodina* (Gaffney, 1981) (Fig. 5). There is further evidence of generic assignment from the relative widths of the anterior and posterior parts of the posterior lobe of the plastron and from the positioning of the pelvic suture on pleural seven of the carapace.

Chelodina insculpta possessed a large, robust bridge strut, a character unique to the *C. expansa* group of species (Thomson, in press; Thomson et al., in press.). Further, this specimen had a large carapace excluding many species from the *C. expansa* group, such as *C. rugosa*, which have a reduced margin. However, the margin is not as flared at the posterior or as wide as *C. expansa*. Therefore, *C. insculpta* is recognised as a valid taxon.

The locality data for this species was originally given as a combination of the Darling Downs, Queensland; Warburton River, South Australia; and Eight Mile Plains near Brisbane, Queensland (de Vis, 1897). In the original description de Vis states that the Warburton material was not figured and consisted of seven carapace fragments. As the name bearing lectotype is an entoplastron this

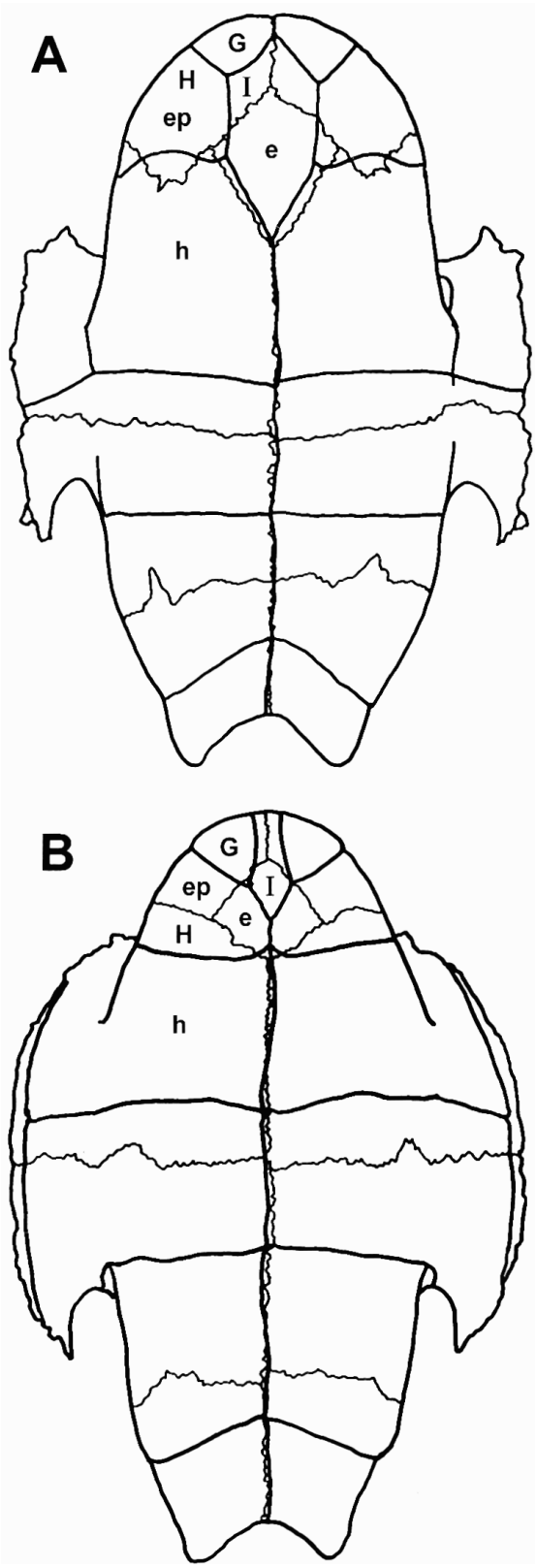

FIG. 5. Comparison of the intergular region of A, *Chelodina rugosa* and B, *Elseya dentata*; showing difference between the *Chelodina* and Short-necked Chelid conditions.

rules out the Warburton River as a type locality. There is no mention of Eight Mile Plains until the locality section of the paper and de Vis clearly states that 'in addition to the fragments of carapace figured, sixteen others from the Darling Downs ...'. It seems clear that despite other material examined only Darling Downs material was figured. As the lectotype (QMF1109a) is clearly identifiable in figure VI of de Vis (1897) I am restricting the type locality to the Darling Downs of Queensland.

DISCUSSION

The five species and one genus described by de Vis (1897) are reduced to three species and *Chelymys* and *Pelecomastes* are synonymised with *Elseya*. *Elseya uberima* is an extinct form of snapping turtle belonging to a large group that possibly contains the New Guinea forms as their sole surviving relatives. They would appear to be the sister group of the *Elseya lavarackorum* group (sensu Thomson et al., 1997). *Rheodytes devisi* is the first fossil record of this highly restricted genus of turtles. Clearly sister taxa, they were found on opposing sides of the Great Dividing Range. *Chelodina insculpta* is a large long neck turtle from an area where *C. expansa* may still be found. This species would appear to be part way between the body forms associated with *C. expansa* and *C. rugosa*, and likely to be the sister species of *C. expansa*.

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