THE UNIVERSITY OF KANSAS

PALEONTOLOGICAL CONTRIBUTIONS

October 6, 1972 Paper 60

A CENSUS OF HOLOCENE SPECIES OF XESTOLEBERIS (OSTRACODA, PODOCOPIDA) FROM THE SOUTHERN OCEANS

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ABSTRACT

Thirty-four species of *Xestoleberis* (including *Semixestoleberis*) have been found in the southern oceans south of 30°S. latitude, although not all of these are endemic to the region. The original descriptions and subsequent descriptions and comments pertaining to these species are included as well as all lateral and dorsal views from previous publications.

Five morphological characters were measured from drawings of lateral views of 67 carapaces. Analysis of these characters shows that height of the carapace is more strongly correlated with radius of curvature of the anterior and posterior portions than are either length or length-height ratio.

INTRODUCTION

Thirty-three species of the ostracode genus *Xestoleberis* and closely similar genera have been identified or described from the southern oceans. The literature on these species is widely scattered, and much of it is difficult or time-consuming to obtain. While preparing to make taxonomic and biometrical studies of some of these species, we have assembled what we believe to be a *complete set* of the literature that applies to *Xestoleberis* of the southern oceans, and we have made some preliminary measurements, some of which may be of heuristic value. We have written this paper in the belief that other students of the benthic Ostracoda would benefit from a compilation of the existing literature and our preliminary measurements.

For our purposes, the northern limit of the southern oceans is taken at about 30°S. latitude. For the Ostracoda this latitude provides a convenient boundary because of the dearth of studies in the southern hemisphere to the north of that latitude, other than studies of truly tropical areas. The only exception made in our study is that we included all of Hartmann's (1962) stations, even though three of them lie to the north of the arbitrary boundary at 30°S. latitude.

PREVIOUS WORK

Figure 1 shows a cumulative histogram of the number of species of *Xestoleberis* identified or described for the first time from the southern oceans since the beginning of their study there in 1866. Note that the histogram also includes *Semixestoleberis debueni* Hartmann (1962), although this is not meant necessarily to imply that it is synonymous with *Xestoleberis*.

After a very slow start in the late 1860's, knowledge of *Xestoleberis* in the southern oceans received impetus from Brady's (1880) report of Ostracoda from the *Challenger* expedition. Brady (1880) found eight species of *Xestoleberis* in the southern oceans, six of which were new. Müller (1908) and Hartmann (1962) each described five species of *Xestoleberis* (including, for the

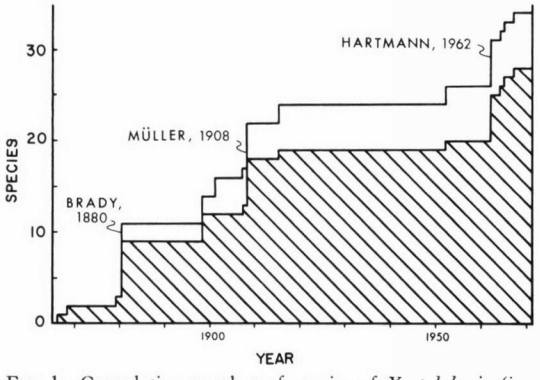


FIG. 1. Cumulative number of species of *Xestoleberis* (including *Semixestoleberis*) identified for the first time from the southern oceans. Upper line indicates total species; lower line indicates those first described from the southern oceans.

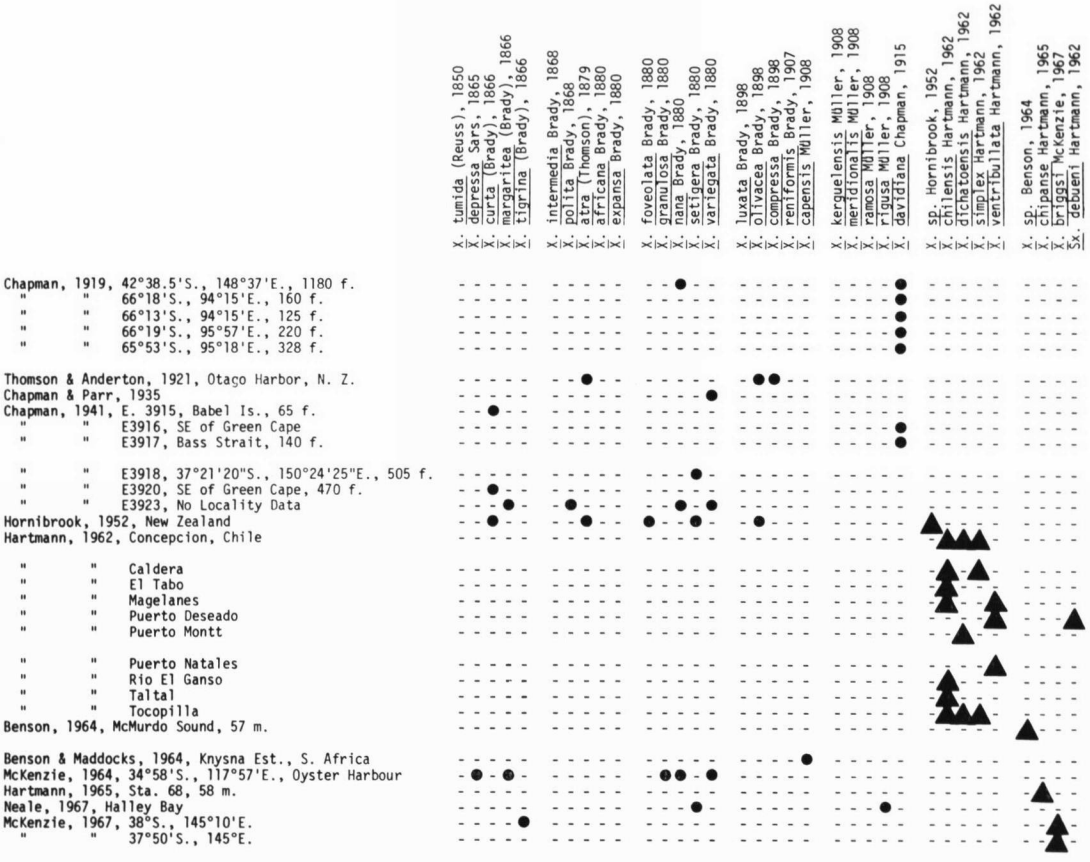
moment, *Semixestoleberis debueni* Hartmann). Other workers have never described more than three species in any paper, and in all but a few instances, one species of *Xestoleberis* per paper is the rule.

Table 1 shows the species that have been identified or described from stations in the southern oceans. It is characteristic that species are rarely indicated in subsequent work by anyone but their original author. No one but Chapman, for example, has ever found *X. davidiana*. This condition, which is evidenced by the large number of blank spaces in Table 1, probably results from a combination of endemism of species of *Xestoleberis* and lack of a thorough understanding of the species and their geographic distribution in the southern oceans. It certainly indicates

TABLE 1. *Occurrence of Species of* Xestoleberis *in the Southern Oceans. Triangle Indicates First Description; Circle Indicates Subsequent Description of a Species Described Previously, Perhaps from Outside the Southern Oceans.*

	X. tumida (Reuss), 1850	X. depressa Sars, 1865	X. curta (Brady), 1866	X. margaritea (Brady), 1866	X. tigrina (Brady), 1866	X. intermedia Brady, 1868	X. polita Brady, 1868	X. atra (Thomson), 1879	X. africana Brady, 1880	X. expansa Brady, 1880	X. foveolata Brady, 1880	X. granulosa Brady, 1880	X. nana Brady, 1880	X. setigera Brady, 1880	X. variegata Brady, 1880	X. luxata Brady, 1898	X. olivacea Brady, 1898	X. compressa Brady, 1898	X. reniformis Brady, 1907	X. capensis Müller, 1908	X. kerguelensis Müller, 1908	X. meridionalis Müller, 1908	X. ramosa Müller, 1908	X. rigusa Müller, 1908	X. davidiana Chapman, 1915	sp. Hornibrook, 1952	X. chilensis Hartmann, 1962	X. dichatoensis Hartmann, 1962	X. simplex Hartmann, 1962	X. ventribullata Hartmann, 1962	sp. Benson, 1964	X. chipanse Hartmann, 1965	X. briggsi McKenzie, 1967	Sx. debueni Hartmann, 1962
Brady, 1866, Melbourne, 10 m.				▲																														
Brady, 1868, Holt Bay, 135 m.						▲																												
Thomson, 1879, Otago Bay, New Zealand							▲																											
Brady, 1880, CH 140, 15-20 f.								▲																										
" " CH 149, 28 f.						●	●																											
" " CH 149, 120 f.													▲																					
" " Ch 150, 150 f.						●																												
" " CH 151, 75 f.													▲																					
" " CH 162, 38-40 f.											▲																							
" " CH 300, 1375 f.						●																												
" " CH 316, Falkland Is. 6 f.							●																											
" " CH 323, 35°39'S., 50°47'W., 1900 f.									▲																									
" " Port Jackson, Australia						●					▲																							
" " Pr. Edward Is. 50-150 f.													▲																					
Brady, 1898, Brighton, New Zealand																▲																		
" " Littleton, N. Z.																	▲																	
Egger, 1901, Sta. 37, Table Bay, S. Africa			●					●																										
" " Sta. 55A, Kerguelen Is.	●		●																															
Chapman, 1906, Gt. Barrier Is., N. Z.			●					●																										
Brady, 1907, Locality unknown																				▲														
Müller, 1908, Gauss Sta., Antarctica																						▲	▲	▲										
" " Kerguelen Is.																						▲		▲										
" " Simonstown, South Africa																										▲								
Scott, 1912, Sta. 325, S. Orkneys																				●														
Chapman, 1915, Sta. 36, E. of Tasmania, 777 f.													●		●																			
" " 40 mi. S. Cape Wiles, 100 f.						●																												
" " S. of Tasmania, 1122 f.													●		●																			
" " Mt. Erebus (Pleistocene)																										▲								
Chapman, 1916b, Mt. Erebus (Pleistocene)																										●								
Chapman, 1916c, 76°55'S., 164°45'E., 121 f.													●													●								
" " McMurdo Sound, 153 f.													●		●											●								
" " 77°01'S., 165°05'E., 171 f.													●																					
" " 76°44'S., 163°24'E., 353 f.													●		●																			
Chapman, 1919, 42°38.5'S., 148°41.5'E., 1320 f.							●						●		●																			
" " 42°44'S., 148°41'E., 1300 f.							●						●		●											●								

TABLE 1. *(Continued.)*



that our knowledge of *Xestoleberis* from the southern oceans is far from complete.

Figures 2 through 5 show the localities in the southern oceans from which *Xestoleberis* has been described. Note particularly the vast expanses in Figure 2 in which no studies have been made, including most of the perimeter of Antarctica. Extensive areas of western Australia remain to be studied (Fig. 3), and the eastern coast of South America has been neglected north of about 50°S. latitude (Fig. 4). The Kerguelen Islands have been sampled fairly well (Fig. 5), but of the many subantarctic islands, they alone have been so well studied.

Thus, the possibility of finding a great many more species of *Xestoleberis* is very real. More interesting, perhaps, is the opportunity to discover relationships among species through the study of geographic variation of morphology after some of the gaps in sampling have been filled.

ACKNOWLEDGMENTS

We are indebted to H. Meade Cadot for his critical evaluation of the manuscript, to Ortrud Williams for translations of taxonomic descriptions in German, and to James E. Anderson for translations of the Norwegian passages in Sars' (1866) work. The research was supported primarily by grants GA-12472 and GV-25157 from the National Science Foundation and in part by the Wallace E. Pratt Research Fund at The University of Kansas. Computations were done at The University of Kansas Computation Center using the Honeywell 635 computer.

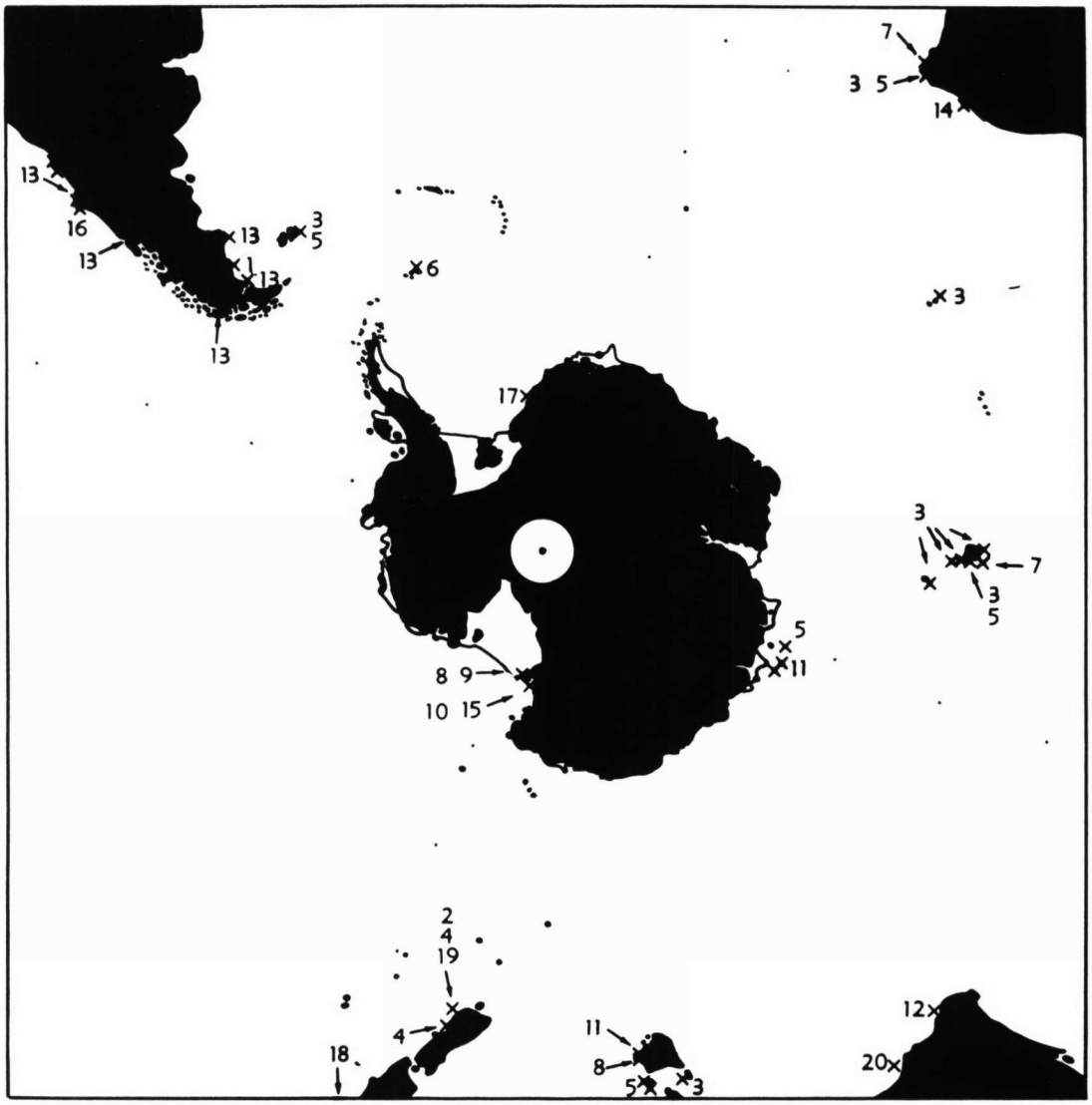


FIG. 2. Locations from which *Xestoleberis s. l.* has been reported in the southern oceans: *1*, Brady (1868); *2*, Thomson (1879); *3*, Brady (1880); *4*, Brady (1898); *5*, Müller (1908); *6*, Scott (1912); *7*, Egger (1901); *8*, Chapman (1915); *9*, Chapman (1916a); *10*, Chapman (1916c); *11*, Chapman (1919); *12*, Chapman (1941); *13*, Hartmann (1962); *14*, Benson and Maddocks (1964); *15*, Benson (1964); *16*, Hartmann (1965); *17*, Neale (1967); *18*, Chapman (1906); *19*, Thomson and Anderton (1921); *20*, Chapman and Parr (1935). Figure does not include localities of Hornibrook (1952) which were given by biogeographic province only.

ANALYSIS OF SHAPES

As was mentioned previously, this paper is a by-product of a biometrical study of some of the species of *Xestoleberis* found in the southern oceans. Accordingly, we regard it as an appropriate place to initiate the biometrical study of *Xestoleberis* by examining some of its morphological characters and their relationships to each other. Figure 6 shows the outline of *Xestoleberis reniformis* Brady and the four measurements that were taken from each of 67 drawings of lateral

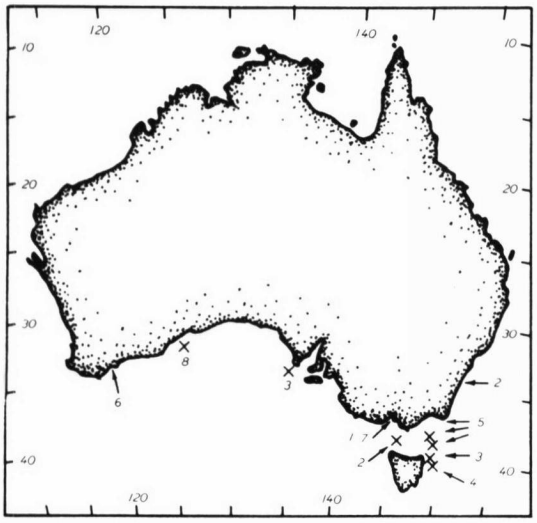


FIG. 3. Locations from which *Xestoleberis* has been reported from Australia: *1*, Brady (1866); *2*, Brady (1880); *3*, Chapman (1915); *4*, Chapman (1919); *5*, Chapman (1941); *6*, McKenzie (1964); *7*, McKenzie (1967); *8*, Chapman and Parr (1935).

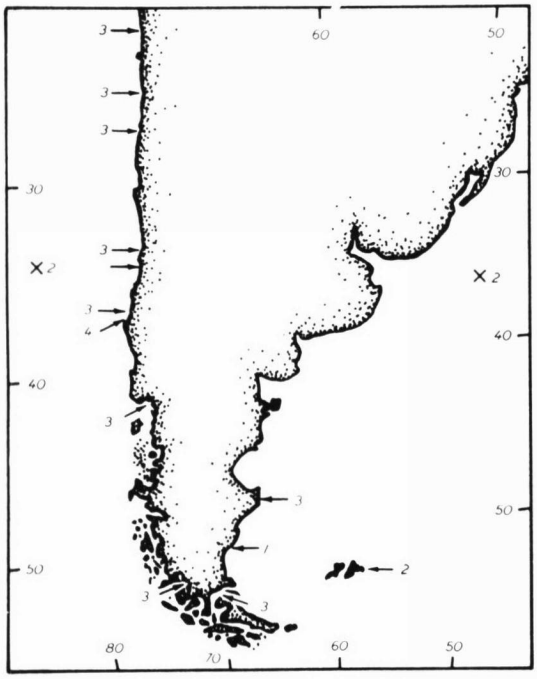


FIG. 4. Locations from which *Xestoleberis s. l.* has been reported from southern South America: *1*, Brady (1868); *2*, Brady (1880); *3*, Hartmann (1962); *4*, Hartmann (1965).

