

QUATERNARY OSTRACODES FROM LADAKH, JAMMU & KASHMIR, INDIA

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ABSTRACT

The paper reports for the first time Quaternary freshwater ostracode assemblages from three localities in Ladakh, Jammu and Kashmir. In all, ten taxa are recorded and illustrated. Of these, *paracyprinotus* cf. *similis*, a Central Asian taxon, is being reported for the first time from India.

INTRODUCTION

The paper records a varied freshwater ostracode fauna from the Quaternary Lacustrine deposits of Ladakh, Jammu and Kashmir. The Quaternary ostracode faunas from Kashmir are well documented through the works of Bhatia (1968, 1969), Bhatia and Singh (1970a, 1970b, 1971) and Singh (1969, 1973,

1974, 1977). Bhatia (1968) has described twenty taxa from (Upper Pleistocene) Karewa of Kashmir and has described their palaeoecology. Bhatia and Singh (1971) have discussed ecology and distribution of Recent freshwater ostracodes from shallow and deep water lakes of Kashmir in which mention has been

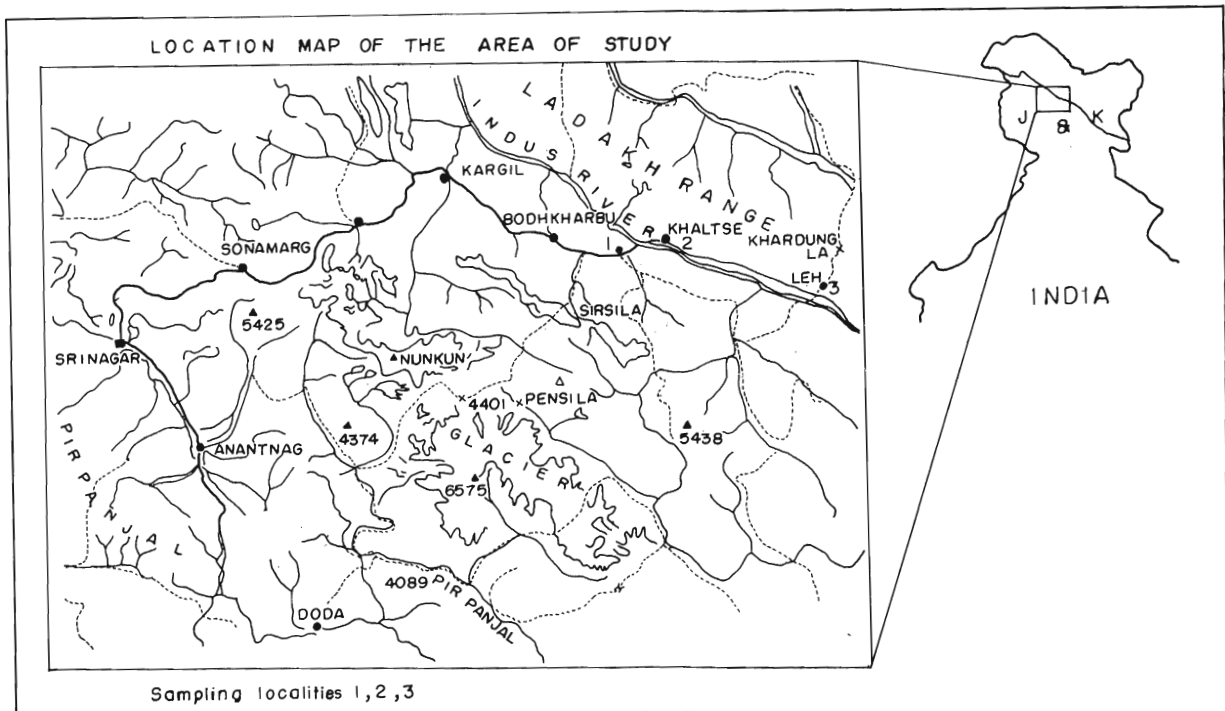


Fig. 1. Location map of the area of study.

made of different ecological controls. Singh (1974) has commented on taxonomic and morphological problems of some ostracode taxa from the Pleistocene of Kashmir. Singh (1977) has also discussed in detail the ontogeny, ecology and morphology of some Recent taxa and has provided comments on taxonomic, palaeoecological and provincial behaviour of Plio-Pleistocene Ostracodes of Kashmir. In all, 38 taxa have been discussed in that paper.

