

SOME CHAROPHYTA FROM THE DECCAN INTERTRAPPEAN BEDS NEAR NAGPUR, CENTRAL INDIA*

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ABSTRACT

Three well preserved taxa of fossil charophytes are described and illustrated from the Deccan Intertrappean beds of Gitti Khadan, Nagpur, Central India. The assemblage includes *Platychara raoi* n. sp., *Platychara sahnii* (Rao and Rao) n. comb., and *Microchara* sp. indet. Both the genera are being reported for the first time from India.

INTRODUCTION

The Tertiary charophytes in India are fairly well documented, particularly of the well known Deccan Intertrappean beds from various parts of the Peninsular India. The important contributions are by SOWERBY (1837; Suchet Hills, near Nagpur), SRIPADA RAO AND NARAYANA RAO (1939; Kateru, north of Rajahmundry in Andhra Pradesh), SAHNI AND NARAYANA RAO (1943; Sausar, near Chhindwara in Madhya Pradesh), MAHADEVAN AND SARMA (1948; Vicarabad, near Hyderabad), RAO (1955; Yellur near Belgaum in Karnataka) and SHIVARUDRAPPA (1972; Gurumatkal in Gulbarga District, Karnataka). Most of these works, however, are in the form of short notes, except that of RAO AND RAO (1939) who described and illustrated thirteen charophyte taxa in some detail. A review of the Indian fossil charophyta has recently been published by RAO (1974). Most of these works, however, need revision in the light of recent investigations and the advanced knowledge of the charophytic flora. A comprehensive revision of these works is under preparation by one of us (SBB).

The present paper records three well preserved taxa of charophytes from the Intertrappean rocks of Gitti Khadan in the neighbourhood of Nagpur city (21° 09' N: 79° 07' E) in Maharashtra (Central India). The present assemblage (*vide infra*) includes one new taxon, one new combination of the known taxon and one indeterminate species. The genera *Platychara* Grambast (1962) and *Microchara* Grambast (1959) are found in association with a number of fresh-water gastropods, lamellibranchs, ostracodes and fish teeth. Both the charophytic genera are being recorded for the first time from the Indian sub-continent. A check list of these taxa is given below:

Platychara raoi n. sp.

Platychara sahnii (RAO & RAO, 1939) n. comb.

Microchara sp. indet.

AGE IMPLICATIONS

Insofar as the age implication of the charophytic flora is concerned, the genus *Platychara* Grambast (1962) is known to range from Maestrichtian to Montian, but never beyond

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Maestrichtian (Grambast, 1971, p. 20). The type species—*P. compressa* (KNOWLTON, 1888)—is known from the Flagstaff Limestone, Upper Palaeocene of Utah (U.S.A.), while *P. perlata* (PECK & REKER, 1947) and *P. caudata* Grambast (1971) are known from the Maestrichtian of Peru and France respectively. Similarly, the type species of *Microchara* Grambast (1959)—*M. hystrix* Grambast (1959)—is known from the Sparnacian of France, as also *M. vestita* Castel (1969). The other two known species of this genus—*M. leiocarpa* Grambast (1971) and *M. cristata* Grambast (1971)—are known from the Maestrichtian of France. According to CASTEL (1969, p. 1589), "*Chara*" *sausari* Sahni & Rao (1943) has similar apical characters as *Microchara* and may also probably belong to that genus.

The controversy concerning the age of the Deccan Intertrappean beds is well known to be repeated here *in extensuo*, nor we have any intention of raking it up again. However, the recent works by BHALLA (1967, 1968) and BHALLA AND KHAN (1969) on the foraminiferal fauna of the Pangadi and Kateru, and the reviews by SAHNI AND SITHOLEY (1957), PRAKASH (1960) and LAKHANPAL (1965) on the rich Intertrappean flora favour a Lower Eocene age for the Intertrappean beds. The evidence of the charophytic flora will have to await a comprehensive revision of all the known Indian taxa. The known stratigraphic ranges of the charophytic genera being described herein do seem to suggest a range from Maestrichtian to Montian. We are, however, inclined to favour more a Middle to Upper Palaeocene (Montian—Landenian) age for the Intertrappean beds near Nagpur.