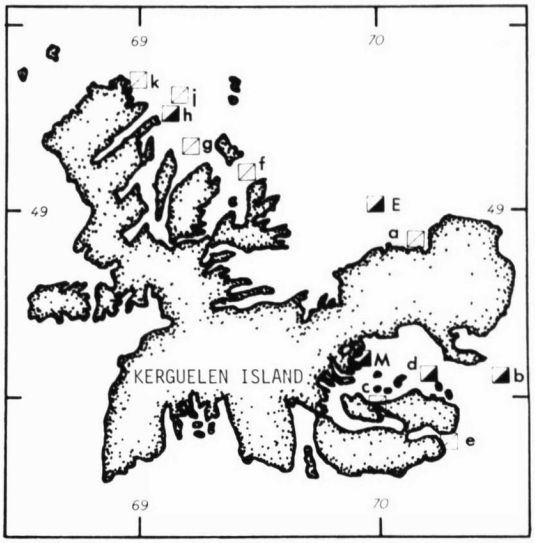


FIG. 5. Locations from which *Xestoleberis* has been reported from the Kerguelen Islands. H.M.S. *Challenger* stations lettered *a* through *h*, *j*, and *k*; samples of Egger (1901) and Müller (1908) indicated *E* and *M* respectively. *Xestoleberis* has been reported from stations with half of square colored; other stations were without *Xestoleberis*.

views. Length was measured tangent to the concave venter. For those few species with convex ventral margins, we oriented the drawings in what appeared to be a reasonable position, recognizing that some error was no doubt introduced in this way. Height was measured perpendicular to length. The two radii of curvature were measured by superimposing a target-like set of concentric circles on a transparent sheet over the anteroventral and posteroventral curves. Although this way of measuring is somewhat

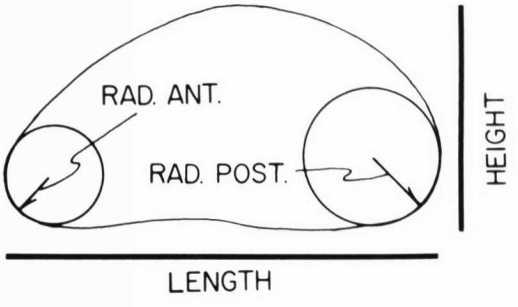


FIG. 6. Outline drawing of a specimen of *Xestoleberis* showing characters measured.

difficult to become accustomed to, we believe that measurements taken in this manner are repeatable. These four characters define fairly well the shape of the carapace in lateral view. In addition, the ratio of length to height was computed and used as a fifth character, a measure of elongation of the carapace.

Table 2 shows the product-moment correlation

TABLE 2. *Product-moment Correlation Coefficients Computed between Pairs of Characters. Italicized Values are Significant at the 0.05 Level.*

	L	H	L/H	Ant.	Post.
Length	1.0000				
Height	*0.7202*	1.0000			
Length/height	0.0783	*–0.6122*	1.0000		
Radius of curvature, anterior	0.2109	*0.5568*	*–0.5152*	1.0000	
Radius of curvature, posterior	*0.5657*	*0.7873*	*–0.4537*	*0.7006*	1.0000

coefficients computed between all pairs of characters. The values printed in italics are statistically significant at the 0.05 level. Several interesting relationships are apparent. First, length is positively correlated with height, but not strongly so. Figure 7 shows a scatter diagram of length plotted against height. The scatter in the diagram results from variation in the ratio of length to height. No clear tendency of males or females or of right or left valves to plot in a particular part of the graph was observed. The correlation of length with radius of curvature of the anterior is not significantly different from zero. On the other hand, length is significantly correlated with radius of curvature of the posterior. These results indicate that long forms tend to have a broader curve at the posterior than short forms, probably due to the overall general size factor. Clearly at least two factors are affecting correlations among these characters.

Height is weakly correlated with radius of

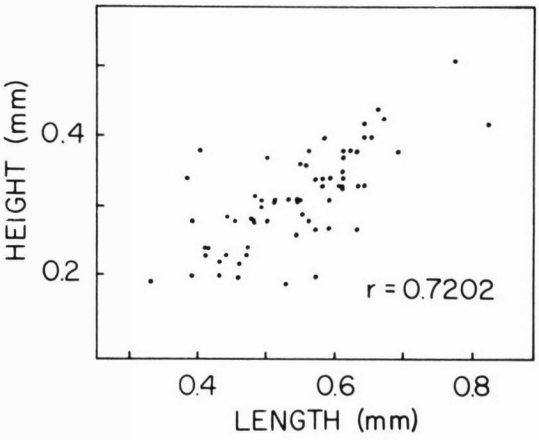


FIG. 7. Scatter diagram of length versus height of all right and left valves illustrated in this paper.

curvature of the anterior (Fig. 8) but is more strongly correlated with posterior curvature. This is the same relationship that was observed between length and the two curvatures, but with height the effect is intensified. The importance of height is indicated by the lack of a significant correlation of length with the ratio of length to height. Furthermore, negative correlations of the two measurements of curvature with length-height ratio indicate the larger correlations of curvature with height as compared with length.

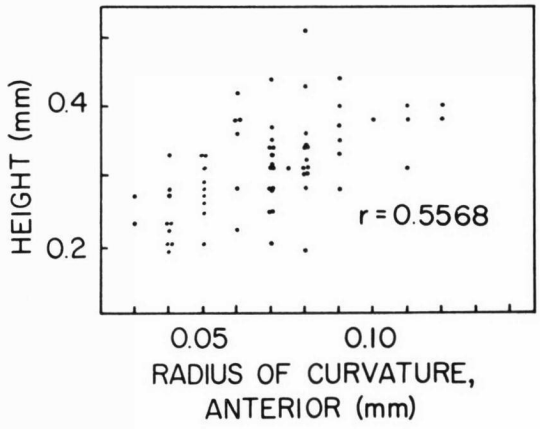


FIG. 8. Scatter diagram of radius of curvature of the anterior versus height of all right and left valves illustrated in this paper.

SUMMARY AND CONCLUSIONS

The thirty-three species of *Xestoleberis* that have been found in the southern oceans almost certainly do not represent all of the species likely to be found there. Moreover, because of the large

areas where *Xestoleberis* has not been studied, it is too early to draw inferences about the systematic relationships of many of the species to each other. Particularly fruitful for further study would be extensive sampling around Antarctica, on the oceanic islands removed by many hundreds of miles from the nearest continental mass, and along the eastern coast of South America.

Preliminary measurements of five characters have indicated that at least two factors affect the relationships among the characters, a general size factor and, perhaps, a factor related to height. A factor analytical study is needed for further understanding of the relationships among the characters. However, such a study would need to be based on a better sampling plan than the one used here.

SYSTEMATIC PALEONTOLOGY

The following section includes original and subsequent descriptions and comments pertaining to all species of *Xestoleberis* that have been described from the southern oceans. These have been translated into English if they were originally in some other language, such as Latin (Reuss, 1850; Sars, 1866; Brady, 1868), Norwegian (Sars, 1866), French (Brady, 1868), or German (Reuss, 1850; Egger, 1901; Müller, 1908; Hartmann, 1962, 1965). In some instances, where species were first described from outside the southern oceans, those descriptions are included as well. The illustrations in Figures 9 through 12 are tracings of the illustrations of lateral and dorsal views made by previous authors and include copies of the original illustrations of all species that have been found in the southern oceans, including those species that were first described elsewhere, as well as copies of subsequent illustrations. The figures are all magnified 50× as nearly as could be determined from information in the papers where they were published.

Phylum ARTHROPODA Siebold & Stannius, 1845

Class CRUSTACEA Pennant, 1777

Subclass OSTRACODA Latreille, 1806

Order PODOCOPIDA Müller, 1894

Suborder PODOCOPINA Sars, 1866

Superfamily CYTHERACEA Baird, 1850

Family XESTOLEBERIDIDAE Sars, 1928

Genus XESTOLEBERIS Sars, 1866

XESTOLEBERIS TUMIDA (Reuss)

Figure 9,*1-3*

Cytherina tumida Reuss, 1850, p. 57, pl. 8, fig. 29a.

Xestoleberis tumida (Reuss), Egger, 1901, p. 457, pl. 3, fig. 47, 48.——Müller, 1912, p. 384.

In 1850, Reuss described *Cytherina tumida* as (transl.):

"Carapace semicircular, anteriorly broadly convex, subinflated, and dilated; margin ventrally straight, dorsally semicircular, laterally weakly subtruncated.

"The small carapace is almost a semicircle in outline; the posterior end is somewhat smaller than the anterior end. The ventral margin is almost straight, the posterior semicircular. The dorsum highly curved, most strongly in front of the middle. Toward the ventral margin it falls steeply, indeed in some examples the lower side is nearly truncated. When greatly magnified the surface of the valves shows very fine, widely separated little bumps; with the naked eye it appears smooth and shiny."

Expanding this description, Egger (1901) wrote (transl.):

"Length: 0.21-0.37 mm, height 0.11-0.20 mm.

"The closed carapace is egg-shaped as seen from the ventral margin, is wider in the posterior half, tapers narrowly towards the front, in cross section the carapace is a wide, reversed heart-shape. The single valve is egg-shaped in outline with greatest height at half of the length; toward the front it is distinctly lower than in the posterior half. The dorsal margin forms a curve which arches from the small anterior end to the posterior end. The ventral margin is nearly straight. The valve is strongly rounded, falls steeply with the curvature to the ventral margin. The surface has scattered sharply bordered pores.

"Those species described by Reuss from the Vienna Tertiary, by Egger from the Miocene, by Ortenburg, from the Cretaceous of the Bavarian Alps, and by Lienenklaus from the northwest German upper and lower Oligocene are combined by Brady into *Xestoleberis depressa* Sars, which has been described from the Kerguelen Islands at 40 meters, at 50° 4′ south latitude, 71° 22′ east longitude at 280 meters depth, as a fossil from the Antwerp Crag, in the post-Tertiary of Ireland, Scotland, Norway, and Canada, and also mentioned as commonly living in the northern Hemisphere.

"Gazelle material: Four closed, two single valves

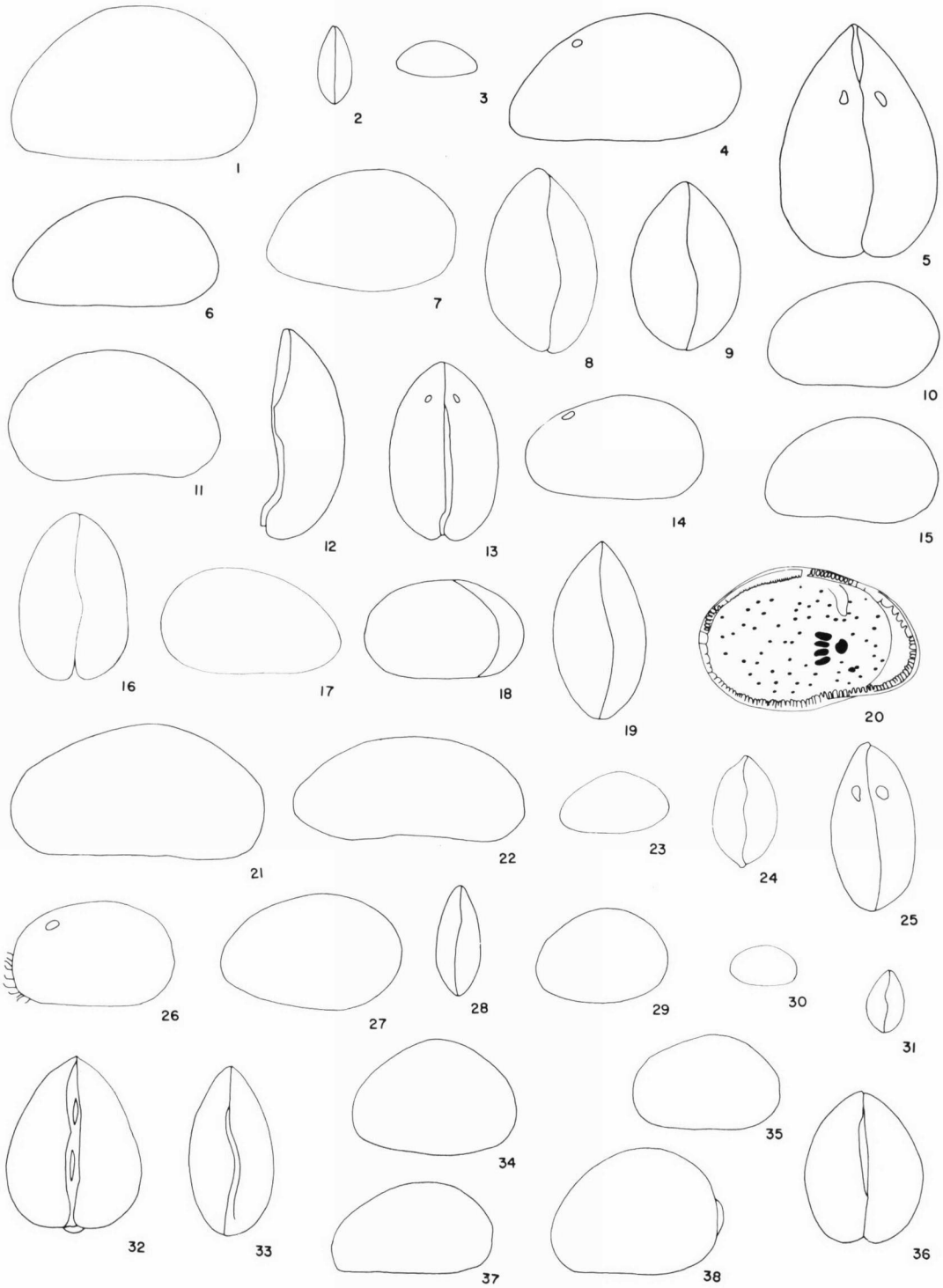


FIG. 9. (*For explanation see facing page.*)

from station 90 near Australia, one carapace from station 55a near the Kerguelen Islands, from station 17 near West Africa, from station 66 near Mauritius at 357, 104, 677 and 411 meters depth."

Xestoleberis tumida has not been reported by other investigators.

XESTOLEBERIS DEPRESSA Sars

Figure 9,*4-6*

Xestoleberis depressa Sars, 1866, p. 68-69.——Brady, 1880, p. 124-125, pl. 31, fig. 1 a-g.——Müller, 1912, p. 303.

Sars (1866) described this species from Norway as follows (transl.):

"Carapace of female strongly ventricose, more broad than high, subdepressed, laterally view venter subplanar or even somewhat excavated, in lateral view semiovate, height about half the greatest length and situated in the middle, dorsal margin forming an equal arch, ventral uniformly sinuated, anterior extremity variously rounded, posterior obtuse; in dorsal view strongly inflated, anterior extremity obtusely acuminate, posterior truncated and in the middle not heavily emarginated. Carapace of the male in dorsal view not particularly broader posteriorly than anteriorly, greatest width located medially. Valves pellucid, very smooth, very polished, pearly, in the extreme anterior portion slightly pilose, colored pale dark-yellow, large dorsal branching spot located behind the eye rich brown. Antennae as in the preceding, short upper second appendage with next three segments short, lower about equal in length, very long and curved terminal claw. Black spot in front of the eye is doubtfully to be seen. Final part of the male copulatory organ as in the preceding long and broadly lanceolate. Length of female, 0.60 mm.

"Lives but by no means abundantly along the whole coast of Norway all the way to Finmark dispersed in depths of 3 to 6 fathoms among copious algae.

"This beautiful cytherid is easily distinguishable in the female by the very markedly distended, and thus depressed, rear part of the shell, which is very often found to be crammed full of eggs and embryos. I have had the opportunity to study the species' development closely, so that I can affirm the excellence of Zenker's observations on the subject. Four distinct stages of development can be perceived, and all of them are frequently found together in one and the same female. The first stage is the mature egg, just emerged from the ovaries, on which an outer covering of transparent skin and an inner kernel of mass (the yolk) can be distinguished. At one edge of the kernel, a distinct embryonic sac is noticeable. In the next stage the egg takes on a marked kidney-like shape, in that one side (the concave side) is curved sharply inward. Now the shadowy beginnings of eyes are already noticeable, but there is still no visible trace of the limbs. These first begin to form in the next stage, and in the beginning they look much like lower antennae. The valves have already formed in this stage, and show a

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FIG. 9. Species of *Xestoleberis* from southern oceans (all figures ×50).

1-3. Xestoleberis tumida (Reuss), 1850.——*1.* Right valve, Reuss, 1850, pl. 8, fig. 29a.——*2.* Dorsal view, Egger, 1901, pl. 3, fig. 47.——*3.* Egger, 1901, pl. 3, fig. 48.

4-6. Xestoleberis depressa Sars, 1865.——*4.* Left valve, female, Brady, 1880, pl. 31, fig. 1a.——*5.* Dorsal view, female, Brady, 1880, pl. 31, fig. 1b.——*6.* Left valve, male, Brady, 1880, pl. 31, fig. 1e.

7-10,15-17. Xestoleberis margaritea (Brady), 1886.——*7.* Right valve, Brady, 1866, pl. 58, fig. 6a.——*8.* Dorsal view, Brady, 1866, pl. 58, fig. 6b.——*9.* Dorsal view, female, Brady, 1880, pl. 30, fig. 2b.——*10.* Left valve, female, Brady, 1880, pl. 30, fig. 2a.——*15.* Left valve, male, Brady, 1880, pl. 30, fig. 2e.——*16.* Dorsal view, Egger, 1901, pl. 3, fig. 27.——*17.* Right valve, Egger, 1901, pl. 3, fig. 28.

11-14. Xestoleberis curta (Brady), 1866.——*11.* Right valve, Brady, 1866, pl. 58, fig. 7a.——*12.* Dorsal view, Brady, 1866, pl. 58, fig. 7b.——*13.* Dorsal view, Brady, 1880, pl. 31, fig. 66.——*14.* Left valve, Brady, 1880, pl. 31, fig. 6a.

18-20. Xestoleberis tigrina (Brady), 1866.——*18.* Left valve, Brady, 1866, pl. 58, fig. 5a.——*19.* Dorsal view, Brady, 1866, pl. 58, fig. 5b.——*20.* Left valve, female, McKenzie, 1967, p. 76, fig. 4a.

21-24. Xestoleberis intermedia Brady, 1868.——*21.* Left valve, female, Brady, 1868, pl. 12, fig. 3.——*22.* Left valve, male, Brady, 1868, pl. 12, fig. 6.——*23.* Left valve, Brady, 1880, pl. 32, fig. 2a.——*24.* Dorsal view, Brady, 1880, pl. 32, fig. 2b.

25-27. Xestoleberis polita Brady, 1868.——*25.* Dorsal view, Brady, 1868, pl. 27, fig. 16.——*26.* Brady, 1868, pl. 27, fig. 15.——27. Left valve, Brady, 1880, pl. 31, fig. 7a.

28. Xestoleberis sp. (Thomson), 1879. Thomson, 1879, pl. 11, fig. B.2.

29-31. Xestoleberis africana Brady, 1880.——*29.* Left valve, Brady, 1880, pl. 30, fig. 4a.——*30.* Dorsal view, Egger, 1901, pl. 3, fig. 34.——*31.* Right valve, Egger, 1901, pl. 3, fig. 35.

32,34,38. Xestoleberis foveolata Brady, 1880.——*32.* Dorsal view, female, Brady, 1880, pl. 30, fig. 1b.——*34.* Left valve, male, Brady, 1880, pl. 30, fig. 1e.——*38.* Left valve, female, Brady, 1880, pl. 30, fig. 1a.

33,37. Xestoleberis granulosa Brady, 1880.——*33.* Dorsal view, Brady, 1880, pl. 30, fig. 5b.——*37.* Left valve, Brady, 1880, pl. 30, fig. 5a.

35,36. Xestoleberis expansa Brady, 1880. Left valve, Brady, 1880, pl. 30, fig. 3a.——*36.* Dorsal view, Brady, 1880, pl. 30, fig. 3b.

distinctive form: they protrude especially sharply just behind the eyes. In the final stage the shell has almost the same form as that of the parent. The antennae, of which only the topmost are still 5-jointed, the mandibles, and the maxillae are already clearly developed, while the hindmost limbs (the walking legs) are in a rudimentary stage, presenting only a pair of tapered, unjointed appendages. This species is spread along our entire coast, and is found in quite significant numbers among my father's cytherid shells collected from the sands at Oxford. It also appears in fossil form in both our older and newer glacial formations."

