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Flower type II (Figure 2*c*)

Description: Flower apparently regular with three preserved petals (could be four or five) which appear to be free, broad, bluntly rounded; maximum width of well-preserved petal 3 mm; preserved flower 1.1 cm across.

Remarks: The flower is incomplete to afford systematic placement but can be compared in overall appearance to members of family Rutaceae.

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Inflorescence (Figure 2*b*)

Description: One more or less complete inflorescence with its counterpart; sympodially growing cymose inflorescence having rounded branched cluster of tiny flowers; bracts small, alternate; structure of individual flowers not clear; flowers tiny, possibly having four petals; inflorescence 3.5 mm across.

Remarks: The inflorescence, though almost complete, is difficult to compare with any modern form, but its overall shape and four-petalled tiny flowers give the impression of an inflorescence of the Cruciferae.

Repository No.: Geological Survey of India, Northern Region, NRP/1/809.

Bud (Figure 2*d*)

Description: A compact and undeveloped small flower bud with its counterpart apparently having bud scales/sepals opened; sepals/bud scales broad, bluntly rounded; undeveloped bud obtusely rounded apically; bud 5 mm across.

Remarks: Due to incomplete nature the bud could not be compared with any modern flower bud.

Repository No.: Geological Survey of India, Northern Region, NRP/1/811.

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Alligatorine teeth from the Deccan Intertrappean beds near Rangapur, Andhra Pradesh, India: Further evidence of Laurasiatic elements

Rajendra Singh Rana
Department of Geology, Kumaun University, Nainital 263 002, India

Alligatorine teeth recovered from Intertrappean beds in the Deccan represent the first record of Indian alligatorines near the Cretaceous–Tertiary boundary level. The present record also suggests that there was a dispersal corridor for faunal exchange between the Laurasian and Gondwanian continents.

TEETH recovered from the Intertrappean locality near Rangapur, Rangareddi District, Andhra Pradesh (Figure 1), provide the first evidence of Indian alligatorine crocodiles near the Cretaceous–Tertiary boundary (KTB) level. The alligatorids are mainly of Eurasiatic distribution, and known from North America[1–6], Europe[7,8] and China[9]. Their presence in India lends support to the hypothesis of a dispersal corridor between the Laurasian and Gondwanian continents.

The otolith assemblage and charophytic flora have already been described from the study area[10,11]. The microvertebrates include fishes, amphibians, turtles, snakes, lizards, crocodiles and mammals. The teeth belong to order Crocodilia, suborder Eusuchia, family Crocodylidae and subfamily Alligatorinae.

The collection represents three morphological types belonging to the posterior and anterior part of the jaw. The posterior crushing teeth, characterized by small size (5.0 mm to 6.0 mm in width, and 2.0 mm to 3.0 mm in height), are typically button-shaped, have wrinkled low crowns sharply separated from the root (Figure 2*d*), are bluntly rounded, and do not appear striated. They are somewhat laterally compressed, showing the presence of weak carinae extending from apex to base (Figure 2*e*) and are laterally symmetrical and swollen at the gingival margin. The elliptical basal part seems trilobate (Figure 2*a*, *b*, *d*). These teeth exhibit similarities with the posterior teeth of *Hassiacosuchus kayi* known from the Lower Eocene of Wyoming (Mook, 1941, plate XXV and fig. 1)[2], isolated teeth of alligatorid recovered from the Upper Cretaceous of Austria and southern France (Buffetaut, 1980, fig. 6)[7], and teeth of *Brachychampsa montana*, *Allognathosuchus* and *Asiatosuchus* described from the Late Cretaceous–Early Tertiary Formations of North America, Europe and China[1–9].

The second type of teeth (Figure 2*e*, *f*), subtriangular in shape, with pointed apices and carinae and with bilobate base, bear close resemblance with the median teeth of *Brachychampsa*, *Allognathosuchus* and *Asiato-*