SYSTEMATICS

The classification followed here is that of GRAMBAST (1962). The terminology for expressing the shape and measurements of the charophyte gyrogonites, however, is after HORN AF RANTZIEN (1959).

All the figured specimens are deposited in the Museum, Centre of Advanced Study in Geology, Panjab University, Chandigarh, under numbers CASGMF 1234 to 1238.

Order—Charales

Family—Characeae Richard (1815)

Sub-family—Charoideae Braun *in* Migula (1897)

Tribe—Gyrogonae Grambast (1956)

Genus—**Platychara** Grambast (1962)

Platychara sahnii (RAO & RAO) n. comb. (Text-figs. 8-13)

Chara sahnii Sripada Rao & Narayana Rao (1939), p. 10, Pl. 1, Fig. 12; Pl. 3, Fig. 5.

Hypotypes—Text-figs. 8-11 (CASGMF 1234 & 1235) and Text-figs. 12-13 (CASGMF 1236).

Material—24 well preserved gyrogonites.

Description—The present material consists of typical gyrogonites of varying size referable to *Chara sahnii* Rao & Rao originally described from the Kateru Intertrappean beds, exposed 2 miles north of Rajahmundry in Andhra Pradesh. The gyrogonites are medium sized, often oblate spheroidal and rarely suboblate in shape, rounded apically due to swollen apical cells, tapering basally with a distinctly protruding basal extremity; greatest diameter above mid-height. Five cellular spirals, flat or convex, which typically thin out along constriction with apical cells which are generally broad and swollen. Spiral cells about 80-100 μ wide, make about two sinistral turns at an angle of about 12-18 degrees to the equator. Base distinctly tapering with a pointed end, basal pore very narrow (20-30 μ), pentagonal or rounded.

Remarks—RAO AND RAO (1939) established this species to accommodate only three specimens of their material. According to them these specimens were laterally flattened or compressed which they thought was a natural feature. However, the present material from Nagpur consists of well preserved specimens, both laterally compressed and non-compressed and shows that the compression or flattening was not a natural phenomenon. A complete gradation from one to the other is seen. Examination of these forms shows that they all belong to the genus *Platychara* which was established by GRAMBAST (1962) to receive species with distinct morphological features like subvoid or suboblate shape, projected basal extremity and modification of spiral cells along the constriction of apical cells. Apparently, the original description and illustrations of *Chara sahnii* Rao & Rao (1939) fit well within the genus *Platychara*, and we have retained the original trivial name for this species under the generic name *Platychara*.

Dimensions—LPA: 550-800 μm , more often 600-700 μm ; LED: 500-700 μm , often 600 μm ; ISI (without the basal projection and apical cells which measure about 50 μ each): 85-92; NC: 10 (see also Table 1).

Table-1 Measurements of *Platychara sahnii* (RAO & RAO) n. comb.

Hypc- types	LPA	LED	AND	ISI	ANI	WCE	BPOO	EA	NC
1	550	625	250	88	45	80	25	18	10
2	550	600	250	92	45	80	20	15	10
3	575	625	275	92	48	85	25	12	10
4	575	650	250	88	44	80	25	14	10
5	550	650	300	85	54	100	30	16	10
Mean	560	630	265	89	47	85	25	15	10

***Platychara raoi* n. sp.** (Text-figs. 1-4)

Derivation of Name—The species is named in honour of late Prof. S. R. NARAYANA RAO, formerly of the Lucknow University, Lucknow.

Holotype—Text-figs. 1-3 (CASGMF 1237).

Type locality—Gitti Khadan, Nagpur city, Maharashtra, India.

Type horizon—Intertrappean chert bed, Palaeocene.