Brady (1880), who identified *Xestoleberis depressa* from around the Kerguelen Islands, wrote:

"Carapace of the female tumid; seen from the side, oblong, sub-semicircular, highest near the middle, height equal to more than half the length; subacutely pointed in front, broadly rounded behind, dorsal margin boldly arched and forming one continuous curve from the anterior to the posterior ends of the ventral margin, which is straight, except for a slight sinuation in front of the middle. Seen from above, the outline is cordate, pointed in front and broad behind, width equal to two-thirds of the length; end view depressed, broad below and boldly arched above, width greater than the height. Surface of the shell smooth, iridescent, marked with numerous small circular papillae. The shell of the male is smaller, much less tumid, and has its posterior portion compressed and narrowly rounded. Length of the female, 1-35th of an inch (.75 mm.); of the male 1-42d of an inch (.65 mm.).

"The only dredgings in which I have seen this species are from Balfour Bay, Kerguelen Island, 20 to 25 fathoms; and from lat. 52°4′S., long. 71°22′E., 150 fathoms. It is to be borne in mind, however, that the distinctions between this and the next species [*X. setigera*], if valid at all, are very slight; and it is not unlikely that the two may prove to be identical. *Xestoleberis depressa* is a common species in the Northern Hemisphere, having been found in the seas of Great Britain, Ireland, Norway, Spitzbergen, and in the Gulf of St. Lawrence, while as a Post-Tertiary fossil it occurs abundantly in Scotland, Ireland, Norway, and Canada.

"In size the northern specimens agree with *Xestoleberis setigera,* while in shape they approach more closely to the Balfour Bay specimens here assigned to *depressa.*"

McKenzie (1964) also reported the species from Oyster Harbour, Australia, in channels and associated with the marine grass *Posidonia australis.*

XESTOLEBERIS CURTA (Brady)

Figure 9,*11-14*

Cytheridea (?) *curta* Brady, 1866, p. 370, pl. 58, fig. 7a,b.

Xestoleberis curta (Brady). Brady, 1880, p. 126, pl. 31, fig. 6a-d.——Müller, 1912, p. 303.——Chapman, 1941, p. 201.

Brady's first description of this species as *Cytheridea (?) curta* was based on one specimen from the West Indies, well outside our arbitrary limit of the southern oceans. In that description he wrote (Brady, 1866):

"*Carapace* subtriangular, reniform, convex, about once and a half as long as broad. The *dorsal margin* strongly arched, somewhat gibbous in the middle. *Ventral margin* slightly concave. *Posterior border* flattened, broad, rounded at the angles. *Anterior extremity* narrow, rounded, and rather produced downwards. Seen from below, the carapace is broadly ovate, scarcely once and a half as long as broad. *Surface* smooth, sparingly papillose.

"Length 1/42 in. (.6 mm.).

"*Hab.* West Indies (shallow water). One specimen."

In 1880, Brady gave a more complete description based on more material from a much wider geographic range:

"Carapace, as seen from the side, oblong, subovate, greatest width situated behind the middle, and equal to more than half the length; extremities well rounded; dorsal margin moderately arched, inferior slightly sinuated in front; seen from above the outline is ovate, tapering only slightly towards the extremities, scarcely pointed in front, rounded behind; the width, which is greatest about the middle is just equal to the height; end view nearly circular. Surface of the shell perfectly smooth. Length, 1-52d of an inch (.49 mm.).

"The following are the dredgings in which *Xestoleberis curta* has been noticed: Off Bermudas, 435 fathoms, mud (Station 33); Royal Sound, Kerguelen Island, 28 fathoms (Station 149); Port Jackson, Australia, 2 to 10 fathoms; off Booby Island, lat. 10°36′S., long. 141°55′E.; 6 to 8 fathoms (Station 187); off reefs at Honolulu, 40 fathoms; in lat. 33°42′S., long. 78°18′W.; 1375 fathoms (Station 300). The type-specimen described in the Zoological Society's Transaction . . . was from the West Indies, and differs in no important respect from those here described, though the measurement is somewhat larger—1-42d of an inch."

Chapman (1941) wrote:

"The 'Challenger' dredgings containing this species are: Kerguelen Island, Port Jackson, Booby Island, Fiji, New Caledonia. The writer found this species at Funafuti to inhabit shallow to deeper water to 200 fathoms. It occurred as a Pliocene fossil in the Mallee Bores."

Hornibrook (1952) gave no description but reported that *Xestoleberis curta* made its first appearance in New Zealand during the early Eocene.

XESTOLEBERIS MARGARITEA (Brady)

Figure 9,*7-10,15-17*

Cytheridea margaritea Brady, 1866, p. 370, pl. 58, fig. 6a,b.

Xestoleberis margaritea (Brady), Brady, 1880, p. 127-128, pl. 30, fig. 2 a-g.——Egger, 1901, p. 456, pl. 3, fig. 27.——Chapman, 1906, p. 110.——Müller, 1912, p. 300.——Chapman, 1941, p. 201.

Xestoleberis margaritea was originally described by Brady (1866) from far outside the southern oceans:

"*Carapace* ovate, convex, very broad in front, suddenly narrowed behind. *Dorsal margin* boldly arched; *ventral margin* convex, slightly sinuated at the posterior third. *Extremities* well rounded, the posterior being very narrow. *Dorsal aspect* broadly ovate, pointed in front. *Surface* smooth, pearly white, thickly set with elevated papillae, and marked, in the adult, with patches of white opacity.

"Length 1/45 in. (.57 mm.).

"*Hab.* Levant (sponge-sand). Many specimens.

"Very similar to *Cytheridea aurantia,* Baird, but more profusely papillose and less tumid. It differs also in being higher in front than behind, the opposite being the case with *C. aurantia.* It agrees precisely in shape with *Cytherina ovulum,* Reuss; but the character 'superficie remote scrobiculata' prevents my referring it with certainty to that species. I have seen no trace of pitting in *C. margaritea.*"

Egger (1901) wrote (transl.):

"Length=0.53, height=0.23 mm.

"The outline of the carapace is ovate in the outline of the lateral surface, in dorsal and ventral view appears ovate with wide posterior and pointed anterior end. The lateral surfaces are lower in front than in the back, the curvature of the valve is convex and higher at the posterior part of the valve. The left valve overlaps the right and projects in lobe-like fashion over the middle line. Toward the ventral margin the valves fall steeply so that in the anterior view of the carapace the abdominal surface appears almost even. The surface of the valves has only small scattered pores.

"Brady described this species from the Booby Islands from 12 meters depth and also mentioned its occurrence in Mauritius and the Mediterranean Sea.

"Gazelle material: One carapace from station 55a near the Kerguelen Islands at 104 meters depth, one single valve from station 87 near Australia at 915 meters depth and from station 37, Table Bay, at 91 meters depth."

Chapman (1906) reported the species from Great Barrier Island, New Zealand:

"Dr. Brady found this species in the 'Challenger' dredgings at one locality only—namely, off Booby Island, Torres Strait, 6-8 fathoms. The same author also records it from the Mediterranean and the Mauritius. The writer found it in the shallow-water sands of the outer beach and lagoon of Funafuti, where it was fairly common, and in the lagoon sands of Cocos Island.

"One perfect carapace found off Great Barrier Island."

Again in 1941, Chapman reported finding the species and also wrote:

"Records by Brady are Sponge sand. Mediterranean, and from the 'Challenger,' off Booby Island. Egger's 'Gazelle' Stations are: Kerguelen and off the coast of West Australia. It was also found by the writer in shallow water round Funafuti, and as a Lower Miocene fossil in the Mallee Bores, Victoria."

McKenzie (1964) found the species in Oyster Harbour, Australia, in the littoral environment, in sandbanks, associated with *Posidonia,* and in channels.

XESTOLEBERIS TIGRINA (Brady)

Figure 9,*18-20*

Cytherideis tigrina Brady, 1866, p. 369, pl. 58, fig. 5a-d.——Müller, 1912, p. 384.

Xestoleberis tigrina (Brady). McKenzie, 1967, p. 97, fig. 4a, fig. 10 e-n.

Brady first reported the species from Australia in 1866:

"Valves oval, convex; extremities rounded, nearly equal. Anterior margin forming a wide flattened lamina. Dorsum arched. Ventral margin slightly convex, sinuate at its anterior third. Seen from above, the carapace is ovate, pointed in front, well rounded behind. Surface smooth, white or light grey, marked with bands or patches of brown, and bearing a few scattered papillae.

"Length 1/50 in. (.5 mm).

"Hab. Australia (littoral shell-sand, Melbourne). Many specimens."

It was not reported again until McKenzie (1967) found it in Port Phillip Bay, Australia:

"MATERIAL: Seaholme, 23 individuals; Ricketts Point, 52 individuals.

"DIMENSIONS: Hypotypes, Nat. Mus. Vic. Reg. No. J105, adult male: length 0.65 mm, height 0.36 mm, breadth, 0.33 mm; adult female: length 0.63 mm, breadth 0.39 mm.

"LOCALITY: Swash mark, Ricketts Point.

"REMARKS: Direct comparison against Brady's types has shown that the present material is undoubtedly his species which was collected from 'Australia (littoral shell-sand Melbourne).'

"DISTRIBUTION: South-eastern Australia."

XESTOLEBERIS INTERMEDIA Brady

Figure 9,*21-24*

Xestoleberis intermedia Brady, 1868, p. 94, pl. 7, fig. 3-7.——Müller, 1912, p. 303.

Xestoleberis? intermedia Brady, Chapman, 1915, p. 45.

Brady (1868) described the species from the Mediterranean Sea (transl.):

"Carapace in side view subreniform, greatest height situated in the middle equaling about half of the length, anterior and posterior obliquely rounded: upper margin strongly arched, lower distinctly sinuated in the middle; ovate in upper view, greatest width located behind the middle equaling the height, anterior acuminate, posterior broadly rounded. Surface smooth, white, often ornamented with small, rounded tubercules; exhibiting a large transparent eyespot in the upper portion (appears dark in reflected light).

"Length, 0.75 mm.

"This *Xestoleberis,* although larger than *X. depressa* and *aurantia* (*X. nitida,* Lill.), lives in the north, assuming through its shape a place intermediate between these two and allied particularly to the second.

"The specimens here differ very little from each other, and sex is probably the cause of the slight differences that one observes. The variations of form are nevertheless very remarkable elsewhere."

The species was first found in the southern oceans by Chapman (1915), who found a single left valve. Following Brady (1880), Chapman queried the species designation:

"The example found in the present series agrees in all particulars with Dr. Brady's figured specimen from Torres Strait, 155 fathoms. It differs from *X. setigera,* G. S. Brady, in the rounded anterior extremity of the carapace.

"Forty miles south of Cape Wiles, 100 fathoms. A left valve."

Except for this one occurrence, the species has not been found in the southern oceans.

XESTOLEBERIS POLITA (Brady)

Figure 9,*25-27*

Xestoleberis polita Brady, 1868, p. 202, pl. 27, fig. 15, 16.——Brady, 1880, p. 127, pl. 31, fig. 7a-c.——Müller, 1912, p. 304.——Chapman, 1919, p. 33.——Chapman, 1941, p. 201.

Brady (1868) described the species from Halt Bay in the Strait of Magellan (transl.):

"Carapace in side view thickened in middle, greatest height exceeding half of the length, anterior extremity rounded, posterior a broadly rounded curve; upper margin strongly arched, lowest part situated near middle; ovate in upper view, anterior portion acuminate, posterior part rounded, greatest width, located behind the middle portion, somewhat exceeds half of the length. Surface of the valve white, polished, with very few small papillae, on the upper portion provided with a large, transparent eyespot.

"Length, 0.5 mm."

In the *Challenger* report (Brady, 1880), he further described the species:

"Carapace as seen from the side, pear-shaped, highest behind the middle; anterior extremity narrow, posterior broad, both well rounded, dorsal margin moderately arched, inferior straight or slightly convex, height equal to two-thirds of the length; seen from above, compressed, ovate, narrowed, and obtusely pointed in front, somewhat broader and rounded behind; width rather less than the height; end view nearly circular. Surface of the shell smooth, very sparingly papillose. Length, 1-52d of an inch (.49 mm.).

"The Challenger specimens of this species were found in mud brought up on the anchor from a depth of 6 fathoms in Stanley Habour, Falkland Islands (Station 316). The type-specimens were taken in a locality not very far distant—Halt Bay, Straits of Magellan."

Chapman (1919) extended the range of the species to Tasmania:

"Observations—*X. polita* has a limited distribution, hitherto being confined to two localities off South America (Falkland Islands and Straits of Magellan). The present specimens, from the west of Tasmania, are fairly typical.

"Occurrence—No. 59 (12th December, 1912), 1320 fathoms. No. 60 (12th December, 1912), 1300 fathoms."

The most recent record of the species in the southern oceans was by Chapman (1941), who found the species off southeastern Australia:

"The type specimens were obtained from the Straits of Magellan, and the 'Challenger' examples came from Stanley Harbour, Falkland Islands, in 6 fathoms. The writer recorded the species from Mawson's 'Aurora' dredgings from the west of Tasmania at 1,300 fathoms."

XESTOLEBERIS sp. (Thomson)

Figure 9,*28*

Cythere atra Thomson (*non* Sars, 1865), 1879, p. 254, fig. A2, C1.——Müller, 1912, p. 371.——Thomson and Anderton, 1921, p. 116.

Thomson (1879) first described this species as *Cythere atra* from Otago Harbour, New Zealand:

"Valves subreniform, highest behind the middle, narrowing anteriorly, rounded posteriorly when viewed from above, narrow-oblong, evenly convex, tapering to a subacute apex anteriorly, more obtuse posteriorly. Examined under a high power, the shell is seen to be sparsely covered with circular translucent spots, which appear black when the animal is within. Margin fringed with very short close cilia. Colour nearly black, opaque, except near the margins. Limbs yellowish. Superior antennae 6-jointed, last joint small, three preceding subequal in in length, setae short; second joint fringed with minute hairs on lower margin. Inferior antennae stout, with the last joint very short; terminal claws short and uneven; urticating seta bi-articulate, reaching to the extremity of the antenna. Limbs similar in shape, lengthening posteriorly. Length 1/40 inch; height 1/70 inch.

"Among *Algae* in shallow water. Otago Harbour."

Thomson and Anderton (1921) again reported the species from Otago Harbour; and Hornibrook (1952) also found the species in New Zealand waters, first included it in the genus *Xestoleberis,* but did not add to the description of it.

XESTOLEBERIS AFRICANA Brady

Figure 9,*29-31*

Xestoleberis africana Brady, 1880, p. 126, pl. 30, fig. 4 a-c. ——Egger, 1901, p. 454-455, pl. 3, fig. 34-36. ——Müller, 1912, p. 303.——Chapman, 1906, p. 110.

Brady (1880) reported the species in *Challenger* samples from Simon's Bay, South Africa:

"Carapace very tumid; seen from the side, broadly subovate, height greatest a little behind the middle, and equal to about three-fourths of the length; obliquely rounded, and somewhat narrowed in front, broad, and well rounded behind, dorsal margin boldly arched, ventral decidedly convex; seen from above broadly ovate, widest in the middle, abruptly tapered and subacuminate in front, rounded behind, width equal to two-thirds of the length; end view subcircular, base somewhat emarginate; height greater than the width. Surface of the shell smooth, slightly papillose. Length, 1-50th of an inch (.5 mm.).

"Dredged in Simon's Bay, South Africa, in a depth of 15 to 20 fathoms. (Station 140)."

Egger (1901) again found *X. africana* in South Africa and described it as follows (transl.):

"Length=0.20, height=0.12 mm.

"As seen from the ventral or dorsal margin the closed carapace is egg-shaped becoming smaller toward the front and more evenly rounded at the posterior end. As seen in side view, the valve is lower in the anterior portion than in the posterior portion, the anterior margin curves towards the ventral margin, the posterior is more widely rounded. The dorsal margin is strongly rounded, the ventral margin almost straight. The left valve overlaps at the back. The valves are vaulted and fall slowly towards the front. The surface is dull and carries scattered thin pores, which are seen only as translucent points.

"Brady described this species from 28-36 meter depth at Simons Bay, South Africa.

"Gazelle material: One carapace and three single valves from station 17 near West Africa, one single shell from station 87, ten from station 90 near Australia, one single shell from station 37 near Table Bay, one from station 66 near Mauritius from 677, 915, 357, 91, and 411 meters depth."

Chapman (1906) found only one left valve off Great Barrier Island, New Zealand and wrote:

"This is a very rare and restricted form. It was originally recorded from Simon's Bay, South Africa, 15 to 20 fathoms.

"One left valve found in our dredging from Great Barrier Island."

XESTOLEBERIS EXPANSA Brady

Figure 9, *35,36*

Xestoleberis expansa Brady, 1880, p. 129, pl. 30, fig. 3 a-d. ——Müller, 1912, p. 303.

Brady (1880) described the species from *Challenger* sample 323 taken at a depth of 1,900 fathoms. He wrote:

"Carapace excessively ventricose; seen from the side, oblong, subovate, highest a little behind the middle, extremities broad and rounded, dorsal margin boldly arched, somewhat gibbous, ventral nearly straight; height equal to two-thirds of the length; seen from above, very broadly ovate, greatest width situated in the middle, and equal to three-fourths of the length, abruptly tapered towards the anterior extremity, which is subacute; posterior extremity broadly rounded, and slightly emarginate in the middle; end view subtriangular, widest at the ventral margin, width much greater than the height, apex acute, lateral angles rounded. Surface of the shell smooth and polished. Length, 1-58th of an inch (.44 mm.).

"One specimen only, dredged in a depth of 1900 fathoms, in lat. 35°39′S., long. 50°47′W.; grey mud (Station 323).

"The remarkably ventricose character, and broadly triangular end-view separate this species unmistakably from any other with which I am acquainted."

The species has not been subsequently reported from the southern oceans.

XESTOLEBERIS FOVEOLATA Brady

Figure 9,*32,34,38*

Xestoleberis foveolata Brady, 1880, p. 130, pl. 30, fig. 1a-g.——Müller, 1912, p. 375.

This species was first described by Brady (1880) from Booby Island (latitude 10° 36′ S.), well outside the southern oceans. Brady's description is as follows:

"Carapace of the female, subcordate, very tumid; seen from the side, the greatest height is situated near the middle, and is equal to more than two-thirds of the length; anterior extremity rounded, and only slightly depressed, posterior very broadly rounded, and somewhat produced in the middle; dorsal margin very boldly arched, ventral nearly straight; seen from above, broadly and obtusely wedge-shaped, tapering rather abruptly near the anterior extremity, which is obtusely pointed, posterior extremity wide, subtruncate, with rounded angles, and a central submucronate projection; greatest width situated behind the middle and equal to three-fourths of the length; end view subtriangular, with extremely convex sides, and rounded lateral angles, apex obtusely angulated, width rather greater than the height. Surface

of the shell ornamented with closely-set, and rather large angular excavations, and, on the ventral surface, also with deep longitudinal furrows. Length, 1-45th of an inch (.53 mm.). The male differs from the female in having the superior margin almost angular in the middle. the dorsal view being regularly ovate, and the end view subtriangular.

"This remarkable species, differing from all other known members of the genus in the strongly pitted character of its shell, was dredged plentifully in a depth of 6 to 8 fathoms, off Booby Island, lat. 10°36'S., long. 141°55'E. (Station 187)."

Hornibrook (1952) subsequently reported *Xestoleberis foveolata* from New Zealand but did not describe the specimens he found.