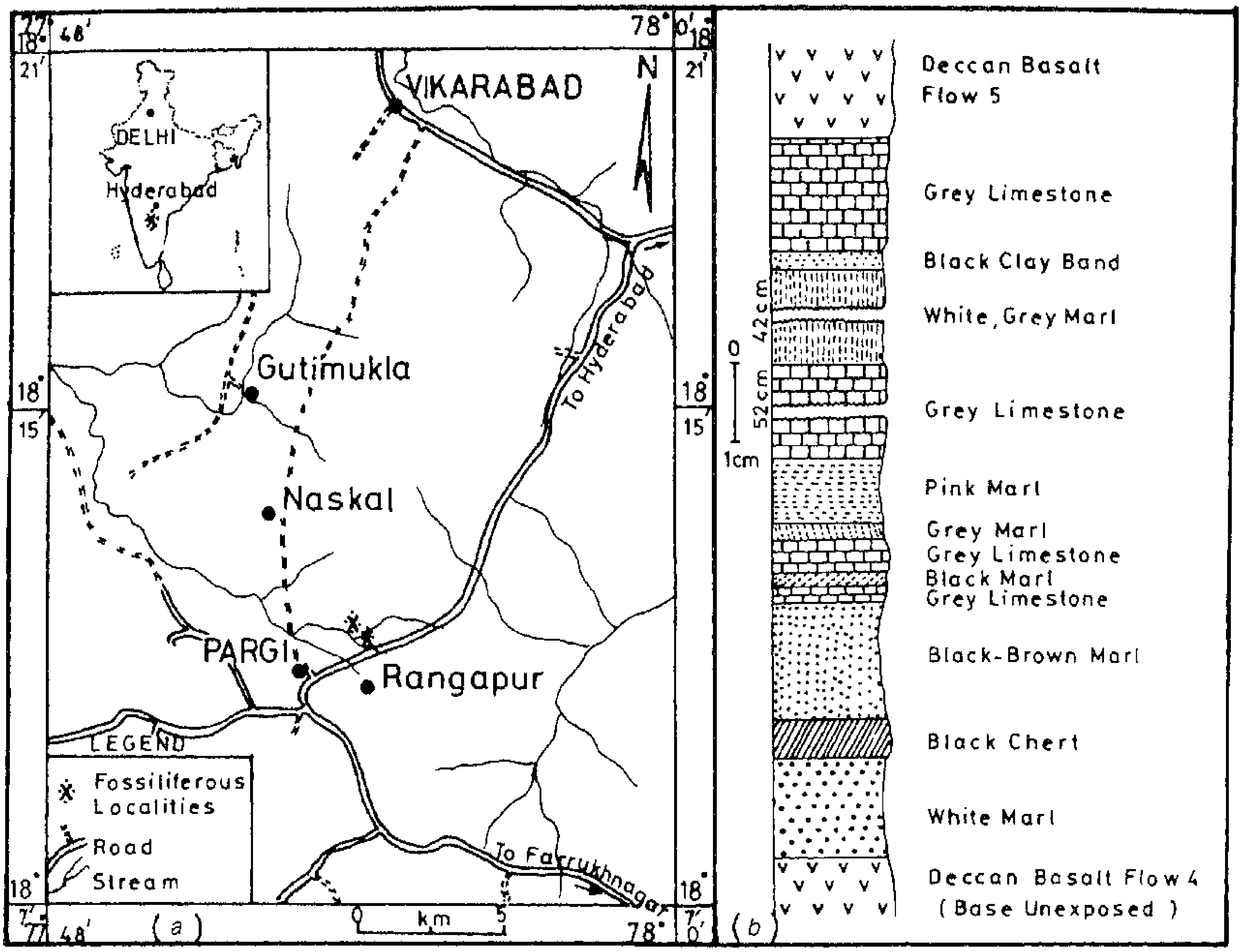

Figure 1. *a*, Location map, showing fossiliferous localities. *b*, Stratigraphic section near Rangapur.

suchus. The third, anterior type, teeth are conical in shape, show carinae-bearing pointed apices and globular base (Figure 2*g*, *h*, *i*). These also resemble the anterior teeth of *H. kayi* and *B. montana*.

The alligatorids are considered to be Laurasian elements which first appeared in the freshwater deposits of North America and Canada about 70 Myr ago[12]. The presence of alligatorines in the Intertrappean beds of the Indian subcontinent provides additional evidence in the interpretation of their palaeobiogeography. Two alternative models can be put forward to explain their presence. These depend essentially on early evolutionary history and centre of origin of alligatorines. Their occurrence in Late Cretaceous–Early Palaeocene horizon in North America, Europe and China and now in India may imply a quick dispersal after origin in any of the regions mentioned above. On the other hand, there is a possibility of the Indian taxa being convergent forms. Relationships to *Bernissartia* cannot be ruled out. In order to demonstrate the validity of the first hypothesis, stratigraphic data of fine resolution are needed. To support the second model, greater taxonomic precision based on better material is needed.

In recent years a large number of KTB freshwater and terrestrial biotas from peninsular India, exhibiting affinities with Laurasian and Gondwanian forms, have been found. These include ostracodes[13], charophytes[11,13], pollens (*Aquilapollenites*)[14], fishes (*Lepidotes*, *Lepisosteus*, Osteoglossidae, Notopteridae)[10,15], amphibians (Pelobatidae)[16], turtles (Pelomedusidae)[15], dinosaurs[17] and therian mammals[18], and indicate that India was not an isolated island continent. The presence of Laurasian alligatorid crocodile in India supports the earlier hypothesis that there was a dispersal corridor for faunal exchange between India and Laurasia[13,16].