Material—7 well preserved gyrogonites.

Description—Gyrogonites medium in size, typically wider than long, often suboblate and rarely oblate spheroidal in shape; flattened longitudinally. Five spiral cells concave or plane, separated by narrow and shallow inter-cellular ridges, narrowly thinout and merge along the constriction with apical cells which are broadened; steeply taper into a projection below the base. Spiral cells 75-100 μ wide, make nearly two sinistral turns at an angle of 10-16 degrees to the equator. Basal opening generally pentagonal, about 25-40 μ in diameter.

Remarks—The present species is close to *P. caudata* Grambast (1971) originally described from the Maestrichtian of SE France, but differs from the latter in being much bigger in size and having less swollen and more broadened apical cells and more number of convolutions in side view. It also differs from *P. sahnii* (RAO & RAO, 1939) in being smaller in size, in general shape and in basal structure.

Dimensions—LPA: 500-650 μm ; LED: 600-650 μm ; ISI (without the basal projection and apical cells which measure about 50 μm each): 68-90; NC: 9-10. (see Table-2).

Table-2 Measurements of *Platychara raoi* n. sp.

	LPA	LED	AND	ISI	ANI	WCE	BPOO	EA	NC
Holotype ..	440	625	250	89	57	75	40	11	9
Paratype 1 ..	500	625	275	80	55	100	40	14	10
„ 2 ..	450	625	250	72	56	100	25	16	9
„ 3 ..	425	600	225	68	56	75	25	10	9
„ 4 ..	475	620	250	77	53	75	25	11	9
Mean ..	460	620	250	77	55	85	31	12	9

Tribe—Chareae Leonhardi (1863)

Genus—**Microchara** Grambast (1959).

Microchara sp. indet. (Text-figs. 5-7) (CASGMF 1238).

Material—2 well preserved gyrogonites.

Description—Gyrogonites small in size, longer than wide, subprolate ellipsoidal or conical in shape; gradually taper basally; summit somewhat blunt. Five spiral cells concave, separated by narrow intercellular ridges; distinctly projected below the base; apical cells not distinct. Spiral cells 50 μ wide, make little more than two sinistral turns at an angle of 16-20 degrees to the equator. Basal opening pentagonal or rounded, about 28 μ in diameter.

Remarks—The present species is close to *M. cristata* Grambast (1971) described from the Upper Maestrichtian of France in most of the characters, but differs from the latter in having conical shape, more projected base and in the absence of surface tubercles. Owing to the paucity of material it is not possible to designate the species at present.