XESTOLEBERIS GRANULOSA Brady

Figure 9,*33,37*

Xestoleberis granulosa Brady, 1880, p. 125-126, pl. 30, fig. 5 a-d.——Müller, 1912, p. 303.

Xestoleberis granulosa was first described from near Australia by Brady (1880):

"Carapace compressed, oblong; seen from the side, subreniform, highest behind the middle, height equal to more than half the length, extremities rounded off, the posterior the broader of the two, dorsal margin well arched, ventral slightly sinuated in front of the middle; seen from above, compressed, ovate, twice as long as broad, widest near the middle, subacuminate in front, rounded behind; end view nearly circular, height slightly exceeding the width. Surface of the shell smooth, somewhat granular in appearance, and sparingly papillose. Length, 1-43d of an inch (.575 mm.).

"Taken off East Moncoeur Island, Bass' Strait, 38 to 40 fathoms, sand (Station 162); Port Jackson, Australia, 2 to 10 fathoms.

"This species is more slender in outline than any other with which I am acquainted, excepting, perhaps, *Xestoleberis intermedia,* Brady (Mediterranean); and *Xestoleberis labiata,* Brady and Robertson (British), from which latter, however, it differs somewhat in shape as well as in the want of the peculiar labiate prolongation of the shell from which the British species takes its name."

This species had not been reported subsequently from the southern oceans since the time of its original description until McKenzie (1964) found it in Oyster Harbour, Australia.

XESTOLEBERIS NANA Brady

Figure 10,*1*

Xestoleberis nana Brady, 1880, p. 126, pl. 31, fig. 5 a-c. ——Müller, 1912, p. 303.——Chapman, 1915, p. 46. ——Chapman, 1919, p. 32.——Chapman, 1941, p. 201.

Xestoleberis nana has been reported frequently from the southern oceans since its original description by Brady (1880), who reported it from Tongatabu, 8° north of our arbitrary northern boundary. Brady wrote:

"Carapace very tumid; as seen from the side, subsemicircular, highest near the middle; extremities obliquely rounded, dorsal margin boldly arched, ventral nearly straight, height equal to more than half the length; seen from above the outline is very broadly ovate, subacuminate in front, broadly rounded behind, greatest width in the middle, and equal to nearly three-fourths of the length; end view depressed, the width much greater than the height. Surface of the shell perfectly smooth. Length, 1-58th of an inch (.45 mm.).

"Found in a dredging, from a depth of 18 fathoms, off Tongatabu, coral bottom (Station 172)."

FIG. 10. Species of *Xestoleberis* from southern oceans (all figures ×50).

1. Xestoleberis nana Brady, 1880. Left valve, Brady, 1880, pl. 31, fig. 5a.

2-5. Xestoleberis setigera Brady, 1880.——*2.* Left valve, male, Brady, 1880, pl. 31, fig. 2a.——*3.* Dorsal view, Brady, 1880, pl. 31, fig. 2b.——*4.* Left valve, female, Brady, 1880, pl. 31, fig. 3a.——*5.* Chapman, 1916c, pl. 6, fig. 49.

6-9. Xestoleberis variegata Brady, 1880.——*6.* Brady, 1880, pl. 31, fig. 8b.——*7.* Brady, 1880, pl. 31, fig. 8a.——*8.* Brady, 1880, pl. 31, fig. 8e.——*9.* Left valve, Chapman, 1916b, pl. 6, fig. 48.

10,16. Xestoleberis olivacea Brady, 1898.——*10.* Left valve, female, Brady, 1898, pl. 46, fig. 6.——*16.* Dorsal view, female, Brady, 1898, pl. 46, fig. 7.

11-12. Xestoleberis sp. Brady, 1898.——*11.* Dorsal view, Brady, 1898, pl. 46, fig. 11.——*12.* Right valve, Brady, 1898, pl. 46, fig. 10.

13-14. Xestoleberis luxata Brady, 1898.——*13.* Right valve, Brady, 1898, pl. 46, fig. 20.——*14.* Dorsal view, Brady, 1898, pl. 46, fig. 21.

15,17-18,22. Xestoleberis reniformis Brady, 1907.——*15.* Dorsal view, male, Brady, 1907, pl. 1, fig. 5.——*17.* Left valve, male, Brady, 1907, pl. 1, fig. 4.——*18.* Scott, 1912, pl. 14, fig. 17.——*22.* Dorsal view, Scott, 1912, pl. 14, fig. 18.

19-21,23-25. Xestoleberis capensis Müller, 1908.——*19.* Dorsal view, male, Müller, 1908, p. 127, fig. 3.——*20.* Left valve, male, Müller, 1908, p. 127, fig. 1.——*21.* Right valve, male, Müller, 1908, p. 127, fig. 2. ——*23.* Dorsal view, female, Benson and Maddocks, 1964, p. 26, fig. 15-2.——*24.* Dorsal view, male, Benson and Maddocks, 1964, p. 26, fig. 15-3.——*25.* Right valve, female, Benson and Maddocks, 1964, pl. 2, fig. 12.

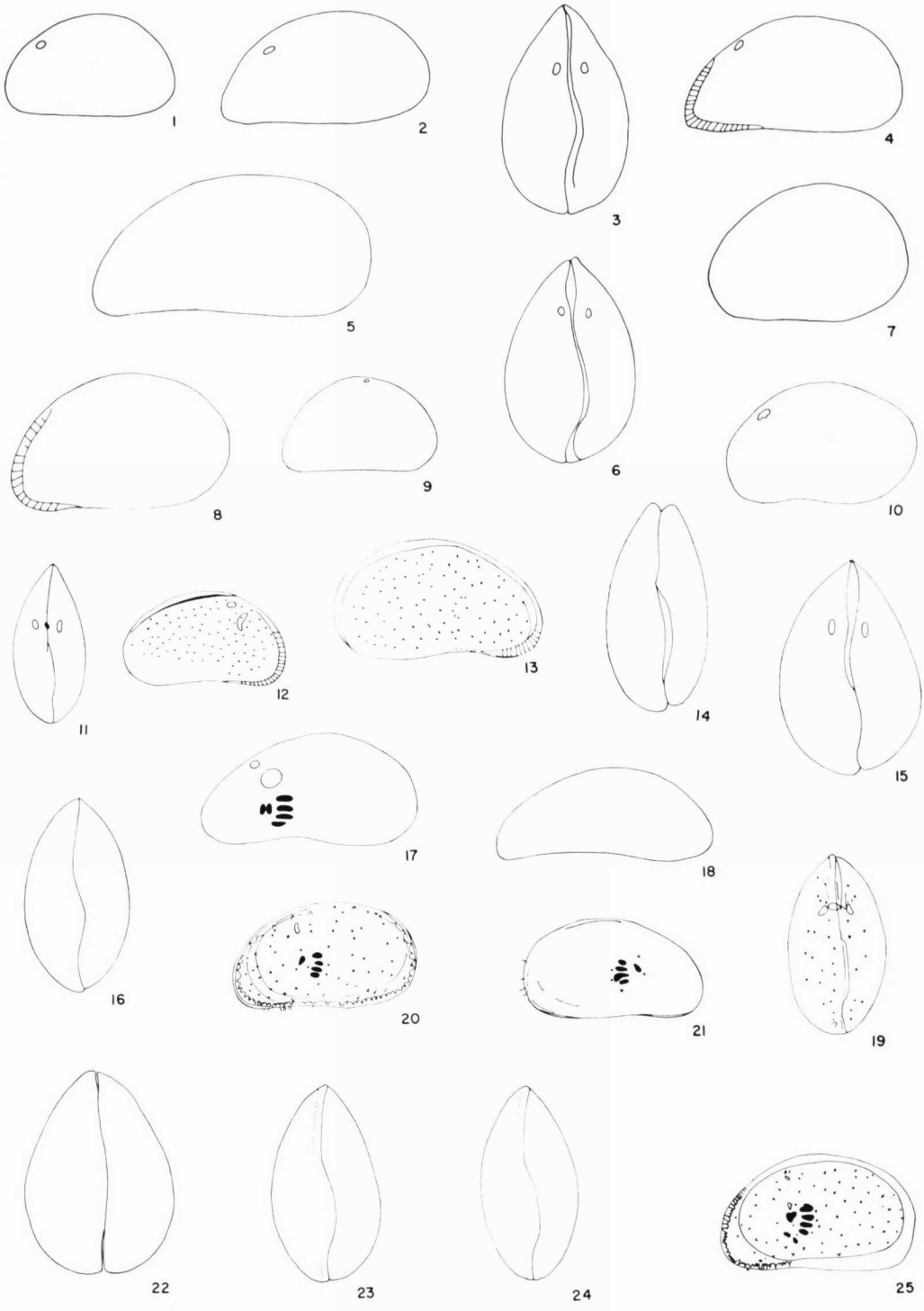

FIG. 10. (*For explanation see facing page.*)

Chapman (1915) reported finding three valves:

"Our specimens from Camp Wiles are rather higher than those figured by Dr. Brady, but there is little doubt that they are referable to the above species.

"*X. nana* was recorded from 18 fathoms off Tongatabu.

"East of Tasmania, 1122 fathoms. One small valve.

"Forty miles south of Cape Wiles, 100 fathoms. Two valves."

Again in 1919, Chapman reported finding the species:

"Observations—Several typical valves were found here. It has been recorded from the South Pacific (Tongatabu and Funafuti); from South of Cape Wiles, South Australia, and the East of Tasmania. The present examples came from the West of Tasmania.

"Occurrence—No. 58 (11th December, 1912), 1,180 fathoms. No. 59 (12th December, 1912), 1,320 fathoms. No. 60 (12th December, 1912), 1,300 fathoms."

In 1941, Chapman reported the species but gave no precise locality data:

"Recorded by Brady ('Challenger') off Tongatabu, 18 fathoms in coral bottom. Egger found it in 'Gazelle' dredgings from Fiji, Samoa, and North-West Australia. The writer has noted its occurrence at Funafuti (South Pacific) at 18-200 fathoms, and also in 'Aurora' soundings, west of Tasmania. Previous records in 'Endeavour' material are: east of Tasmania, 1,122 fathoms, and 40 miles south of Cape Wiles, 100 fathoms."

McKenzie (1964) found a similar species in Oyster Harbour, Australia, associated with the marine grass *Posidonia australis* and in channels.

XESTOLEBERIS SETIGERA Brady

Figure 10,*2-5*

Xestoleberis setigera Brady, 1880, p. 125, pl. 31, fig. 2a-d, fig. 3a-c.——Müller, 1912, p. 304.——Chapman, 1916c, p. 73.——Chapman, 1919, p. 33.——Chapman, 1941, p. 202.——Neale, 1967, p. 18-19.

Brady (1880) described the species as follows:

"Very closely similar to *Xestoleberis depressa,* but, when seen from the dorsal surface, less tumid both in front and behind; the width, also, is considerably greater than the height, so that the end view is much depressed. The surface of the shell is studded with small papillae, many of which bear single minute setae. Length, 1-42d of an inch (.65 mm.).

"I have notes of the occurrence of this species as follows: off Christmas Harbour, Kerguelen Island, 120 fathoms, specimen figured (fig. 3, a-c); off Heard Island, 75 fathoms, mud, Station 151; off Prince Edward's Island, 50 to 150 fathoms."

Chapman (1916c) wrote:

"This species appears to be almost restricted to the Southern Ocean. Brady records it from Kerguelen Island, 120 fathoms; Heard Island, 75 fathoms; and Prince Edward's Island, 50-150 fathoms. Egger's specimens came from the coast of Liberia, West Africa.

"Occurrence—Sample No. 3, 121 fathoms, one carapace; No. 4, 153 fathoms, rare; No. 5, 171 fathoms, one valve."

In 1919, Chapman reported *Xestoleberis setigera* from 1,320 fathoms and commented:

"Observations—Localities for this species have been hitherto confined to the colder parts of the Southern Ocean (Kerguelen, Heard and Prince Edward's Islands), excepting in the case of dredgings at Funafuti, which yielded this species at 12-60 fathoms, and also from the lagoon and beach sands at the same locality.

"Occurrence—No. 59 (12th December, 1912), 1,320 fathoms."

Again in 1941 Chapman found the species off southeastern Australia and summarized its previous occurrences:

"The 'Challenger' specimens came from Kerguelen, Heard and Prince Edward's Islands. The 'Gazelle' dredged it off Monrovia, West Africa. From Funafuti the writer obtained it from beach sand of Avalau, sand from the lagoon beach at Funafala, the lagoon dredgings Rocky Islet, lagoon dredgings 8½ miles from the Mission Church at 12 fathoms, and off Tutanga at 50-60 fathoms."

Hornibrook (1952) reported *Xestoleberis setigera* from New Zealand distributed all along the islands from the Aupourian to the Rossian provinces.

One of the southernmost occurrences of the species at Halley Bay, Australia, was reported by Neale (1967):

"Dimensions of figured specimen—Length 0.545 mm.; height 0.286 mm.; width 0.351 mm.

"Remarks—This low, depressed form is characterized by the low height in proportion to the length (about 50 per cent) and in the width being much greater than the height (about 120 per cent of the height) in carapaces. This species is much rarer than the preceding one [*X. rigusa*], only five specimens being found. It is easily differentiated from *X. rigusa* by simple length:height measurements as shown in Fig. 6, and as in that species only females and juveniles were found at Halley Bay.

"The Halley Bay material agrees well with the specimen of *X. setigera* in the British Museum (Nat. Hist.), although the latter is a little sharper anteriorly. The adult also agrees very closely with the form from 'Balfour Bay,' Iles de Kerguelen, which Brady also found from lat. 52°4'S., long. 71°22'E. and figured as the female of *X. depressa* Sars (Brady, 1880, pl. XXXI, fig.

4a-d). Brady, himself, commented that the distinctions between *X. setigera* and *X. depressa,* if valid at all, are very slight and lie in the fact that *X. setigera* is less tumid in front and behind. Whilst his remarks are very pertinent, the distinction between the two species is upheld provisionally until a fuller study can be undertaken.

"The left valve, obtained at lat. 76°55′S., long. 164°45′E. in 121 fathoms (222m.) of water and figured by Chapman (1916c, pl. VI, fig. 49) as *X. setigera,* agrees fairly closely and it is included here in the synonymy although it is unfortunate that he did not include a dorsal view.

"From *X. reniformis* (Brady, 1907) it differs in lacking the markedly concave ventral margin, and from *X. davidiana* Chapman (1916b) it differs in being more tumid posteriorly and less acute anteriorly in dorsal view, and in having a less concave ventral margin in side view. With other species it does not agree closely. Brady's specimens came from 120 fathoms (220m.) off 'Christmas Harbour,' Iles de Kerguelen, from mud at 75 fathoms (140m.) off Heard Island (station 151), and from 50-150 fathoms (91-275 m.) off the Prince Edward Islands.

"Of the five specimens one is interpreted as an adult, two as belonging to instar 8, and the other two to instar 6."

XESTOLEBERIS VARIEGATA Brady

Figure 10,*6-9*

Xestoleberis variegata Brady, 1880, p. 129, pl. 31, fig. 8 a-g.——Müller, 1912, p. 304.——Chapman, 1915, p. 46.——Chapman, 1916c, p. 73, pl. 6, fig. 48. ——Chapman, 1919, p. 33.——Chapman, 1941, p. 202.

Brady (1880) first described *Xestoleberis variegata* from Tongatabu, north of the southern oceans' arbitrary boundary:

"Carapace of the female, tumid; seen from the side, broadly pear-shaped, highest near the middle, extremities well rounded, the anterior, however, much narrower than the posterior; dorsal margin broadly arched, ventral sinuated in front, and convex behind the middle; seen from above, broadly ovate, tapering, and pointed in front, rather broadly rounded behind, width scarcely equal to the height; end view subcircular. Surface of the shell smooth, variegated with blotches of dark upon a pale ground. Length, 1-43d of an inch (.57 mm.). Specimens which I believe to belong to the male of this species are represented in figures . . . [see our plates] . . . and, as usual, are more elongated and slender than those of the opposite sex.

"*Xestoleberis variegata* was noticed in dredgings from off St. Vincent, Cape Verde, in 1070 to 1150 fathoms (Stations 93, 94); and off Tongatabu, 18 fathoms (Station 172)."

In 1915, Chapman reported the species from the southern oceans for the first time:

"The previously recorded localities for this species are off St. Vincent, Cape Verde, 1070 fathoms; off Tongatabu, 18 fathoms; Noumea, 2-6 fathoms; and in the Fiji and Samoan Islands, in shallow water. In dredgings taken at 1489 fathoms at Funafuti the writer found a single valve of this species.

"Forty miles south of Cape Wiles, 100 fathoms. Two valves."

After finding *Xestoleberis variegata* in samples from McMurdo Sound, Chapman (1916c) wrote:

"This species was found in both deep and shallow water round Funafuti; and it often occurred in the atoll's lagoon. Dr. Brady's records for the species are Cape Verde, Tongatabu, Fiji, and Noumea.

"Occurrence—Sample No. 4, 153 fathoms, one valve; No. 8, 353 fathoms, one valve."

Later he (Chapman, 1919) reported it from west of Tasmania:

"Observations—As another widely distributed form, this species has occurred off Cape Verde, off Tongatabu, at Funafuti; from New Caledonia, in the Fiji and Samoan Islands, and off South Australia. The present occurrence is west of Tasmania.

"As a fossil its history dates back to the Miocene (Victoria), where these ancient specimens differ in no way from the living examples.

"Occurrence—No. 59 (12th December, 1912), 1,320 fathoms."

Chapman and Parr (1935) reported finding the species at a depth of 89 fathoms, but they did not add to its description. In 1941, Chapman again reported *Xestoleberis variegata,* this time without precise locality data:

"The 'Challenger' records for this species are: off St. Vincent, Cape Verde, at 1,070-1,150 fathoms; and off Tongatabu in 18 fathoms. Brady also found the species at Noumea in 2-6 fathoms, and in shallow water from seven localities in the South Sea Islands, in shore sands and reef pools. At Funafuti, *X. variegata* was found in lagoon dredgings in shallow water, and off Funamanu at 50 fathoms. Only one occurrence was noted from the 'Aurora' dredgings, at Station 59, in 1,320 fathoms, near Western Tasmania. As a fossil this species was found in the Lower Miocene of the Victorian Mallee Bores (Chapman). But for the more swollen dorsal convexity, this fossil form was typical of the living form, even to the variegated surface markings. Previous 'Endeavour' samples showed this species to occur at the Station 40 miles south of Cape Wiles, 100 fathoms."

McKenzie (1964) also reported the species from Oyster Harbor, Australia.

XESTOLEBERIS LUXATA Brady

Figure 10,*13-14*

Xestoleberis luxata Brady, 1898, p. 441, pl. 46, fig. 20-27. ——Müller, 1912, p. 303.

Brady (1898) first described this species from New Zealand. It has not been reported subsequently from the southern oceans. Brady wrote:

"Shell of the *female* compressed, subreniform, left valve much larger than the right, and overlapping everywhere except on the ventral margin . . . , seen from the side, nearly twice as long as high, highest behind the middle, depressed in front; anterior extremity narrow, rounded but somewhat flattened, posterior wide and boldly rounded; dorsal margin forming a continuous curve, flattened toward the front, but boldly rounded behind, ventral sinuated in front of the middle; seen from above, compressed, ovate, twice as long as broad, widest behind the middle, tapering gently towards the front, well rounded behind; shell-surface smooth, marked with numerous very small circular papillae. Colour yellowish white. Length .6 mm. Antennules . . . six-jointed, bearing two setae on the second joint, one on the third, three on the fourth, one on the fifth, and three on the sixth, all of them short; the mandibular branchia . . . consists of only two setae, and the animal is, in other respects, similar to the typical *Xestoleberis*.

"*Hab.* On Algae in Lyttelton Harbour, New Zealand.

"In most species of *Xestoleberis* there is some inequality of the valves, but in this species it is more pronounced than in any other known to me."