No work has hitherto been done on similar fauna from the Ladakh region. The samples in question which have yielded ostracodes were collected from three localities (Fig. 1). At Locality 1, the Quaternary deposits near Lamayuru monastery occur in a bowl shaped basin filled with sediments which appear to be a dried up lake. These Quaternary sediments comprise cream coloured silts and sands, horizontally disposed within the depression. They can be seen from a distance on account of their colour contrast with grey Triassic bedrock. The maximum thickness does not exceed 60 metres. The sediments towards the margins are coarser than those in the central part of depression. The specimens which have yielded ostracodes were collected from the margins. The Recent samples were collected from a pond and a freshwater lake at Khaltse (Locality 2) and Leh (Locality 3). The Khaltse pond which lies within the village is about one and a half metre deep and a streamlet feeds it in summer. A variety of fauna and flora is associated with ostracode fauna in the pond. The temperature at the time of collection was about 26°C. The shallow water lake near Leh (8 km to the west of Leh on the highway) has a depth less than 2 metres in the centre when the water is full and contains a lot of vegetation along with other fauna. The water source is river Indus which touches the fringe of the lake.

The fauna being presently described includes ten taxa, nine of which have already been reported from the Karewas and Recent deposits of Kashmir, while the tenth, namely *Paracyprinotus cf. similis*, a central Asian form, is being reported for the first time from India. From the sub-Recent, *Parastenocypris delormei* and *Ilyocypris bradyi* constitute the most abundant elements of the fauna while from Recent *Heterocypris incongruens* constitute bulk of the population as indicated in Table 1.

Table 1. Frequency distribution of the Ostracode taxa in the studied localities of Ladakh

Ostracode taxa	Localities		
	1	2	3
1. <i>Cypris</i> sp. A	R	-	-
2. <i>Cypris</i> sp. B	R	-	-
3. <i>Heterocypris incongruens</i>	-	A	A
4. <i>Herpetocypris</i> sp.	R	-	-
5. <i>Parastenocypris delormei</i>	A	-	R
6. <i>Cypridopsis vidua</i>	R	-	-
7. <i>Potamocypris smaragdina</i>	-	-	R
8. <i>Candona (Pseudocandona) marengoensis</i>	R	-	-
9. <i>Ilyocypris bradyi</i>	A	R	F
10. <i>Paracyprinotus cf. P. similis</i>	R	-	-

A = Abundant; F = Frequent; R = Rare.

SYSTEMATIC DESCRIPTION

Subclass	Ostracoda
Order	Podocopida
Superfamily	Cypridacea
Family	Cyprididae
Subfamily	Cypridinae BAIRD, 1845
Genus	<i>Cypris</i> MULLER, 1776

Cypris sp. A (Plate I — 1)

Material: One right valve, adult female, Locality 1.

Remarks: The specimen has a typical cyprid shape and muscle scar pattern; the valve is subtriangular in lateral outline with smooth surface. The marginal pore canals are distinct, simple and closely spaced. The inner lamella is thick and wide anteriorly.

Dimensions (in mm): L = 1.83; H = 0.80

Cypris sp. B (Plate I — 2)

Material: One left valve, female, Locality 1.

Remarks: The valve is subquadrilateral in lateral view. The greatest height is near antero-dorsal angle. The dorsal margin is strongly arched more towards posterior side. The anterior margin is broadly rounded with posterior end pointed. The surface is smooth; Inner lamella moderately broad, wide anteriorly and posteriorly. Due to the paucity of material no specific identification is possible.