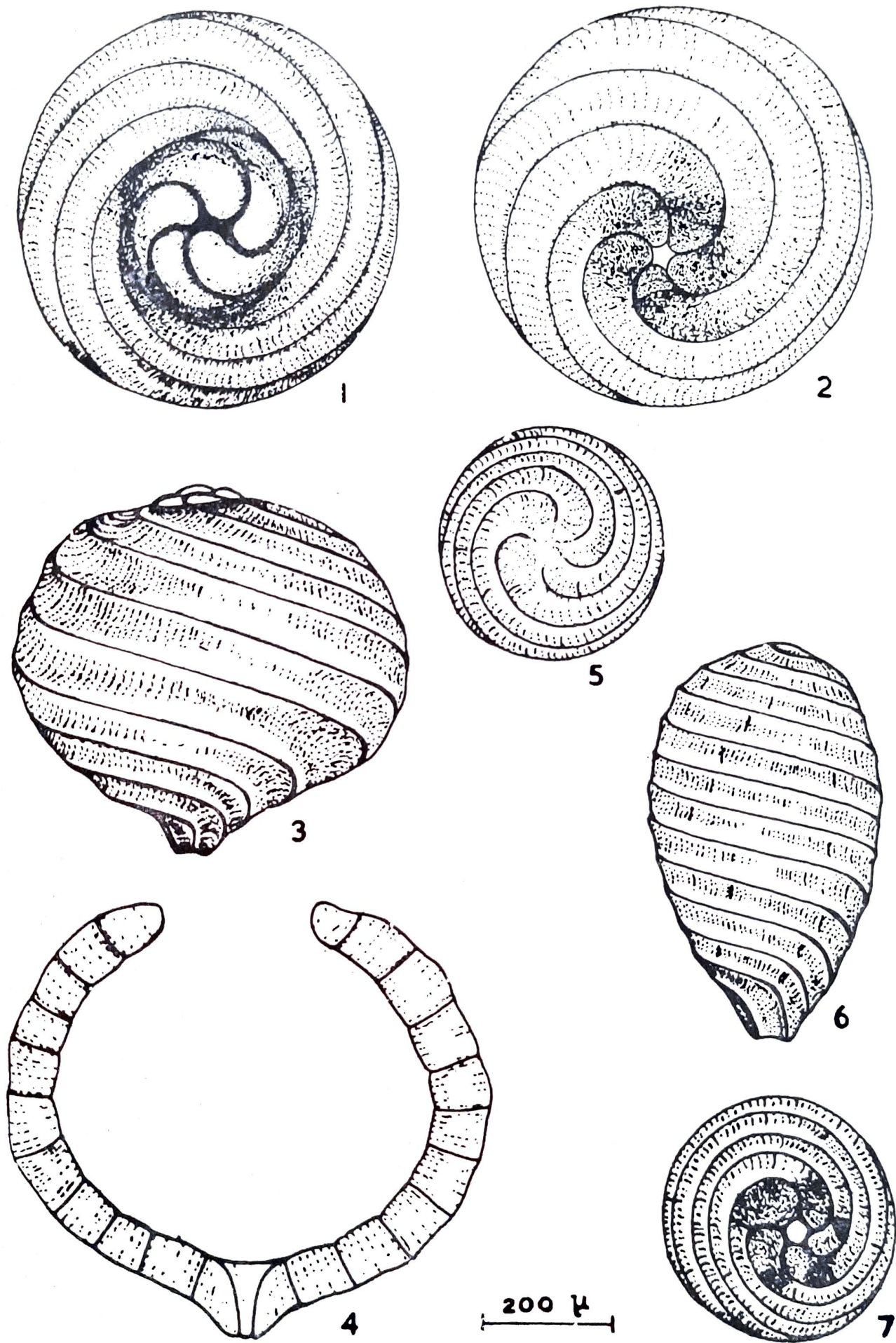
Dimensions—LPA: 475-500 μm ; LED: 360-400 μm ; ISI: 125-132; NC:10-12. (see Table-3).

Table-3 Measurements of *Microchara* sp. indet.

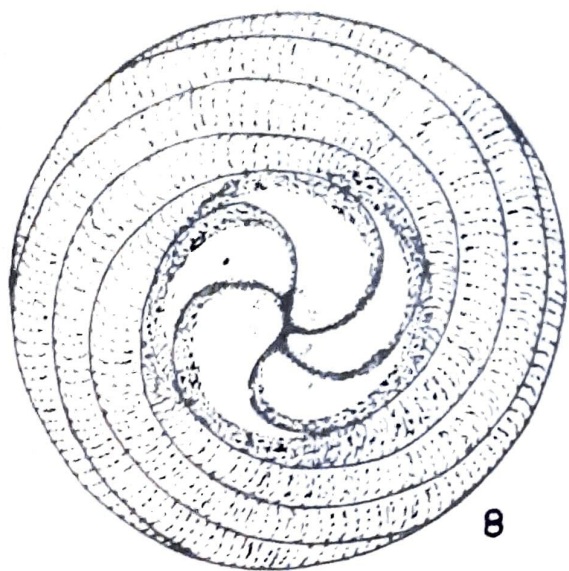
	LPA	LED	AND	ISI	ANI	WCE	BPOO	EA	NC
Hypotype 1 ..	500	400	250	125	50	50	25	20	10
„ 2 ..	475	360	250	132	53	50	30	16	12
Mean ..	487	380	250	128	52	50	28	18	11