XESTOLEBERIS OLIVACEA Brady

Figure 10,*10,16*

Xestoleberis olivacea Brady, 1898, p. 442, pl. 46, fig. 6,7. ——Müller, 1912, p. 304.

Brady (1898) first reported *Xestoleberis olivacea* from rock pools at Brighton, New Zealand:

"Shell, seen from the side . . . , subreniform, greatest height situated in the middle and equal to two-thirds of the length; extremities well rounded; dorsal margin boldly and evenly arched, sloping steeply behind, more gradually in front, ventral rather deeply sinuated in front, boldly arcuate behind, where it forms a curve continuous with that of the posterior extremity; seen from above . . . , ovate, nearly twice as long as broad, widest in the middle, lateral margins evenly and boldly arcuate; anterior extremity subacuminate, posterior narrowly rounded. Shell-surface perfectly smooth and without markings, excepting a dark eye-spot. Colour dark olive. Length .55 mm.

"*Hab.* Rock-pools, Brighton, New Zealand."

Thomson and Anderton (1921) reported the species from rock pools at Otago Harbour, and Hornibrook (1952) found it from the Aupourian to the Forsterian province of New Zealand.

XESTOLEBERIS sp. Brady

Figure 10,*11-12*

Xestoleberis compressa Brady (*non* Seguenza, 1885), 1898, p. 442, pl. 46, fig. 10-19.——Thomson and Anderton, 1921, p. 116.

Xestoleberis sp. Brady, Müller, 1912, p. 304.

Brady (1898) first described this species as *Xestoleberis compressa,* but it is clearly different from the *X. compressa* previously described by Seguenza (1885). Brady's (1898) description is as follows:

"Shell, seen from the side . . . , reniform, highest in the middle, height equal to more than half the length; anterior extremity obliquely rounded, posterior boldly and evenly rounded; dorsal margin boldly arched, ventral rather deeply sinuated in the middle; seen from above . . . , compressed, ovate, fully twice as long as broad, acuminate in front, rounded behind. Shell-surface smooth, marked with distant, very minute papillae. Colour yellowish. Length .46 mm. Antennules . . . six-jointed, third, fourth, and fifth joints each with a single strong apical spine and a slender seta, sixth joint with two setae; second joint fringed externally with fine, short hairs; in other respects like typical *Xestoleberis*.

"*Hab.* Rock-pools, Brighton, New Zealand.

"G. W. Müller notes that in many, if not in all, species of *Xestoleberis* the shell bears a crescentic pellucid patch behind the eyes, and of this he gives several figures. I have not been able to find this patch in any of the species here described, though in *X. compressa* there is, at any rate in some specimens . . . , a similar mark in front of the eyes. But the shell in this species and in others of the same genus is liable to the presence of similar irregular spots on various parts."

Thomson and Anderton (1921) noted the occurrence of the species in Otago Harbour, New Zealand.

XESTOLEBERIS RENIFORMIS Brady

Figure 10,*15,17-18,22*

Xestoleberis reniformis Brady, 1907, p. 6, pl. 1, fig. 4, 5. ——Scott, 1912, p. 583, pl. 14, fig. 17, 18.——Müller, 1912, p. 304.

Brady (1907) first described this species from material from an unknown locality, the circumstances of which are described below. It is included here for the sake of completeness since it was almost certainly collected from the southern oceans. Brady (1907) wrote:

"Shell of the *male* seen from the side . . . subreniform, much narrower in front than behind, greatest height situated behind the middle and equal to half the length; anterior extremity well rounded, narrow, posterior much wider, not very fully rounded, dorsal margin forming a

continuous arch, highest behind the middle, sloping very gradually backwards and with a rather steep curve towards the front, ventral margin rather deeply sinuated in the middle. Seen from above, the outline is broadly ovate . . . , pointed in front, broadly rounded behind, the lateral margins very boldly arcuate, greatest width situated behind the middle and equal to two-thirds of the length. The surface of the shell is smooth, deep ochreous yellow in colour, with a conspicuous dark eye-spot within the dorsal margin near the front, just below and behind which there is a large irregularly shaped pellucid, sub-circular patch, and below this again a series of four oblong muscle spots, arranged in a transverse curve, and in front of these two smaller spots the long diameters of which lie in the opposite direction. The left valve is the larger of the two, overlapping the right both in front and behind. Length 0.65 mm. The shell of the *female* is somewhat more tumid, and seen from the side has no ventral sinuosity; it is also almost free from anterior depression, the two extremities being nearly equal in width.

"Two specimens only of this small species were seen, a male and a female; the female, however, was only an empty shell and was quite colourless. The exact locality of the capture I do not know. The specimens were accidentally discovered in a flocculent diatomaceous deposit which settled from the liquid in which the larger Cypridinidae had been preserved. The flexuous lateral contour of the male distinguishes this from any other species of *Xestoleberis* known to me."

Scott (1912), in his report of the species, justified his identification of it by saying:

"A few specimens—adult and (?) young—of a *Xestoleberis* occurred among other Ostracoda collected in Scotia Bay, South Orkneys; Station 325, 60° 43′42″S., 44°38′33″W. They so closely resemble the form described by Dr. Brady in his paper on the 'Ostracoda of the English National Antarctic Expedition' that I ascribe them to the same species. They differ a little from the description and figures given by Brady, but the peculiar outline of the shell, both when seen from the side and from above, seems to be characteristic of the species. Length of specimen represented by the drawings, .62 mm."

XESTOLEBERIS CAPENSIS Müller

Figure 10,*19-21,23-25*

Xestoleberis capensis Müller, 1908, p. 127-128, fig. 1-10. ——Müller, 1912, p. 300.——Benson and Maddocks, 1964, p. 26, fig. 15, pl. 2, fig. 12.

Müller (1908) described *Xestoleberis capensis* as follows (transl.):

"Left valve of the male: height about 5/9 of the length, highest point a little behind the midpoint of the length, dorsal margin rather flatly curved, not defined against anterior and posterior margin; both ends rather broadly rounded, the back distinctly wider than the front. The posterior margin extends uniformly into the flat s-shaped ventral border. Surface covered thickly with large remarkable pore canals. The line of concrescence is visible in profile throughout most of the circumference, it is invisible only near the ventral border. The marginal zone is penetrated by two different pore canals, short and thick ones not sharply terminated at the base which terminate similar to normal pore canals, and longer and thinner ones sharply terminated at the base with barely noticeable openings. Both kinds of pore canals alternate almost regularly at the anterior margin, in the front half of the ventral margin the short thick canals are missing (their aperture goes more or less completely to the line of concrescence), at the posterior margin apparently the thin canals are always missing. The conditions vary sometimes, for example, the thin canals can originate out of the thick near the point, in which case they are difficult to observe, especially at the anterior margin of the left valve of the male . . . carapace somewhat dull, the kidney shaped spot is very small. Right valve similar to the left, at the boundary of the posterior and ventral margin a more or less obtusely angled corner.

"Carapace of the female similar to that of the male, although a little higher. Seen from the back (male) width about ½ of the length (the figured example was not completely closed), at the widest at about ½ of the length; the sides form curves, which go to both ends with no distinct boundary, anterior end pointed, posterior end rounded.

"The claws of the three thorax legs are regularly curved over their entire length, the second segment of the third leg is hirsute on the anterior edge, with very small terminal bristle; the furcal bristles are strong and remarkably different in length.

"At the penis the attachment is thin, wedge-shaped and pointed. The shape seems to be constant; the vas deferens is distinctly s-shaped in the area of the incoming and outgoing branches, at the boundary of both branches a long loop is built, the opening lies near the medial border.

"Length of the female 0.55, of the male 0.49, the size rather constant.

"Occurrence: Simonstown, common."

The species was subsequently identified by Benson and Maddocks (1964), who wrote:

"Diagnosis—Distinguished by the equality of the greatest height and width of the carapace, width somewhat more than half the length just behind mid-length; radial-pore canals of two sizes; eye scar inconspicuous, narrow, often represented by two small scars; antennal scar heart-shaped; posteroventral marginal outline obtusely angulate. *Rec.*

"Description—Lateral outline ovoid, narrowly rounded anteriorly, very broadly rounded and somewhat truncate behind, greatest height just behind mid-length; dorsal margin sloping steeply and evenly anteriorly, sloping

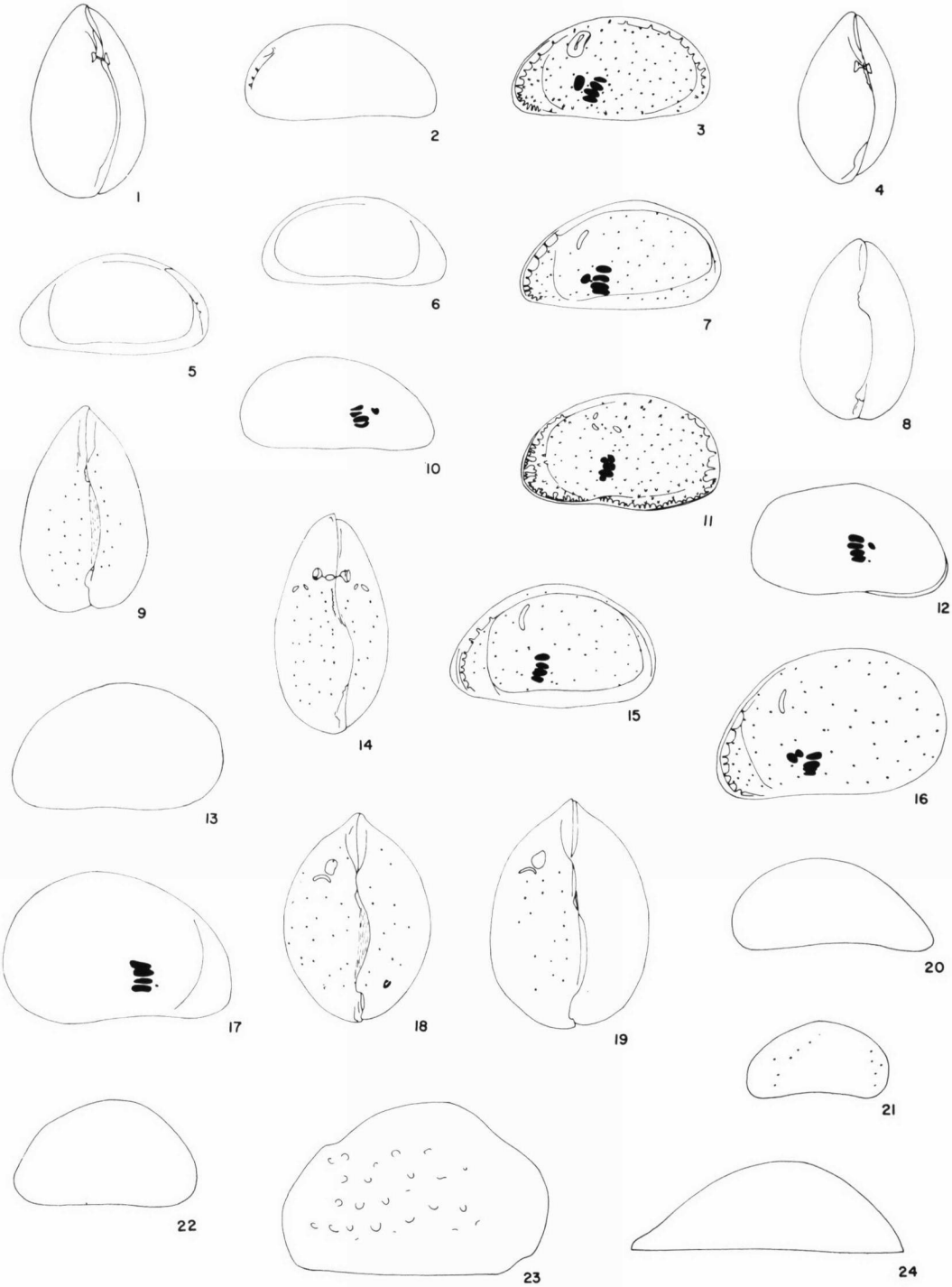

FIG. 11. (*For explanation see facing page.*)

more gently posteriorly; ventral margin very slightly sinuate; posterior margin broadly arched, nearly vertical, meeting dorsal and ventral margins at distinct, rounded obtuse angles. In dorsal view greatest width just behind mid-length, anterior narrowly rounded, posterior more broadly rounded in females, similar to anterior in males. Surface smooth, normal-pore canals large, numerous.

"Hinge antimerodont, robust, in left valve the anterior element is formed of about 12 small sockets, the posterior element is a row of about 7 sockets; between these the dorsal margin projects as a smooth bar, the ends of which are faintly crenulate and grade into the floor of the sockets. In right valve rims of anterior and posterior margins are strengthened dorsally, becoming denticulate ridges; between these terminal hinge elements is an elongate, much depressed groove, which is smooth in the center, crenulate at its ends. Duplicature wide, with wide anterior and narrow posterior vestibules; fused portion fairly narrow. Line of concrescence lobate as result of proximal enlargement of some radial-pore canals. Two sizes of radial-pore canals are present, some narrow and of the same width throughout, others thick and widening proximally. Both types are present along the anteroventral margin, but the larger type is dominant elsewhere. The muscle-scar pattern consists of four, large, oblong adductor scars arranged in a curved vertical row with ventral one smallest, dorsal one largest and triangular; antennal scar large, V-shaped or heart-shaped; two oval mandibular scars present ventrally. Eye scar small, consisting of either a single narrow curved scar or two small elongate scars at an angle to each other. Presumed males smaller than females, less inflated posteriorly.

"Dimensions—Presumed females: length 0.53-0.60 mm, height 0.33-0.36 mm, thickness 0.32-0.35 mm. Presumed males: length 0.55 mm, height 0.35 mm, thickness 0.35 mm.

"Material—48 specimens, of which 10 were whole carapaces, none containing soft parts, many immature.

"Remarks—The Knysna specimens do not display as distinct a difference between the two types of radial-pore canals as Müller indicated the Simonstown form possessed, nor do the thick and thin radial-pore canals alternate regularly along the anteroventral margin as described by Müller. In other features of the carapace forms from Simonstown and Knysna are identical. *X. ramosa* Müller, 1908, also described from Simonstown, differs from *X. capensis* by its greater size, more sinuous venter, and more irregularly lobate line of concrescence. *X. africana* Brady, 1880, dredged by the *Challenger* Expedition from Simon's Bay, is much more tumid both in lateral and dorsal view. One whole specimen of *X. africana* is available for examination in the British Museum. The inner margin and the muscle-scar pattern could not be satisfactorily seen for comparison."

XESTOLEBERIS KERGUELENENSIS Müller

Figure 11,*1-4*

Xestoleberis kerguelenensis Müller, 1908, p. 131-133, fig. 1-12.——Müller, 1912, p. 298.

Müller (1908) first described this species, and it has not been reported from the southern ocean subsequently. Müller wrote (transl.):

"Left valve of the male: Height slightly greater than ½ of the length, about 15/29, the highest point slightly behind half of the length, dorsal margin strongly rounded, anterior margin small, posterior margin somewhat more widely rounded. Ventral margin distinctly convex, right valve similar to the left valve. Ventral margin straight or weakly concave in the mouth region. Surface covered densely with large distinct pore canals, fused marginal zone of the anterior margin is penetrated by dense, unbranched, thick pore canals. The fused zone is not only visible at the anterior margin but also at the posterior margin; it is invisible on the left valve at the ventral margin and indistinct on the right valve.

FIG. 11. Species of *Xestoleberis* from southern oceans (all figures ×50).

1-4. Xestoleberis kerguelenensis Müller, 1908.——1. Dorsal view, female, Müller, 1908, p. 132, fig. 3.—*2.* Right valve, male, Müller, 1908, p. 132, fig. 2.——*3.* Left valve, male, Müller, 1908, p. 132, fig. 1.—*4.* Dorsal view, male, Müller, 1908, p. 132, fig. 12.

5-10. Xestoleberis meridionalis Müller, 1908.——*5.* Left valve, male, Müller, 1908, p. 130, fig. 1.——*6.* Right valve, male, Müller, 1908, p. 130, fig. 1.——*7.* Left valve, female, Müller, 1908, p. 130, fig. 3.——*8.* Dorsal view, male, Müller, 1908, p. 130, fig. 2.——*9.* Dorsal view, female, Müller, 1908, p. 130, fig. 4.——*10.* Right valve, female, Müller, 1908, p. 130, fig. 3.

11-14. Xestoleberis ramosa Müller, 1908.——*11.* Left valve, male, Müller, 1908, p. 129, fig. 1.——*12.* Right valve, male, Müller, 1908, p. 129, fig. 1.——*13.* Left valve, female, Müller, 1908, p. 129, fig. 3.——*14.* Dorsal view, female, Müller, 1908, p. 129, fig. 2.

15-19. Xestoleberis rigusa Müller, 1908.——*15.* Left valve, male, Müller, 1908, p. 126, fig. 1.——*16.* Left valve, female, Müller, 1908, p. 126, fig. 2.——*17.* Right valve, female, Müller, 1908, p. 126, fig. 2.——*18.* Dorsal view, male, Müller, 1908, p. 126, fig. 3.——*19.* Dorsal view, female, Müller, 1908, p. 126, fig. 4.

20-24. Xestoleberis davidiana Chapman, 1915.——*20.* Right valve, male, Chapman, 1916a, pl. 6, fig. 6.——*21.* Left valve, Chapman, 1941, pl. 8, fig. 2.——*22.* Left valve, Chapman, 1916a, pl. 6, fig. 5.——*23.* Left valve, Chapman, 1919, pl. 22, fig. 2.——*24.* Chapman, 1916a, pl. 6, fig. 2a.

"Carapace of the female similar to that of the male. Ventral margin of the left valve less distinctly convex, of the right valve distinctly concave, fused zone at the posterior margin also visible in profile, but more difficultly. As seen from the back, in both sexes the exposed animal (not supported by the glass slide) seems very much inclined, sloping strongly towards the right. The width of the female is about 4/7 of the length, widest at about 4/7 of the length. The sides form flat curves which proceed uniformly to the anterior rounded tip, posterior end broadly rounded. Carapace of the male smaller, the posterior end more narrowly smaller.

"The ventral claw of the 2nd antenna of the male is combed, not those of the female. For the forms of the claws of the thoracic legs compare fig. 4-6.

"At the penis, on the medial side the attachment has a continuation that is turned strongly toward the base which in the profile is partly covered by the furca and the margin of the basal part (therefore it is hardly visible as a separate structure); its distal part is wedge-shaped, attenuated and pointed; twice I found the top to be recurved hook-like on one side, once strongly rounded. The vas deferens describes a similar figure to that of *X. meridionalis*.

"Length of the female 0.52-0.54 mm; of the male 0.47-0.54 mm.

"Occurrence: Kerguelen station, about 15 individuals were collected.

"Of a second species of the genus *Xestoleberis* collected at the Kerguelen Islands only a few females were found. I will forego a description of this form as no satisfying description can be made based on this material."

XESTOLEBERIS MERIDIONALIS Müller

Figure 11,*5-10*

Xestoleberis meridionalis Müller, 1908, p. 120-131, fig. 1-6.
——Müller, 1912, p. 298.

In his original description of *Xestoleberis meridionalis,* Müller (1908) wrote (transl.):

"Left valve of the female: Height somewhat greater than ½ of the length (6/11), the highest point distinctly behind ½ of the length, dorsal margin strongly rounded, no distinct boundary with the anterior and posterior margins. Anterior end small, posterior end moderately widely rounded, ventral margin nearly straight, ascending in a flat curve in the posterior 2/5; towards the anterior margin rounded in less distinctive corner. Punctation, fused zone, and pore canals similar to that of *X. rigusa*. Right valve similar to the left one, the anterior margin more strongly pointed (always?).