Genus *Heterocypris* CLAUS, 1893
Heterocypris incongruens (RAMDOHR)
(Plate I — 3, 4).

Cypris incongruens Ramdohr, 1808, p.86, pl. 3, figs. 1-12; pl. 15, figs. 18, 20.

Cypris incongruens (Ramdohr). Turner, 1895, pp. pp. 330-331, pl. 68, figs. 9-16, (et. syn.)

Heterocypris incongruens (Ramdohr) Sars, 1924, p.116-117 pl. 4, figs. 1-2.

Cyprinotus salinus Bhatia, 1968, p. 471, pl. 1 figs. 1a-c pl. 5, fig. 9 (non *Cyprinotus salinus* Brady)

Heterocypris incongruens (Ramdohr), Battish, 1981, p. 666-668, figs. 12A-K.

Material: Over hundred valves, all female, Localities 2 & 3.

Remarks: This cosmopolitan species was described by Ramdohr (1808) from Europe. Our specimens resemble *H. incongruens* in all distinguishing characters. There is considerable difference of opinion about the validity of the genus *Heterocypris* since the soft parts of the genus and those of *Hemicypris* Sars (1903) are similar. Morkhoven (1963) recognises three subgenera under *Cyprinotus* and assigns a subgeneric status to *Heterocypris* Malz (1976) upholds the retention of the taxon as a separate genus. Battish (1981), while discussing the taxonomic aspects of the genus is also of the same view as Malz. The species in general is characteristic of small shallow water bodies, but also can withstand varied habitats.

Genus *Parastenocypris* HARTMANN, 1964

Parastenocypris delormei SINGH
(Plate I — 6-8)

Parastenocypris delormei Singh, 1974, pl. 106-108 Fig. 4, C-E

Material: More than one hundred fifty specimens, mostly adults, all females. Localities 1 & 3.

Remarks: The genus was first described by Hartmann (1964) from the Recent of India. It is very close to the genus *Stenocypris* Sars but differs from it by its much shorter septa. Singh (1974) recorded and described this species from the Upper Karewa and Recent of Kashmir. Our specimens are identical with the type material of Singh (1974) housed in the Museum of CAS in Geology, P.U. Chandigarh.

Dimensions:

Adult = L = 0.86-1.55 mm, H = 0.40-0.73

Juvenile = L = 0.50-0.70 mm, H = 0.26-0.36

Genus *Herpetocypris* BRADY & NORMAN, 1889

Herpetocypris sp.
(Plate I — 5)

Material: Five specimens, all male. Locality - 1.

Remarks: The carapace is elongate, ovate, slightly convex dorsally and concave ventrally. Both anterior

and posterior ends are rounded. The surface is smooth. Normal pore canals are numerous and widely scattered. The muscle scars are distinct. Inner lamella is broad anteriorly and posteriorly. The material is too meagre for a precise specific identification.

Dimensions: (in mm)

L = 0.9-1.33 m H = 0.30-0.53

Genus *Cypridopsis* BRADY, 1867

Cypridopsis Vidua (MULLER)

(Pl. II — 1)

Cypris vidua Muller, 1776, p. 199; Muller 1785, 55 pl.4, fig. 7-9

Cypridopsis vidua (Muller) Brady, 1868a, p. 375-376 pl. 24, figs. 27-30, 1868, p. 117.

Cypridopsis vidua (Muller) Staplin, 1963, p. 1183-1184, p. 159

Cypridopsis vidua (Muller) Jain et al., 1969, p. 3, Figs. 1 a-b.

Cypridopsis vidua (Muller) Bhatia, 1968, p.471, pl. 31; fig. 3, pl. 5 fig.8.

Cypridopsis vidua (Muller) Bhatia & Singh, 1977, p. 406-407..