ACKNOWLEDGEMENTS

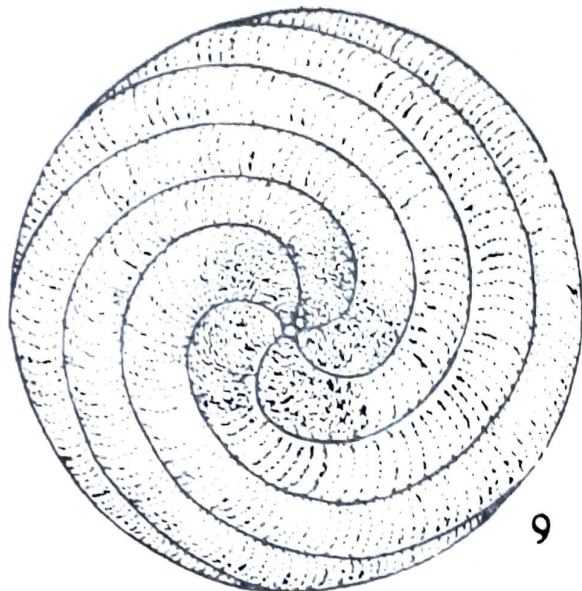
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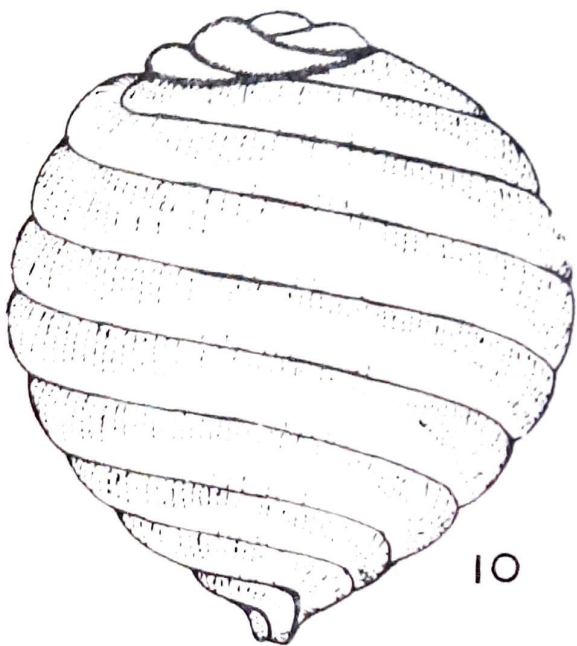
Text-figs. 1-4: *Platychara raoi* n. sp., 1, 2, 3, Holotype, apical, basal & lateral views respectively; 4. Longitudinal section. Text-figs. 5-7: *Microchara* sp. indet., apical, lateral and basal views respectively.