"The carapace of the male similar to the female, somewhat lower, at the boundary of posterior and ventral margins, left or on both sides a more or less distinctive corner with rounded tip. The fused zone is visible at the posterior margin (easy to miss because of the cloudiness of the carapace). As seen from the back the female is about 7/11 as wide as long, at the widest about 2/3 of the length, the sides form flat curves, which proceed rather uniformly to the anterior pointed end. They turn strongly medially near the posterior end so that the posterior end seems to be widely transversely truncated and angularly impressed in the middle.

"Carapace of the male seen from the back smaller, about 1:2, widest point distinctly in front of 2/3 of the length, posterior end rounded, slightly retracted in the middle.

"The bristle of the 2nd segment is about as long as the third on the third thorax leg. Terminal claw about as long as the third and fourth segments.

"The attachment of the penis is attenuated from the base towards the top and terminally pointed, the top is more or less strongly truncated, the median margin forms a reentrant angle (visible only under the cover glass). The vas deferens forms a somewhat irregular 8-shaped figure.

"Length of the female 0.52-0.61 mm; of the male 0.46-0.56 mm.

"Gauss-station, rather common (about 40 individuals).

"This species, especially the view of the back of the female, reminiscent of *Xestoleberis depressa* Brady from the Kerguelen Islands (1880, p. 124, pl. 31, fig. 1) which I do not consider identical with *Xestoleberis depressa* G. O. Sars (1865, p. 68; Brady, 1868, p. 438); they can be distinguished in that the minimal size of the female is 0.61 instead of 0.75 and of the male is 0.56 instead of 0.65, and by the punctation which is much too sparse.

"In the carapace it is similar to *X. parva* G. W. Müller (1894, p. 334, pl. 24, fig. 6, 10, 11, 15, 29, 30) but differs in the structure of the penis and the appendages."

The species has not been reported by other students of the southern oceans ostracode fauna.

XESTOLEBERIS RAMOSA Müller

Figure 11,*11-14*

Xestoleberis ramosa Müller, 1908, p. 128-130, fig. 1-8.——Müller, 1912, p. 297.

Müller (1908), in the only report of this species from the southern oceans, wrote (transl.):

"Left valve of the male: height distinctly greater than ½ of the length, almost 3/5; at the highest point (in the posterior half) the height is approximately 4/7 of the length. The dorsal margin forms a distinctive curve which blends into the rather widely rounded anterior margin. At the border of dorsal and posterior margin there is an indication of a corner, this can be suppressed. The posterior margin falls steeply in a flat curve and together with the ventral margin forms a rather distinctive corner with more or less a strongly rounded point. Ventral margin distinctively s-shaped with the back 1/3 distinctly ascending. Surface covered rather densely with large pore canals, the line of concrescence is visible in the entire outline; the radial pore canals are united into groups

of two to six which originate from a common stem, although they remain single in the dorsal half of the anterior margin and in the posterior half of the ventral margin where they are mixed with small groups. The kidney-shaped spot is divided into two smaller sharply outlined ones. The right valve is differentiated from the left in that the anterior end is less rounded, and by the form of the dorsal margin, in which the posterior half instead of being a curve is a straight line (possibly a flat curve) so that the dorsal margin forms a distinctive corner at half of the length, and the dorsal and posterior margins define a distinctive corner. The teeth of the hinge are usually visible at the previously mentioned corner. As pointed out there can be a straight line instead of a flat curve, in which case the corners are less distinctive; the appearance in this area is influenced by the position of the valve.

"The carapace of the female similar to that of the male, somewhat higher, posterior end somewhat wider. The pore canals of the anterior margin are also united into groups. The stem from which they originate is shorter and wider, the individual canals longer, but the situations vary. As seen from the back the width is about ½ of the length, widest point occurring at about 3/5 of the length, the sides form curves which blends into both ends. Posterior end rounded, anterior distinctive pointed.

"The claws of the thoracic legs are short, strongly bent, the third one has two bristles at the anterior margin of the proximal segment (without the knee bristle).

"The attachment of the penis is attenuated towards the top, bent towards the median, and more or less distinctively pointed terminally. The median and lateral margins are strongly chitinized, the space between them is very thin, so that you first get the impression of a bipartite attachment, but it is single as in the other species. I could not distinguish the vas deferens.

"Length of the female, 0.60-0.65 mm; of the male 0.57-0.6 mm.

"Occurrence: Near Simonstown, less common than *capensis*."

XESTOLEBERIS RIGUSA Müller

Figure 11,*15-19*

Xestoleberis rigusa Müller, 1908, p. 125-126, fig. 1-6, pl. 19, fig. 10.——Müller, 1912, p. 297-298.——Neale, 1967, p. 17, fig. 6, plate Id, d'.

Müller (1908) reported *Xestoleberis rigusa* from Gauss-Station, Antarctica and described it as follows (transl.):

"Left valve of the female: height about 2/3 of the length, highest point slightly behind the midpoint, dorsal margin curved, not defined against the anterior and posterior border, anterior margin small, posterior margin very broadly curved, ventral margin almost straight (the true ventral margin is covered in the profile by the overlying ventral surface of the shell). Surface covered rather thickly with fairly large pore canals. Fused section visible only at the anterior margin, where it is penetrated by short, thick pore canals, which are not visible in the profile. Right valve similar to the left, somewhat higher, the ventral margin distinctly indented, the anterior margin sometimes with indication of a corner.

"Valve of the male a little higher, the dorsal margin much more strongly curved, the posterior margin rather small, a little more broadly rounded than the anterior part, the ventral margin convex.

"Seen from the back, the female is very wide, width almost 3/4 of the length, widest at about 2/3 of the length; the sides form flat curves which converge little from the front to about 1/4 of the length and from there on strongly, where it is weakly concave. Posterior end very broadly rounded, anterior part pointed, the tip truncated.

"Valve of the male seen from the back somewhat smaller, width about 7/10 of the length, widest at not quite 2/3. The sides form strong curves, which converge from the front and the back at about the same rate, the posterior extremity much less rounded than the female, the anterior end similar to the female. Carapace in both sexes slightly dull.

"Third thoracic leg with two bristles at the front end of the proximal segment, bristle on the second segment long and thin, almost as long as the last two segments together, terminal claw also long and thin, somewhat longer than the two previously mentioned segments.

"Penis with a short, terminal, widely rounded attachment. The vas deferens approaches the base more strongly than usual at about 1/5 of the length of the penis, forming a very long loop.

"Length of the female 0.63-0.66 mm, of the male 0.55-0.57 mm.

"Occurrence: Gauss-station, rather common, altogether 34 individuals were collected."

In a subsequent discovery of the species, also from Antarctica, Neale (1967) wrote:

"Dimensions of figured specimen left valve (HU.13.-R.12.80).—Length 0.597 mm.; Height 0.371 mm.; Width 0.221 mm.

"Description—Rounded triangular in side view with the greatest height at about the mid-point and equal to about two-thirds of the length. Ventral profile slightly concave. Surface smooth and shining with a moderate number of sieve-like normal pore canals. Zone of concrescence narrow with about 21 radial pore canals in the posterior half of the shell. Tooth plates crenulate but not markedly so. In dorsal view wide, the outline fairly evenly rounded but with the anterior third rather straight and meeting the remaining two-thirds of the outline at a slight angle. Greatest width in this view at, or a little behind, mid-length.

"Remarks—The typical reniform post-ocular scar characteristic of *Xestoleberis* is present, a scar which Hartmann (1965, p. 583) said is absent in the Patagonian

genus *Semixestoleberis* (Hartmann, 1962, p. 230 *et seq.*). In his diagnosis of the latter Hartmann drew attention to the sieve-type normal pore canals, a feature present in *X. rigusa,* but one which is also present in the type species of *Xestoleberis* itself, *X. aurantia* (Baird) as shown by Wagner (1957, p. 94, pl. XLV, fig. 3), and which should thus be regarded as of no diagnostic significance in the case of these genera. In the other diagnostic features, the crenulate tooth plates and the relatively numerous marginal pore canals (*Semixestoleberis debueni* Hartmann, the type species of *Semixestoleberis* has only seven marginal pore canals in the posterior half of the shell compared with about 21 in *X. rigusa*), *X. rigusa* agrees with *Xestoleberis* and not with *Semixestoleberis.*

"*X. rigusa* is by far the commoner xestoleberid at Halley Bay, being represented by 124 specimens of which 30 are adult, 43 belong to instar 8, 34 to instar 7, 11 to instar 6, five to instar 5 and one to instar 4. Müller described the male of this species in the community from "Gauss station." It is curious that at Halley Bay only females occur, a situation also found in the other species of *Xestoleberis* present.

"The present species differs from *X. margaritea* Brady in being higher in proportion to the length, and as seen in side view it is built up more postero-dorsally than *X. capensis* Müller and *X. setigera* Brady. In this respect, as well as in its greater tumidity in dorsal view, the Halley Bay species also differs from *X. granulosa* Brady.

"Two of the specimens from McMurdo Sound figured by Benson (1964, text-fig. 6; pl. 1, fig. 6) appear to belong here; the other two figured specimens seem more doubtful, his pl. 1, fig. 3 bearing a resemblance to *X. kerguelensis* in side view."

XESTOLEBERIS DAVIDIANA Chapman

Figure 11,*20-24*

Xestoleberis davidiana Chapman, 1915, p. 45.——Chapman, 1916b, 51, pl. 6, fig. 5a-c, 6.——Chapman, 1916c, p. 73.——Chapman, 1919, p. 32, pl. 22, fig. 2, 29.——Chapman, 1941, p. 201, pl. 8, fig. 2.

The first description of *Xestoleberis davidiana* was by Chapman (1915) from a raised Pleistocene beach on Mt. Erebus in Antarctica. Chapman wrote:

"The following description is based on a specimen from a raised beach on the slopes of Mt. Erebus in the Antarctic region. The publication of the paper in which it should have appeared being unavoidably delayed, I am indebted to Professor David for permission to include it here.

"Carapace in side view, semiovate, bluntly pointed in front and behind; back rounded, slightly angulated at the summit; ventral border gently concave, edge rounded, ventral surface excavate. Edge view, compressed ovate. End view, conical, with rounded sides. Surface of shell more or less numerously pitted, each pit or group of pits surrounded by a white spot; probably armed with fine bristles (as in *X. setigera*) in the living state. A few valves of narrower build are present, one of which is figured; they are probably referable to male specimens.

"Measurements—Length of type specimen, .48 mm.; greatest thickness of carapace, .3 mm.; height, .3 mm.

"It is extremely interesting to find this neat little species still living in the Southern Ocean.

"South of Tasmania, 1122 fathoms. One valve."

Later (Chapman, 1916b) he wrote:

"Description—Carapace in side view, semiovate, bluntly pointed in front and behind; back rounded, slightly angulated at the summit; ventral border gently concave, edge rounded, ventral surface excavate. Edge view, compressed ovate. End view conical, with rounded sides. Surface of shell more or less numerously pitted, each pit or group of pits surrounded by a white spot; probably armed with fine bristles (as in *X. setigera*) in the living state. A few valves of narrower build are present, one of which is figured; they are probably referable to male specimens.

"Measurements—Length of type specimen, .48 mm.; greatest thickness of carapace, .3 mm.; height, .3 mm.

"Observations—At first sight this species reminds us of *X. setigera,* G.S. Brady, both in the narrow side view of the carapace and the punctate ornament. The latter, however, in *X. setigera* is distinctly papillate. This present species is distinguished by the subacute extremities in side view and the pointed dorsal area of the end view.

"*X. davidiana,* whilst related to *X. setigera,* also a southern form, may be regarded as distinct on the strength of the above characters, which are constant throughout the numerous specimens occurring in the elevated deposit from the slopes of Mount Erebus."

He reported the species again in 1916 (Chapman, 1916c):

"Occurrence—Sample No. 3, 121 fathoms; one carapace; No. 4, 153 fathoms, one valve."

In 1919, Chapman reported subsequent discoveries of this species:

"Observations—This species has occurred in soundings in the Ross Sea near the Ice-barrier and also in elevated deposits (Pleistocene) on the slopes of Mount Erebus. It was lately found in 'Endeavour' dredgings South of Tasmania at 1,122 fathoms. The present soundings containing this species are from the South polar region and from the west of Tasmania.

"Occurrence—No. 28 (14th February, 1912), 160 fathoms. No. 29 (14th February, 1912), 125 fathoms. No. 31 (15th February, 1912), 220 fathoms. Additional sample (3rd September, 1912), 706 fathoms. No. 58 (11th December, 1912), 1,180 fathoms. No. 60 (12th December, 1912), 1,300 fathoms. No. 139 (27th January, 1914), 328 fathoms."

The last observation of the species was by Chapman in his 1941 paper:

"The earlier references to the above species relate to the material collected as upthrust muds on the slopes of Mount Erebus, and also muds dredged in the Ross Sea by the 'Nimrod,' of the Shackleton Expedition of 1907-9. The 'Aurora' specimens were obtained from several dredgings along the Ice Barrier, and also from South-East Tasmania towards Macquarie Island. Previous records of 'Endeavour' material include south of Tasmania, 1,122 fathoms."

XESTOLEBERIS sp. Hornibrook

Hornibrook (1952) did not describe or illustrate this species, but he mentioned finding it as a fossil in rocks as old as Miocene and in the Holocene in the Aupourian to Forsterian provinces. He also mentioned *Xestoleberis* sp. restricted to the Aupourian Province, and it is not clear if he is referring to several species in open nomenclature or to only one. From Holocene environments, he also reported finding *X. setigera* Brady, *X. atra* (Thomson, *non* Sars), *X. olivacea,* and *X. faveolata.*

XESTOLEBERIS CHILENSIS Hartmann

Figure 12,*1-4*

Xestoleberis chilensis Hartmann, 1962, p. 219-222.

Xestoleberis chilensis was first described by Hartmann (1962), who wrote (transl.):

"Name: *chilensis* because of the distribution of the species along the entire Chilean coast.

"Holotype: Zoologisches Museum Hamburg, valves in slides, body in glycerine.

"Type locality: Dichato near Concepcion.

"Description of the species: Like similar *Xestoleberis* species this species shows distinctive sexual dimorphism.

"The right valve of the female is elongated, the dorsal margin curved evenly, the highest point shortly before half of the length of the valve. The dorsal margin blends without indication of a boundary into the anterior and the posterior margins. The posterior end is narrowly curved; broadest curvature is at the border of the lower third of the valve. The rounding of the anterior end is more narrow; the broadest curvature is in the lower third and forms the transition into the smooth indented ventral margin. The transition between the posterior and ventral margin is indistinct.

"The selvage of the valve is visible laterally only in the region of the anterior margin. The inner margin and the line of concrescence are separated only at the anterior margin. Otherwise they merge in the region of the remaining shell margin. The marginal pore canals are dense but do not branch as in many other species of *Xestoleberis.*

"The surface of the carapace is smooth; many large normal pore canals are present. In this species, the posterior eyespot remains narrow and curved in hooklike fashion. The muscle scar pattern is large. They are in vertical sequence, a fifth lying in front. The latter is commonly perforated by a pore canal.

"As at the margin relatively long hairs originate out of the pore canals. In the posterior half of the left valve is considerably more convex than the right valve. The central margin is strongly arched outwards behind the indentation in the mouth region. The posterior end is more widely rounded, the widest curvature is higher than in the right valve.

"As seen from the top the greatest width is behind the center of the carapace; the posterior end is widely curved, the anterior end tapered.

"The hinge margin of the carapace consists of two terminal tooth elements on the right valve, a groove is between them. Therefore it is of the merodont *Xestoleberis* type. The front tooth plate of the type has seven teeth, the back one eight teeth. The hinge elements of the left valve are complementary, the median ridge is crenulated terminally.

"The valves of the male are smaller and thinner than those of the female. In particular the left valve does not show the strong anterior convexity of the valves of the females. This may be connected with the fact that *Xestoleberis* species have brood care; their eggs are carried in the carapace cavity until the hatching of the young.

"The other structural relations of the carapace agree with the female.

"The appendages of the female agree exceptionally well with the male.

"The 1st antenna is thin. The four podomeres are in the ratio 5:6:7:3 in length. The terminal podomere is cylindrical and small.

"On the 2nd antenna the small end claw is densely spined, the large one shows thin barely noticeable spines. The distal-ventral seta of II barely reaches the middle of III. It is annulated.

"The setae of the antenna agree with those of *X. simplex* n. sp.

"On the masticatory ridge of the mandible are four teeth. They decrease in size from the outward in. Teeth 2-4 are divided. Several spines follow the four front teeth, then small undivided teeth. The podomeres of the palp are relatively strong. The terminal podomere has a strong claw and several setae. On the branchial plate two completely separate branches were formed.

"The maxilla has one strong process directed toward the mouth which is covered densely with seta distally in which the points of the seta overlap the masticatory process. This is probably a auxilliary organ for food absorption. The palp and masticatory process of these appendages are thin. The terminal podomere of the palp becomes at least 5 times longer than wide. The setae of the palp and the masticatory processes are long and thin. In addition a claw is formed at the terminal podomere of the palp.

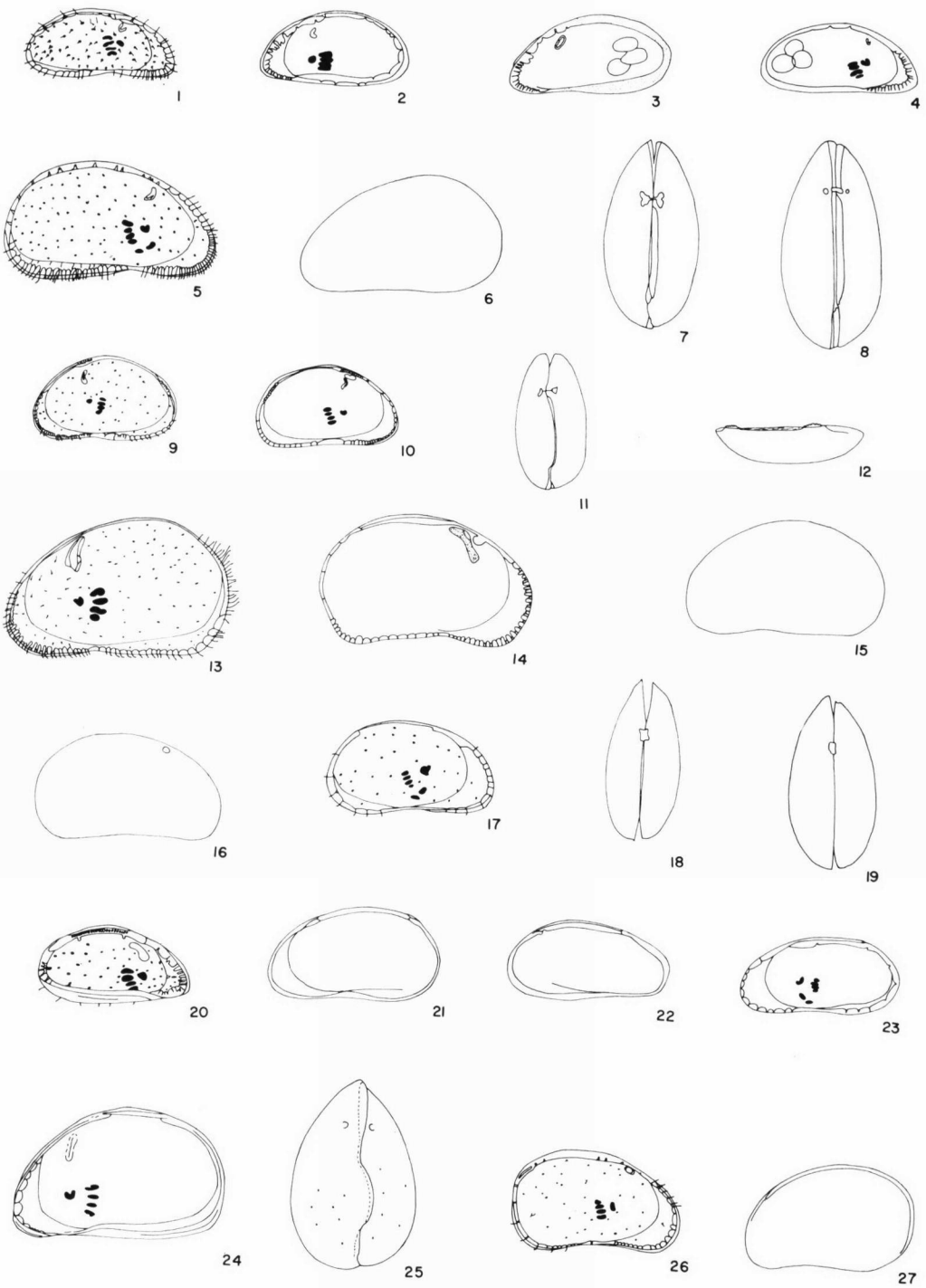

FIG. 12. (*For explanation see facing page.*)

"The setae of the basal segments of the thoracic legs follow the formula: 2 2 1 / 2 1 1 / 1 1 1.