Material: One adult female. Locality 1.

Remarks: This cosmopolitan species was originally described from the Recent of Europe. It has been already reported from Pleistocene and Recent of Kashmir Valley Bhatia (1968) and Bhatia and Singh (1970a, b, 1971b) and also from Spiti Valley by Jaiff et al. (1969).

Dimensions: (in mm) L = 1.33; H = 0.73.

Genus *Potamocypris* BRADY, 1870

Potamocypris smaragdina(VARVA)

(Pl. II — 3 & 4)

Cypridopsis smaragdina Varva, 1891, p. 80-81, fig. 26

Potamocypris smaragdina (Varva) Daday, 1900 non Vidi

P. smaragdina (Varva) Staplin, 1963, p. 1185, pl. 159. figs. 40-43; 46, 49 (et Syn)

P. smaragdina (Varva) Singh 1977, p.370-71, pl. VIII, figs. 10-15.

Material: One adult female. Locality - 3.

Remarks: The species was originally described by Varva (1981) from the Recent of Bohemia. It is also reported and described from Dal lake by Singh (1977). It lives in large numbers in foul and Stagnant ponds with rich growth of vegetation. The species can be readily identified by its distinctive outline, shape and punctate nature.

Dimensions: (in mm) L = 0.94; H = 0.65

Subfamily *Candoninae* BRADY, 1900

Genus *Candona* BAIRD, 1845

Candona marengoensis KLIE

(Plate II — 2)

Candona marengoensis Kile, 1931, p. 337, 341-343, figs. 13-16.

C. marengoensis (Klie) Staplin, 1963, p. 777-778 pl. 94, figs. 1015
C. (Pseudocandona) marengoensis Klie. Bhatia, 1983, p. 451, p. 451, pl. 2, fig. 3
C. marengoensis (Klie) Bhati, Batra and Kotlia, 1985, p. 45-54, fig. 6.17 (4)

Material: One left valve. Locality - 1.

Remarks: This is a cosmopolitan species. From the Indian subcontinent the species is recorded and described from the Upper Karewa of Kashmir (Bhatia, 1968) and from Recent (Bhatia and Singh, 1970) and also from Upper Siwaliks (Tatrot Formation) by Mathur (1972).

Family Cyprididae KAUFMANN, 1900
 Subfamily Ilyocypridenae KAUFMANN, 1900
 Genus *Ilyocypris* BRADY & NORMAN, 1880

Ilyocypris bradyi SARS
 (Plate II — 5 & 6)

Ilyocypris bradyi Sars. 1890, p. 59-60
I. bradyi (Sars.) Staplin, 1963, p. 1186-1187. (Pl. 160 figs. 34, 35 et Syn.)
I. bradyi (Sars) Bhatia, 1968, p. 474, 476, pl. 4, figs. 1-a-c, pl. 5; fig. 21, 22 (et syn.)

Material: Over hundred specimens, Adults and juveniles, all females. Localities 1, 2 and 3.

Remarks: This cosmopolitan species was described by Sars (1890) from Norway. From the Indian subcontinent this species was first recorded from Upper Siwaliks beds near Chandigarh by Bhatia and Khosla (1967). It is also known from the Recent and Pleistocene of Kashmir (Bhatia, 1968, Bhatia and Singh, 1970).

Dimensions: (in mm)

Adult female L = 0.83-1.03 H = 0.46-0.56
 Juvenile female L = 0.46-0.60 H = 0.26-0.33

Subfamily Cypridinae BAIRD, 1845

Genus *Paracyprinotus* SCHNEIDOR in MANDLESTEM *et al.*, 1957.