The alligatorids indicate freshwater coastal plain environment. At Rangapur, while the fauna is predominantly freshwater of a coastal plain, there are marine elements (*Pycnodus*, *Dasyatis*, *Igdabatis*, *Enchodus* and *Eotrigonodon*) also. The predominance of molluscan shells in the Intertrappean beds of Rangapur and the highly etched and pitted surface of the alligatorine crushing teeth strongly support Carpenter and Lindsey's view[5] that the alligatorids were molluscivorous and chelonivorous. The etching and pitting of the surface of the teeth are interpreted as resulting from the action of

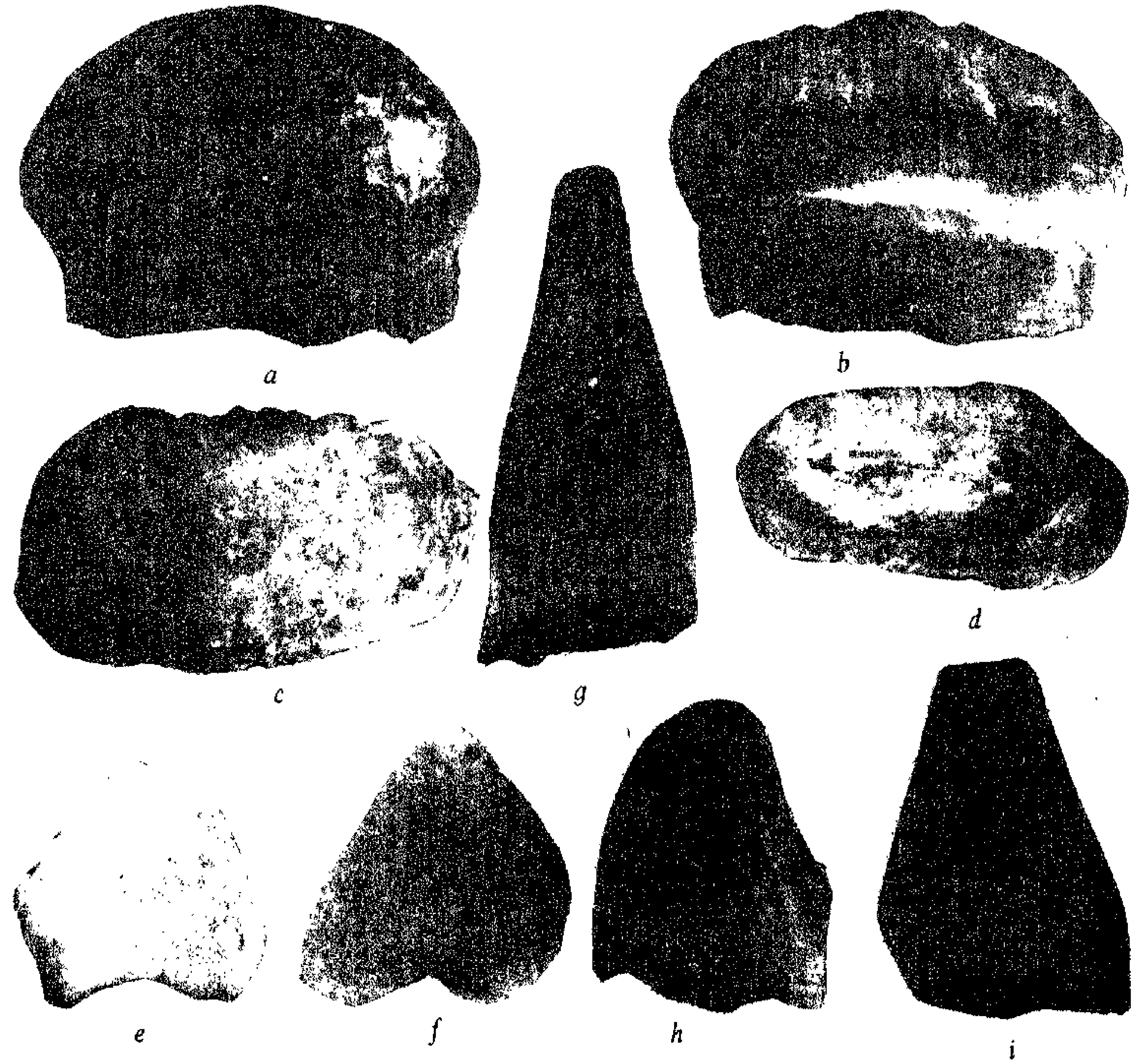

Figure 2. Alligatorine teeth from Deccan Intertrappean beds. *a–d*, Posterior teeth: *a* and *b*, lateral view (× 10.3), *c*, apical view of another tooth (× 11.27), *d*, basal view of another tooth (× 10.6); *e*, median tooth (× 9.0); *f*, median tooth (× 9.1); *g*, conical tooth (× 19.6); *h*, conical tooth (× 7.4); *i*, conical tooth (× 15.3).

the strong gastric juices of the molluscs and chelonian vertebrates.

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