"P1—Setae of the anterior margin originate directly one after another. Distal-dorsal setae of II longer than III. The claw is bent at a right angle at the tip. All setae are finely annulated.

"P2—The setae of the anterior margin of the protopodite originate separately. The proximal is smaller than the distal. Distal-dorsal of II is longer than III. It is strong. The claw is shaped like P1.

"P3—Distal-dorsal seta of II is thin, but longer than III. The terminal claw is only slightly curved at the end, otherwise almost straight.

"The posterior end of the female is bristled, as well as stretched in a long terminal point. The furca bristle is smooth. Only one was found.

"The copulatory organ of the male has two asymmetrical halves. The basal part of the left half is pointed, the right one obtusely angled. The outer coverings of both halves are rounded and voluminous, their median chitinous ridge mechanism shows complicated structures.

"Since both basal parts of the hemipenes are not on the same level with the outer covering, the outline of the outer covering or basal parts can change in the glycerine preparation (depending on the position of the organ). Make your observation carefully. I refer to fig. 123-126.

Measurements:

	female	male
length	0.37-0.45 mm	0.28-0.39 mm
height	0.18-0.20 mm	R=0.19-0.20 mm
		L=0.15-0.17 mm
width	0.24-0.26 mm	0.19-0.20 mm

"These measurements include all of the populations found in Chile. The largest specimens came from El Tabo. The remaining specimens were considerably smaller. Since all sizes were present, but no substantial boundaries were shown, I called the especially large specimens only as *var. major*.

"Locality: These species were found at the following stations: Taltal, Tocopilla, Caldera, Dichato, El Tabo, Rio El Ganso in Seno Otway in Magellanes and other places in these fjords (the latter reported by Cecalovic), also in Fuerte Bulnes, Rio de Los Ciervos and Rio San Juan. The samples from Rio de los Ciervos were also collected by Cecalovic.

"Comments: The species belongs to a species group which shows considerable uniformity among each other. I went into the geographic distribution of this species group in the general part (p. 50). The strong uniformity is very striking in the structure of the copulatory organs and also of the shell structure and the structure of the appendages. Individually the species differ through the following characteristics of the related species.

"*X. arcturi* Triebel (Galapagos islands) 1954:

"Outline of the penis, anterior end in *chilensis* without tooth, upper muscle scar without dorsal excavation. Teeth of the hinge are longer in *chilensis* than in *arcturi;* sexual dimorphism stronger. Relative length of the joints vary from A I. The appendage to the maxilla is missing in *arcturi*. Anterior margin of P III with only one seta, distal-dorsal of II weaker.

"*X. meridionalis* G. W. Müller 1908.

"Larger and higher than *chilensis* n. sp. Penis structure similar, closely related.

FIG. 12. Species of *Xestoleberis (1-16,20,24-27)* and *Semixestoleberis (17-19, 21-23)* from southern oceans (all figures ×50).

1-4. Xestoleberis chilensis Hartmann, 1962.——*1.* Right valve, male, Hartmann, 1962, p. 220, fig. 118.——*2.* Left valve, male, Hartmann, 1962, p. 220, fig. 119. *3.* Left valve, female, Hartmann, 1962, p. 220, fig. 122.——*4.* Right valve, female, Hartmann, 1962, p. 220, fig. 121.

5-8. Xestoleberis dichatoensis Hartmann, 1962.——*5.* Right valve, female, Hartmann, 1962, p. 225, fig. 137. *6.* Left valve, female, Hartmann, 1962, p. 225, fig. 138.——*7.* Dorsal view, male, Hartmann, 1962, p. 225, fig. 144.——*8.* Dorsal view, female, Hartmann, 1962, p. 225, fig. 143.

9-12. Xestoleberis simplex Hartmann, 1962.——*9.* Left valve, female, Hartmann, 1962, p. 223, fig. 131.——*10.* Right valve, female, Hartmann, 1962, p. 223, fig. 132.——*11.* Dorsal view, Hartmann, 1962, p. 223, fig. 133.——*12.* Hartmann, 1962, p. 223, fig. 134.

13-16. Xestoleberis ventribullata Hartmann, 1962.——*13.* Right valve, female, Hartmann, 1962, p. 228, fig. 151.——*14.* Left valve, female, Hartmann, 1962, p. 228, fig. 152.——*15.* Left valve, male, Hartmann, 1962, p. 228, fig. 157.——*16.* Right valve, male, Hartmann, 1962, p. 228, fig. 158.

17-19, 21-23. Semixestoleberis debueni Hartmann, 1962. *17.* Right valve, female, Hartmann, 1962, p. 232, fig. 160.——*18.* Dorsal view, male, Hartmann, 1962, p. 232, fig. 162.——*19.* Dorsal view, female, Hartmann, 1962, p. 232, fig. 163.——*21.* Left valve, female, Hartmann, 1962, p. 232, fig. 161.——*22.* Right valve, male, Hartmann, 1962, p. 232, fig. 166.——*23.* Left valve, male, Hartmann, 1962, p. 232, fig. 165.

20. Xestoleberis briggsi McKenzie, 1967. Left valve, McKenzie, 1967, p. 76, fig. 4N.

24,25. Xestoleberis, sp. Benson, 1964.——*24.* Female, Benson, 1964, p. 13, text-fig. 6-2.——*25.* Dorsal view, female, Benson, 1964, p. 13, text-fig. 6-1.

26,27. Xestoleberis chipanae Hartmann, 1965.——*26.* Right valve, female, Hartmann, 1965, p. 357, fig. 90.——*27.* Left valve, female, Hartmann, 1965, p. 357, fig. 91.

"*X. humilis* Klie 1940.

"Distinctively smaller (0.56; 0.45 max. mm) than *humilis;* dorsal margin of the male varies from the female. Anterior end of the carapace of the female not as pointed as in *chilensis*. Top of the copulatory organ more pointed.

"De Vos (1957) figured *X. humilis* Klie (1940) from Roscoff. It is extremely unlikely that these are the same species since even the sketch shows considerable differences. There are within the genus *Xestoleberis* a number of species groups with very similar penes which are not illustrated very accurately. Identification of species within the genus *Xestoleberis* based solely on the structure of the penis is very difficult. In other genera this characteristic is absolutely reliable.

"*X. rubrimaris* Hartmann (in press):

"Dorsal margin of the female less bent than in *chilensis* n. sp. Shell of the female in *rubrimaris* not as convex as in the male. Toothplate of *rubrimaris* is longer than in *chilensis* n. sp. The anterior muscle scar is round in *chilensis,* sometimes heart-shaped with a enclosed pore canal. In *rubrimaris* this has a rounded anterior extension. Outline of the penis varies, in *rubrimaris* is similar to that of *arcturi.*

"Material: 20 specimens from Dichato, 3 specimens from the north of Chile, from El Tabo a population with a lot of specimens, from the south 6 specimens."

XESTOLEBERIS DICHATOENSIS Hartmann

Figure 12,*5-8*

Xestoleberis dichatoensis Hartmann, 1962, p. 224-227.

Hartmann (1962) described this species as follows (transl.):

"Name: For the type locality of that species, Dichato near Concepcion.

"Holotype: Zoologisches Museum Hamburg, valves in slides, body in glycerine.

"Type locality: Dichato near Concepcion.

"Description of the species: Female: highest point of the carapace is well behind the middle. From there on the dorsal margin falls steeply to the posterior margin, more evenly towards the anterior margin. The transition to both margins however is imperceptible. The posterior margin falls almost vertically, reaches its widest curvature below half of its height, from where it merges into the strongly bent ventral margin. The posterior margin is slightly rounded in the lower part. The widest curvature is in the lower half and is lower than in the posterior margin. The ventral margin is clearly indented in the mouth region. The finely striped selvage of the valve margin is clearly visible in the region of the anterior margin, the ventral margin, and in the lower posterior margin. Inner margin and line of concrescence merge slightly in the mouth region, otherwise they are separated.

"The marginal zone is wide. At the anterior margin there are densely packed groups of branched marginal canals. In the region of the ventral and posterior margins fewer canals are developed; they are, however, larger but do not branch as often.

"The surface of the shell is smooth. Normal pore canals are numerous. Short setae originate out of all canals. The kidney-shaped eyespot remains small.

"The muscle-scar-pattern shows a group of four impressions in an inclined line. In front of those is a single U-shaped one at the height of the 2nd scar of the row. Inclined below there are two oblong, weakly bent antennal scars over the mouth region.

"The hinge of the right valve has 12 teeth in the front tooth plate and seven in the back plate. The groove is deep. The left valve is a little higher in the back than the right one. The valves of the males are a little thinner than those of the females. The posterior margin of the left valve of the male descends more steeply than that of the female.

"Viewed from the top the carapace of the female seems to be more elongated than that of the male. The widest point is behind the middle in the female, in the male it is approximately median. The posterior ends are rounded in both sexes, the anterior ends are dully pointed.

"Appendages: The four podomeres of the 1st antenna have the ratio 9:9:12:5. The ventral distal seta of II extends to III. The claws are as follows: III—one, IV—two, V—two, VI—four seta and one sensory seta.

"The 2nd antenna has two terminal claws, the smaller of which is more strongly bent. The spinning seta does not reach the end of the terminal claws. The setal groups of the next to last podomeres are proximal; dorsally there are two setae, ventrally one claw exists. There is one distal-ventral claw on this segment.

"The mandibular palp is thin, with four podomeres. The branchial plates have two long fused branches at the base. The fused basal section is a little shorter than the divided distal portion. On the outside of the masticatory ridge are four large divided teeth, on the inside spines and setae.

"The palp and masticatory ridges of the maxille are thin. The palp is armed distally with a strong claw and several setae.

"The setal formula of the thoracic appendages reads: 1 2 1 / 1 1 1 / 1 1 1.

"The distal-dorsal setae of the 2nd podomere are shorter than the following podomeres. The endclaws of P1 and P2 are strong, that of P3 is weakly bent.

"The abdomen of the female has a thickened point which has one spine. The end of the body is also spined at the top and the bottom. The furca has one strong and one weak claw.

"The copulatory organ of the male has a bent hook-like extension which however, is wider on the right basal part than the left. The copulatory tube is rolled spirally, originates in the middle part of the organ between several chitinous rods. Outside on the boundary between the outer covering and basal part is a bent lateral process. You will find details in fig. 150.

"The measurement of the species are:

	male	female
length	0.53-0.56 mm	0.56-0.61 mm
height	0.29-0.31 mm	0.31-0.35 mm
width	0.29-0.30 mm	0.28-0.29 mm

"Locality: This species was found between Puerto Montt and Tocopilla at proper places among eulittoral algae.

"Comments: This species is closest to the one I described from Salvador (Hartmann 1959), *Xestoleberis eulitoralis*. Also the form of the copulatory organ shows some similarity. The lateral hook of the new species is missing. In addition the Salvador species are smaller.

"Material: I had a large number of specimens of this species.

"Contribution to the larval development: In addition to many adult examples I was also able to examine the larva of different stages, especially for their hinge ontogenies. Accordingly, after calcification of the carapace a segmented merodont hinge develops as early as the nauplius. The number of teeth is very small. No exact number could be established.

"In stage 4 of the development the plate of the hinge was already considerably larger in the front and in the back. Those with terminal crenulations on the left valve had especially developed corresponding teeth. Only a single pair of legs was formed; the furca appear as setae.

"The 3rd stage was not distinguishable from the 4th with regard to the hinge structure, the inner crenulations were also well developed. The furca was still foot-like. Also antennae, mandibles, and maxille were developed.

"In stage 5 the hinge structure of the adult type was already reached, but there were only six teeth present on the anterior hinge plate, which the adult specimen has 12-13 teeth. Two pairs of legs are developed. In the 7th stage the hinge structure of the adult specimen is reached. The teeth of the hinge plates are still not as sharply outlined as those of the adults.

"In the genus *Cyprideis* (see Hartmann, 1961) we can similarly observe the slow development of the hinge to the adult type. Above all the number and the size of the teeth of the hinge plates are modified."

XESTOLEBERIS SIMPLEX Hartmann

Figure 12,9-12

Xestoleberis simplex Hartmann, 1962, p. 222-224.

In his original description of this species, Hartmann (1962) wrote (transl.):

"Name: *simplex*—simple. Named because of the lack of characteristic shape of the shell.

"Holotype: Zoologisches Museum Hamburg, valves in slides, body in glycerine.

"Type locality: Dichato near Concepcion.

"Description of the species: I only had female specimens of these species. The highest point of the carapace is slightly behind half of the length.

"The dorsal margin is strongly rounded, blends evenly into anterior and posterior margin. The posterior end of the valves is widely rounded, slightly more so than the anterior margin. The greatest curvature of both margins is below half of the height. The ventral margin is only slightly indented in the mouth region, the selvage invisible only at the anterior margin. Inner margin and line of concrescence are separate, they converge slightly only in the region of the ventral margin. The marginal zone is narrow. There are many marginal pore canals especially at the anterior margin. They are undivided. The surface of the carapace is smooth. The valves are covered with simple pores. The posterior eye spot is simple, without punctae in marginal zone. It is small.

"There are four muscle scars in vertical sequence, a rounded fifth one lies in front which surrounds dorsally a pore canal. The setae from the pore canals are short.

"Viewed from the top the widest portion of the carapace is about in the middle. The anterior end is pointed obtusely, the posterior end rounded. The hinge has rather long terminal tooth plates in the right valve with a groove between them. The anterior toothplate has eleven teeth in the type specimen, the posterior one has nine teeth. The hinge of the left valve is complementary in structure.

"Appendages: The podomeres of the 1st antenna are in a length ratio 6:6:7:4. The terminal podomere is slender being smaller distally than at the base. The setae are II—distal-ventral seta as far as the middle of III; III—one distal-dorsal claw; IV—one dorsal, one ventral; V—two dorsal, one ventral; VI—three setae, one sensory seta.

"The two terminal claws of the 2nd antenna vary in length; the small one is densely spined, the larger one is smooth. The spinning seta reaches almost to the end of the terminal claws. The distal ventral claw of II extends past the middle of III. The setal groups of the next to last podomere are slightly proximal to the median. There are two dorsal setae, one ventral sensory seta and one simple ventral seta.

"On the next to last podomere a claw originates distal-ventrally. The masticatory ridge of the mandible has very long teeth. From the outside to the inside there are: two large thin teeth, one spine, three divided teeth, spines.

"The palp is thin and has four podomeres. The terminal podomere segment has a very strong claw and two setae. The branchial plate holds two long agglutinated setae.

"On the maxilla the palp and masticatory processes are thin and small. The terminal podomere of the palp is four times as long as its basal width. Distally the palp has a claw and seta.

"The setal formula of the basal segments of the thoracic legs reads: 1 2 1 / 1 1 1 / 1 1 1. All setae are annulated and setose, especially on the posterior marginal seta of the protopodites. Distal dorsal setae of II at P1 as long as III, at P2 and 3 longer than III. They are strong.

Terminal claws of all legs are similarly built, distally bent, and strong.

"The abdomen of the female ends in a short spine. The furca bears two short spine-like appendages.

"Measurements:

length	0.36-0.39 mm
height	0.20-0.23 mm
width	0.19-0.20 mm (shell slightly open)

"Locality: The species was found in Dichato, Caldera, and Tocopilla.

"Comments: The small size and the form of the shell characterize the species. Because of this it is easy to differentiate from other species even with their simple outlines. Unfortunately there were no males present so that no comparisons could be discussed.

"Material: From Dichato I had diverse individuals (exact number not noted, appr. 15-20), from Caldera and Tocopilla only empty valves of the species."

XESTOLEBERIS VENTRIBULLATA Hartmann

Figure 12,*13-16*

Xestoleberis ventribullata Hartmann, 1962, p. 227-230.

This distinctively shaped species was first described by Hartmann (1962), who described it as follows (transl.):

"Name: *ventribullata*—because of the ventral expansion of the carapace.

"Holotype: Zoologisches Museum Hamburg, valves in slides, body in glycerine.

"Type locality: Puerto Deseado in Argentinian Patagonia.

"Description of the species: The carapaces of the male and female show sexual dimorphism.

"The greatest height of the right valve of the female is behind the middle. From this point the dorsal margin falls in a steep curve to the posterior margin, less steeply to the anterior margin. The transition to the posterior margin is characterized by a strong curve. The posterior margin bends weakly at first and then curves more steeply. The broadest curvature of the posterior margin is therefore at the transition to the dorsal margin above the mid-line of the valve. The widest curvature of the anterior margin is below the mid-line. The anterior margin is less rounded and blends without indication of a corner or stronger rounding into the anterior dorsal margin. The ventral margin is indented in the mouth region. The posterior ventral corner (in front of the transition with the posterior margin) is somewhat bulged.

"The right valve shows this shape considerably more strongly than the left; the posterior margin lies above this swelling; the ventral margin is weakly concave in front of the swelling. The highest point of the right valve is somewhat farther in front than the left; the postero-dorsal is completely suppressed and the anterior margin more widely rounded than in the left valve.

"The marginal conditions are the same in both shells. Inner margin and line of concrescence come together only in the mouth region. The fused zone is wider at the anterior margin and posterior margin; in front densely branched pore canals are formed. Pore canals are not as dense in the region of the ventral and posterior margin as at the anterior margin; in addition the branching is much rarer. The pore canals of the carapace surface remain relatively small and dense and contain setae as those of the margin. In addition to these setae, the valve margin has a series of other freely originating setae (especially in the region of the posterior margin). The kidney-shaped spot is large, thin and densely punctate. Otherwise the shell surface is smooth. The muscle-scar-pattern has four impressions in vertical sequence with a fifth U-shaped one in front.

"As seen from the top the widest point is behind the middle; the carapace is egg-shaped. The posterior end is broad, the anterior end slightly rounded.

"The hinge margin has 14 teeth in the anterior terminal element of the right valve (besides three crenulations in the groove); the posterior element has eight and lacks the three crenulations. Otherwise the same as in the genus.

"The carapace of the male differs strongly from that of the female.

"Their form is altogether thinner; the highest point of the carapace is displaced more towards the front. In addition the posterior end of the carapace seems more broadly rounded than in the female. The left valve of the male has a distinctive outward curvature slightly past the middle of the ventral margin. The bulging outward curvature of the posterior ventral corner is only indicated in the left valve. Otherwise the sexes are the same.

"From Magallanes I have the last larval stage of this species. The valves were somewhat more bulged ventrally than those of the female, the hinge has fewer teeth (as mentioned in the description of *dichatoenis*). Otherwise the outline and the appendages not much different.