Paracyprinotus cf. P. similis
 (Plate II — 7)

Material: One female right valve. One male adult left valve and one female instar left valve. Locality - 1

Remarks: The present specimens from Ladakh are close to *P. similis* described from Kazakhstan Central Asia by Schneider (in Mandlestem *et al.*, 1957). This is the first record of this species from India. The valves are subtriangular in lateral outline, the greatest height being a little anterior to middle. The dorsal margin has a hump like projection in the anterodorsal

side. The posterior end is rounded. The surface is smooth and muscle scars are very distinct with two mandibular scars. The inner lamella is broad and wide anteriorly and posteriorly.

Dimensions: (in mm)

Adult female L = 1.16; H = 0.60
 Adult male L = 0.93; H = 0.43
 Instar female L = 0.70; H = 0.36

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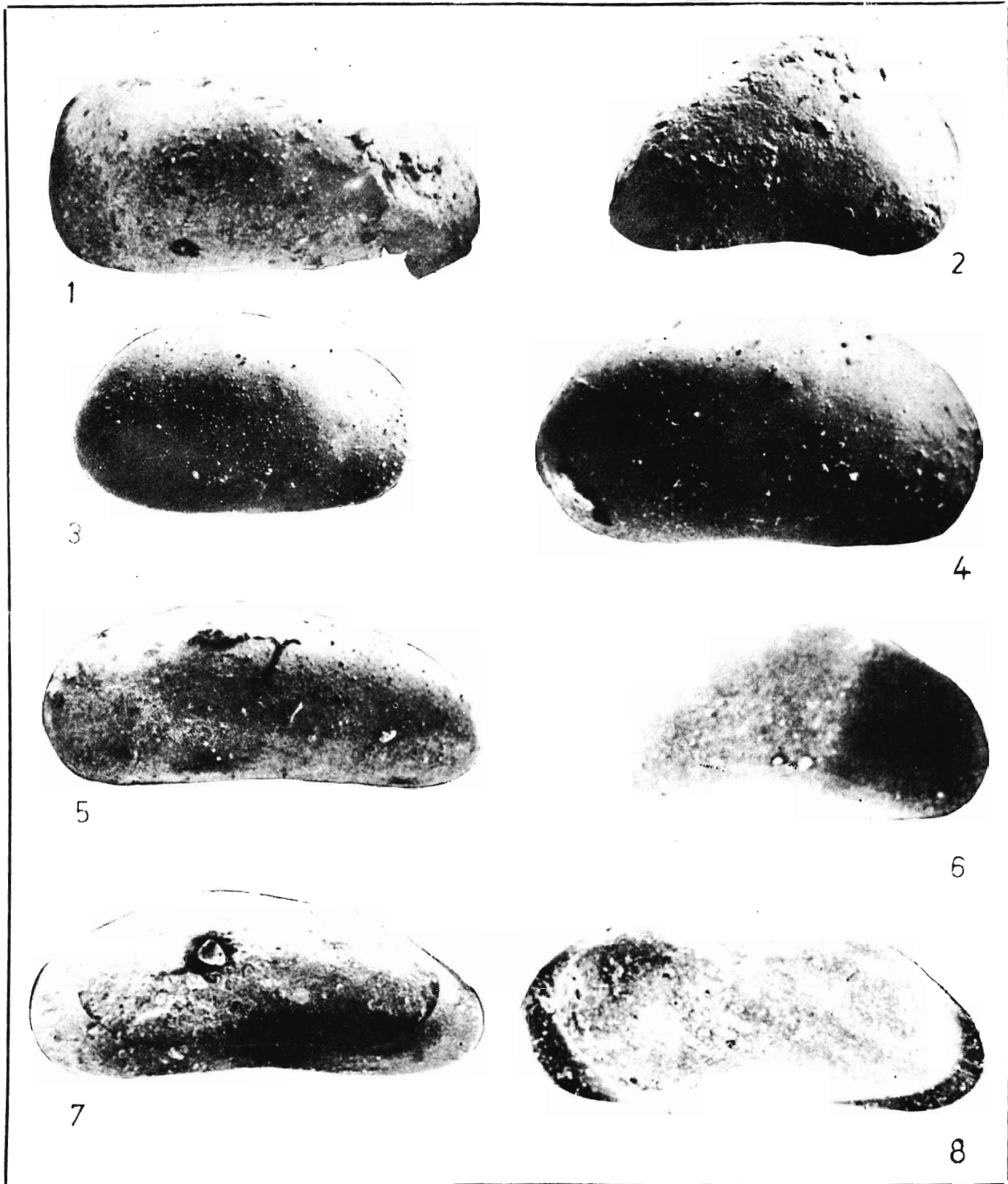
EXPLANATION OF PLATES