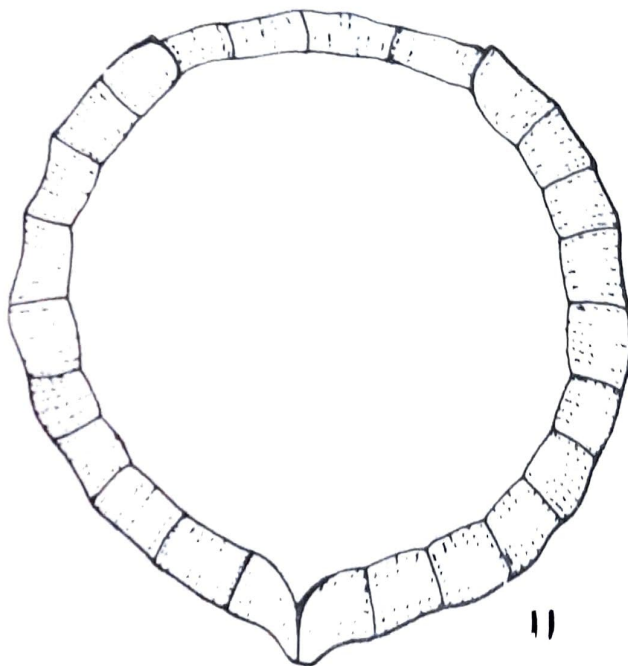
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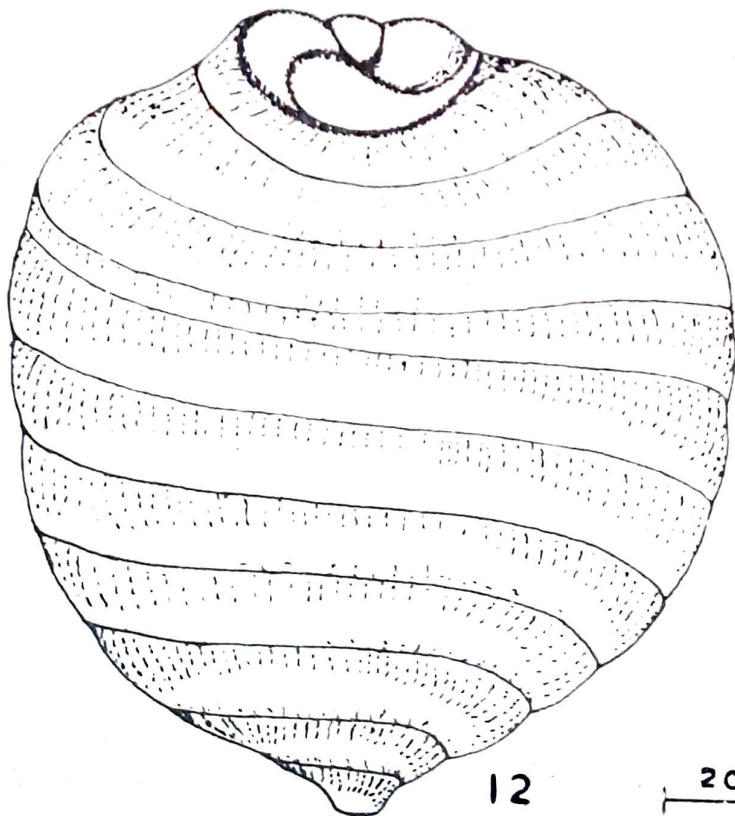
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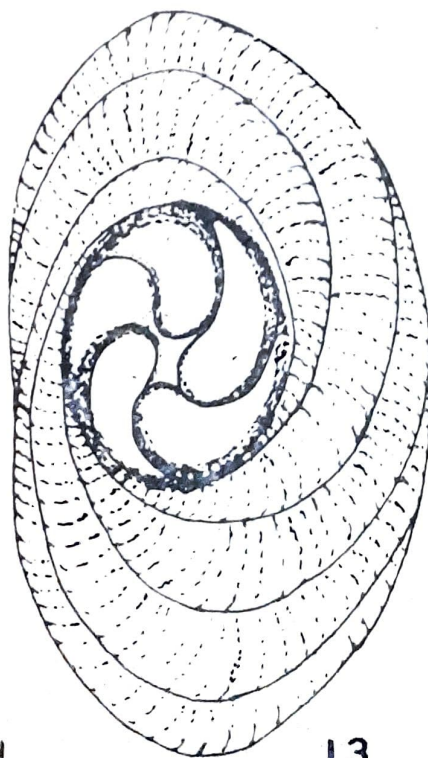
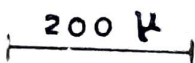
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Text-figs. 8-13: *Platychara sahnii* (RAO & RAO) n. comb., 8, 9, 10-apical, basal & lateral views respectively; 11. Longitudinal section; 12, 13. Compressed form, lateral and apical views respectively.