"Appendages: The podomeres of the 1st antenna are as 12:6:8:6. Podomere II has dorsal-ventral setal tufts. The ventral-distal seta from II reaches to the edge of IV or slightly past that. III—one distal-dorsal claw, IV—also two and a ventral seta, V—two and a ventral seta. The end segment has one strong claw, one sensory seta, and two thin setae.

"The spinning seta of the 2nd antenna does not reach the end of the terminal claws. Dorsal-ventral seta from II reaches to III. The seta-bearing extension from the next to last podomere has two dorsal setae and two ventral claws. They are medial. There is one strong distal-ventral claw. The terminal claws (two) are the same in length and very strongly developed; one of them originates inside of the terminal podomere.

"The masticatory ridge of the mandible from outside to the inside bears: one undivided tooth, one strengthened seta, 5 undivided teeth, hooks, and seta. The branchial plate has two separated setae. The palp has four podomeres.

"The masticatory processes and the palp of the maxilla are thin. The 1st masticatory process has one setal tuft which originates inside on a special extension. The terminal podomere of the palp is four times as long as wide. Distally it bears two claws and several setae. The setae originating at the distal-dorsal edge of the protopodite of the palp are feathered.

"The setal formula of the basal segments of the thoracic legs reads: 2 2 1 / 2 1 1 / 2 1 1. The distal-dorsal setae from II are longer than those of III. Claws from P1 and P2 are bent in hooklike fashion; those of P3 long and slightly bent. Dorsal and ventral setae of the protopodites are haired, the setae of the knee are smooth.

"The posterior portion of the female body ends with a haired seta in addition to which there is a dorsal and a ventral smooth seta. The furca has a very strong, densely spined seta and one smaller haired one. The upper strong seta of the furca is narrowed proximally outside in front of the furca, and below the end of the body there is a leveled genital area which has chitinous tubes and musculature.

"The appendages of the male are largely the same as those of the female. The smaller terminal claw has a distinctive, long setal ridge. The strongly recurved top of the claw forms the first tooth of the bristle comb.

"The copulatory organ has a spoon-shaped rounded basal part on the right, and left a weak sickle-shaped attachment. The copulatory canal is spirally curved. Otherwise with the characteristics of the genus. The copulatory organ shows that the species belongs to a widespread species group, which has spoon- and sickle-shaped attachments.

"Measurements:

	male	female
length	0.56-0.58 mm	0.61-0.65 mm
width	0.36-0.38 mm	0.36-0.38 mm
height	0.30-0.33 mm	0.36-0.42 mm

"I had one *'forma minor'* from Puerto Natales, where the females measured 0.56-0.59 mm, and the male 0.52-0.53 mm. I have already mentioned this *'forma minor'* in the discussion of the decrease in size of marine animals in brackish water. The locality near Natales was strongly brackish, fresh, containing only a small quantity of salt. In contrast to Magallanes and Deseado there were more males than females in Natales.

"Locality: The species was found near Deseado in Argentinian patagonia, in Puerto Natales, in Seno Ultima Esperanca, in Tierra del Fuego, Estancia Cameron, and in Seno Otway (last two found by Cecalovic).

"Comments: The species belongs to a very common species group (as suggested by characteristics of the shell and the penis, marginal zone of the shell, basal part of the penis) which share the same characteristics. In future investigations one should try to utilize these characteristics to separate the genus *Xestoleberis* into different subgenera or especially genera. Without doubt the genus *Xestoleberis* presents a natural, related group.

"Material: I had a large number of individuals of this species."

XESTOLEBERIS sp. Benson

Figure 12,*24-25*

Xestoleberis sp. Benson, 1964, p. 12-13, text-fig. 6, pl. 1, fig. 3, 6, 7; pl. 4, fig. 8.

In his description of this species, Benson (1964) wrote:

"Description—Carapace small, fragile, tumid; flattened to slightly depressed on venter. Reniform in lateral view; dorsal margin broadly rounded; ventral margin straight to slightly convex; anterior margin narowly and obliquely rounded, much smaller than the posterior end; the two broad arcs of the ventral and posterior margins converge to form a slight angle at the posteroventer; greatest height median. Ovate in dorsal view, greatest width just posterior of median. Subtriangular in end view with inflated sides and depressed venter. Left valve slightly larger than right, with overlap along the dorsal margin, particularly at the anterodorsum; contact around the remainder of the free margin is even.

"Surface smooth, becoming mottled with many centers of rosette recalcification, mostly coincident with location of normal-pore canals. This mottling appears to be the result of replacement of the original clear material with an opaque substance of recrystallization, producing a slightly splotchy appearance. The normal-pore canals are simple, moderately densely spaced; best seen on the interior of the valves. Valves milky except for marginal areas and eye spots.

"Hinge hemimerodont. Marginal area broad in the anterior, narrower in the posterior where it is broadest along the posteroventer. The vestibule is well developed. The radial-pore canals are funnel-shaped, forming a scalloped line of concrescence; there are about 10 in the anterior, obscure in the posterior. The selvage forms the hinge teeth at the dorsum, continues around the marginal area, is incurved at the ventral sinuation, and separated from the margin in the anteroventral region by the development of a small flange. The closure of the venter is simple. In ventral view, the radial-pore canals appear short and simple, not complicated as in many other species of *Xestoleberis*. Muscle-scar pattern consists of four adductor scars in a ventral row, a "V"-shaped antennal scar, mandibular scars not visible. The eye scar is elongate, sausage-shaped. Dimorphism between male and female pronounced with the female being longer, larger in the posterior to allow for the carrying of the young.

"Dimensions—Length 0.56-0.64 mm.; width 0.31-0.40 mm., height 0.28-0.41 mm.

"Material—More than 120 specimens were examined.

"Remarks—This species could not be indentified with any of the others previously described from Antarctica on the basis of shape or configuration of the marginal areas or muscle-scar patterns. It is my judgment that many of

the species of *Xestoleberis,* particularly those known from the southern hemisphere, are poorly founded on minor differences in carapace morphology. Rather than to contribute another such species I have elected just to call attention to the existence of this form and await further information on its internal anatomy before trying to compare it formally with other xestoleberid species.

"In examining and opening many valves, while looking for soft parts, I found a female with 13 young inside her sealed carapace. As can be seen in the photograph . . . the space required for the young is nearly 3/4 of the internal volume of the mother. There was no trace of the soft parts of the female and it might be surmised that she was eaten by her young after entombment, before their own demise. It was also interesting to notice how similar in shape the valves were to much more mature instars. Because of their size and well-formed appearance, I wondered whether these forms were not more than the first instar in their development. Unfortunately, there was not sufficient representation of intervening instars to estimate statistically their growth stage.

"Occurrence—This form was found in McMurdo Sound at Station 'P' in 57 meters of water. Other species of *Xestoleberis* have been found to be common in the Antarctic by Müller (1908) and Chapman (1916, 1919). Brady (1907) even found a specimen of *X. reniformis* in a plankton tow collected by the British National Antarctic Expedition of 1901-04 along with flocculent diatomaceous material."

XESTOLEBERIS CHIPANAE Hartmann

Figure 12,*26,27*

Xestoleberis chipanae Hartmann, 1965, p. 356, fig. 9-94.

Hartmann (1965) based his original description of this species on a single female specimen. The species has not been found subsequently. Hartmann wrote (transl.):

"Name: After the research ship of the Mar Chile I expedition, the corvette *Chipana* of the Chilean Navy.

"Holotype: Zoologisches Museum Hamburg K 27 953 (carapace), K 28 157 (soft parts).

"Type locality: Station 68, 73° 38,5′ W, 37° 08,7′ S. Off Punta Lavapie, 58 meters water depth.

"Description: Carapace of only a single female found: the carapace shows an especially bulging posterior end. The greatest height of the valves is therefore behind the middle. The anterior end is only slightly rounded, widest curvature below half of the height, posterior end rather widely rounded with widest curvature at the posterior dorsal corner of the valve. The dorsal margin is only weakly curved. It is defined only towards the posterior margin by a dull corner. The posterior margin falls very steeply and is only slightly bent forwards. The transition into the ventral margin occurs at a sharp bend. The ventral margin is nearly straight, is median, but distinctly concave. The bend of the anterior margin is almost even. The valve margin is smooth all over. The selvage is visible at the lower posterior margin, ventral margin, and anterior margin, with its cutaneous part as seen from the side, the only exception being the median ventral indentation. The marginal zone remains relatively narrow. At the anterior and posterior margin, simple, narrow pore canals are formed which are sparse at the posterior margin. A wide marginal zone is formed medially only at the ventral margin. Here we find also some wider and branched pore canals. These conditions are however, visible only when seen from below (see fig. 92). Also it is only here that the inner margin merges with the line of concrescence. (At the posterior margin of the existing specimen the inner margin could not be seen.) The surface of the shell is smooth. No kidney-shaped spot was formed at the eye!!! There are four muscle scars formed in vertical sequence with a fifth in front of the upper one. The normal pore canals are large, not too numerous; however they are distributed over the surface of the entire carapace. Left and right valves are very similar. The right valve is shorter than the left one, otherwise they agree with each other. As seen from the top the greatest width is distinctly behind the middle. Because of this the carapace looks somewhat wedge-shaped. The anterior end is dully pointed, the posterior end rounded. On the left hinge a strongly projecting ridge is formed, which is crenulated at the end several times. At the front and back of the ridge are crenulated depressions; in front there are eight sockets and in the back there are six. The opposite valve is complementary, but the tooth plates are not visible from this viewpoint; they are placed much more within the valve under the dorsal margin of the valve.

"Appendages: The four podomeres of the antennule are in the length ratio of 8:6:6:5. The distal-ventral seta of the 2nd podomere is wide and small at the base and does not reach the end of the segment. Dorsally the following bristles are present: segment III—one claw, IV—one claw, V—two long claws, VI— three or four (?) claws and bristles. The terminal podomere of the antenna has two long, small claws, which are only weakly bent. The spinning seta does not reach the end of the terminal claws. The bristle groups of the next to last podomere are proximal to the median. There are two dorsal and one ventral claws. Distal-ventrally the same segment has one claw. The branchial plates of the mandible have two large setose branches which are separated from each other for the entire length. The palp is small; the terminal segment is square with two strongly bent claws. The masticatory part has five teeth. The first one is undivided, the others are at least weakly cleft distally. Spines are behind the teeth. Palp and masticatory processes of the maxillae are thin. The terminal podomere of the palp is very small, about four times as long as the width at the base. It ends in one thick bristle. The maxilla and both thoracic legs have the following setae on the basal segments: 2 2 1 / 2 1 1 / 2 1 1. At the maxilla the knee and posterior marginal setae are very long. The distal-

dorsal seta of the 2nd segment is longer than that of the 3rd segment. Claw thin and bent distally. At PI (2nd walking leg) the proximal anterior marginal seta is very small. The dorsal-distal seta of the 2nd segment is also longer than that of the 3rd segment. The claw is thin, only weakly bent and distally not bent upwards. PII is built like PI. The abdomen ends in a lobe-like continuation which is curved upwards. The furca in front of it has two bristles.

"Measurements: length 0.48 mm, height 0.30 mm, width 0.12 mm (single valve).

"Material and place where found: only one female specimen was found at station 68.

"Ecology: The substrate at station 68 consisted of fine sand and rocks and was covered with dead algae. Assay showed low oxygen content (0.10 ml/1), which could occur only exceptionally in those shallow waters. A part of the fauna there had therefore died out.

"Comments: *Xestoleberis* species were found so far predominantly from the eulittoral and higher sublittoral. Most are phytal inhabitants, but they live also on other substrates. This species is the first known from the sublittoral of the South American west coast. Because of the absence of an eyespot, it is relatively easy to distinguish. Also the strongly curved posterior end is not very common in these species. Lastly the small line of concrescence and the few marginal canals show good possibilities for differentiation. In all these characteristics the existing example is different from the eulittoral species (which were written about in the first part of the report of the expedition—Hartmann-Schröder and Hartmann, 1962). For this reason the description of this species on the basis of only a female specimen was risky. In the paleontological literature the definition of *Xestoleberis* species is often based solely on the habitat, not on the shell structure. Because of this each discovery should be checked before zoogeographical, ecological, or even phylogenetic conclusions are made from the type locality and stratum."

XESTOLEBERIS BRIGGSI McKenzie

Figure 12,*20*

Xestoleberis briggsi McKenzie, 1967, p. 97-99, fig. 4n.

In his description of this species, McKenzie (1967) wrote:

"DERIVATION OF NAME: For W. Briggs, Jr., presently working on Neogene ostracodes of New Zealand.

"MATERIAL: Seaholme, 4 individuals; Ricketts Point, 2 individuals.

"DIAGNOSIS: A species of *Xestoleberis* characterized by small-medium size; narrowly ovate shape in lateral view; smooth surface; dorsal margin arched; ventral margin nearly straight; anterior narrowly rounded; posterior broadly rounded; eye scar present; greatest height approximately medial, about half the length. In dorsal view subovate; anterior tapered; posterior broadly rounded; greatest breadth posteromedial, little more than the height. Internally: lamellae broadest anteriorly; anterior vestibule prominent; radial pore canals simple, usually straight, most numerous anteroventrally; normal pore canals scattered, sieve-like, hinge merodont, LV with crenulate terminal sockets and an intervening crenulate bar, RV complementary; muscle scars large comprising 4 adductors, and a heart-shaped antennal scar, others not observed. Anatomically not known. Sex dimorphism present, females broader than males.

"DIMENSIONS: Holotype, adult, Nat. Mus. Vic. Reg. No. J106: length 0.43 mm, height 0.21 mm, breadth 0.24 mm.

"TYPE LOCALITY: Tide pool, Seaholme.

"REMARKS: This species is smaller than, and generally dissimilar to the previous species, and also to *X. granulosa* Brady, 1880, which was taken off East Moncoeur Island, Bass Strait, and in Port Jackson. Some Noumea material, referred by Brady to *X. granulosa,* also differs from this species in shape and internal features (Noumea types examined).

"DISTRIBUTION: Southeastern Australia."

Genus SEMIXESTOLEBERIS Hartmann, 1962

SEMIXESTOLEBERIS DEBUENI Hartmann

Figure 12,*17-19, 21-23*

Semixestoleberis debueni Hartmann, 1962, p. 231-234.

Although Hartmann (1962) included this species in *Semixestoleberis* from the first, we have mentioned it here for the sake of completeness. We do not mean to imply that we think it should be placed in genus *Xestoleberis.* Hartmann (1962) wrote (transl.):

"Name: dedicated to Fernando de Buen.

"Holotype: Zoologisches Museum Hamburg, valves in slides, body in glycerine.

"Type locality: algae-covered stony river coast of the Rio Deseado near Puerto Deseado in Argentinian Patagonia.

"The valves of the female and the male show strong sexual dimorphism.

"The right valve of the female is highest behind the midpoint of the valve. The dorsal margin is evenly curved falling steeply toward the posterior margin and less steeply to the anterior margin. The posterior end is broadly rounded with largest protrusion directly below the median line, the anterior margin is less rounded with the greatest curvature in the lower third of the shell height. The transition of the anterior and posterior margins with the dorsal and ventral margins are not especially marked. The ventral margin is only very weakly incurved medially. Viewed from the side, a selvage is visible only in the region of the anterior and antero-ventral margin. The fused zone is narrower than in most of the species of *Xestoleberis,* becoming widest in the median ventral margin where it meets the

inner margin. Otherwise the inner margin and line of concrescence are separated. Marginal pore canals are only sparsely developed. They are simple. The normal pore canals are perforated in sieve-like fashion, but no short setae originate out of them as in the marginal canals. The kidney shaped spot of the *Xestoleberis* species is missing.

"The muscle-scar-pattern shows four impressions in vertical sequence; in front of it there is a large clover leaf-like impression at the height of the upper impression of the vertical sequence. Below those are two antennal scars. The left valve varies in outline somewhat from the right valve. The greatest height of the valve is very slightly farther forward than in the right valve. The valves of the males differ considerably. We find a flat, stretched form with greatest height only little behind the middle that is not as high and bulged as in the females' valves. Left and right valves differ imperceptibly from one another. As seen from the top, the widest point in both sexes is approximately at the median. The female is narrower than the male. The posterior end is rounded and the anterior end obtusely pointed. Otherwise no variation.

"The hinge margin has two terminal hinge elements on the right valve which are not crenulated. Between the two there is a groove. The structure of the left hinge margin is complementary. The hinge is of a lophodont type which should precede the merodont type of the *Xestoleberis* species.

"The colors of the shell were dark brown.

"Appendages of the female: terminal portion of the antenna is bent upwards as in *Cytheroma,* the podomeres are short and strong, claws are well developed. The podomeres are related as: 10:6:5:5.

"The distal-ventral seta of II is short, at III there is a thin distal-dorsal seta, at IV there is one strong dorsal claw, and one weaker ventral claw; V has two claws; the terminal podomere has two claws, one seta and one sensory seta. The 2nd antenna has two strong smooth terminal claws. The terminal podomere is longer than wide. The next to last podomere has one strong claw and one smooth claw ventral-distally. The seta-carrying portions of this podomere are in the distal half. The ventral one has two setae, the dorsal one has one. The 2nd podomere of the antenna has one smooth distal-ventral seta which overhangs the seta-carrying portion. The spinning seta is strongly developed, but does not reach the end of the terminal claws.

"The branchial plate of the mandible has two long branches. The palp has four podomeres. One divided tooth is on the masticatory ridge, one stronger seta follows towards the inside, then one divided tooth, seta, and three undivided teeth decreasing in size.

"Maxillary palp and masticatory processes are strong. The 1st masticatory process has a brush-like seta inside. The terminal podomere of the palp is small; on the protrusion in front of it there are hairy setae at the basal segment of the palp. One branch of the branchial plate is formed abnormally.

"The setal formula of the basal segments of the thoracic legs reads: 1 2 1 / 1 1 1 / 1 1 1.

"P 1: the knee seta is strong, smooth. Anterior margin seta and posterior margin setae are hairy. The distal dorsal seta of the 2nd podomere is strong.

"P2 and P3: As P1, but the knee setae are weaker. The claws of all 3 leg pairs are short and strong but hardly bent. In some circumstances there can be two setae at the anterior margin. The real proof which was tested on the basis of a supposed broken place was unsuccessful. If bristles should exist they would be very small and hardly noticeable.

"The body of the female ends with the furca. This is right next to the extensive genital area and has one large hairy and one small annular seta.

"The appendages of the males vary in the structure of the 2nd antenna and the 2nd leg pair.

"The 2nd antenna is shorter and more solid than in the female. The spinning seta is somewhat weaker but the same in length. The ventral setal group at the next to last podomere has one strong, one weak, and one small sensory seta and dorsally two different setae. Distal-ventrally this podomere bears one large and one small seta.

"The terminal podomere of the antenna is modified by the development of two completely abnormal end claws. The anterior end claw is gigantic and keeled medially, the smaller one is covered densely with spiney ridges. These claws probably are used in connection with copulation. The 2nd pair of legs of the male has one very long hairy dorsal marginal seta, one long hairy knee seta, one tiny short and one long hairy seta distal-dorsally at segment II, and one long annulated and hairy end seta. The long hairy seta at II greatly overlaps the end of the leg. The hairy end seta is longer than the distally cleft endopodite.

"The copulatory organ has one extensive basal covering, one sub-covering [*Nebenkapsel*] and one rounded, relatively small basal part. Inside this attachment is a hook which can be extended or retracted. The copulatory tube is short and strongly chitinized. See details in figure 172.

"The measurement of the species are:

	male	female
length	0.42-0.43 mm	0.42-0.46 mm
height	0.21-0.22 mm	0.23-0.26 mm
width	0.20-0.21 mm	0.25-0.27 mm

"Locality: This species was found only in the mouth of the Rio Deseado in Argentinian Patagonia in algal growth and brackish water.

"Comments: See discussion of the genus.

"Material: A population of this species was found in the sample of the Rio Deseado."

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