PLATE - I

1. *Cypris* sp. A right valve, ext. view x70
2. *Cypris* sp. B left valve, ext. view x70
3. *Heterocypris incongruens* left valve, ext. view x70
4. *H. incongruens* left valve, ext. view x50
5. *Herpetocypris* sp. left valve, (male) ext. view x80
6. *Parastenocypris delormei* left valve, ext. view x80
7. *P. delormei* left valve, int. view x80
8. *P. delormei* left valve, int. view x80

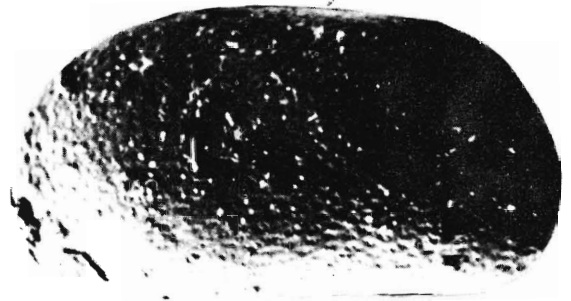
PLATE - II

1. *Cypridopsis vidua* left valve, ext. view x100
2. *Candona (Pseudocandona) marengoensis* left valve, ext. view x60
3. *Heterocypris incongruens* left valve, ext. view x70
4. *H. incongruens* left valve, ext. view x50
5. *Herpetocypris* sp. left valve, (male) ext. view x80
6. *Parastenocypris delormei* left valve, ext. view x80
7. *delormei* left valve, int. view x80
8. *P. delormei* left valve, int. view x80

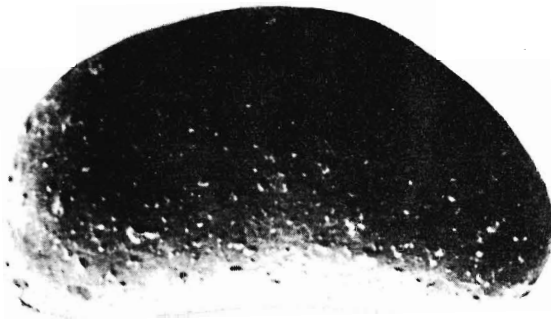




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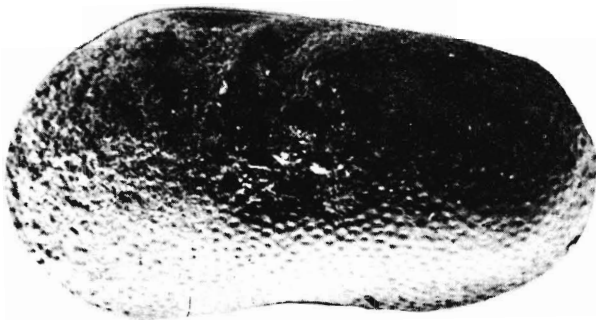
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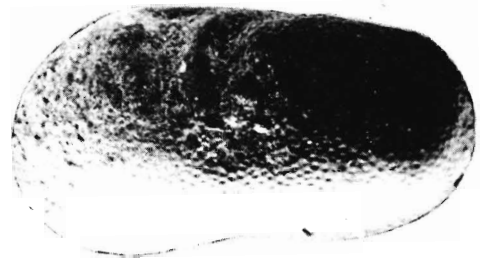
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