

Chitons (Mollusca: Polyplacophora) from the Seychelles with description of a new species

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Notes are given on nine chiton species, collected mainly during the 'Oceanic Reefs' Expedition to the Seychelles (1992-1993), with some biogeographical observations. *Ischnochiton goudi* (family Ischnochitonidae) is described as a new species.

Introduction

The 'Oceanic Reefs' Expedition to the Seychelles with R.V. "Tyro", part of the Netherlands Indian Ocean Programme 1992-1993, organized by the National Museum of Natural History, Leiden, procured 24 samples of Polyplacophora, belonging to nine species of which one is new to science. Most specimens were collected by Mr J. Goud of the Mollusca Department, either by dredging, by hand-sampling, or by Scuba-diving and snorkeling. Additional material was collected by Mr J.P. Buys by diving and snorkeling in Seychelles in 1989.

Material and observations

Leptochitonidae

Leptochiton (Parachiton) ronaldi Kaas & van Belle, 1985

Leptochiton (Parachiton) ronaldi Kaas & van Belle, 1985: 179, fig. 84, map 38.

Type: BMNH 1952.11.17.320 (as "*Lepidopleurus andamanicus*", non E.A. Smith, 1906).

Type locality: Andaman Islands, Dakshin-Andaman, Port Blair.

Material.— 'Oceanic Reefs' Expedition 1992-93. Sta. 678: Seychelles, NE Point of Mahé Island, 4°35'S 55°28'E, rocky bottom towards sandy beach, Scuba-diving, 10 m, 13.i.1993, 1 specimen.— 'Oceanic Reefs' Expedition. Sta. 721: Seychelles, N of Bird Island, 3°42'S 55°13'E, rectangular dredge, 45-55 m, 21.xii.1992, 1 specimen.— 'Oceanic Reefs' Expedition 1992-93. Sta. 765: Amirante Islands, NW of Poivre Island, 5°44'S 53°19'E, Van Veen grab, coarse calcareous sand, 38-40 m, 29.xii.1992, 1 specimen.

Ischnochitonidae

Ischnochiton (I.) goudi spec. nov. (figs 1-11)

Material.— 'Oceanic Reefs' Expedition 1992-93. Sta. 738: Seychelles, SE of Mahé, 4°45'S 55°33'E, 35-45 m, 24.xii.1992, 1 specimen, dry, holotype, RMNH 56933.— 'Oceanic Reefs' Expedition 1992-93. Sta.

717: Seychelles, Bird Island, off E coast; 3°43'S 55°13'E; edge of bank, scuba diving and snorkeling, 20/21.xii.1992, 1 specimen in alcohol, paratype 1, RMNH 9383.— 'Oceanic Reefs' Expedition 1992-93. Sta. 682: Seychelles, E-coast Mahé Island, Anse Mare Jupe, St. Anna; 4°36'.5N 55°30'E, rocky shore, seagrass, algae and coral reef, 15.i.1993, 1 specimen in alcohol paratype 2, RMNH 9384.— 'Oceanic Reefs' Expedition 1992-93. Sta. 604: Seychelles, Mahé, NE point of NE coast, 04°35'S 55°28'E, intertidal to 5 m., reef flat and slope with many corals, snorkeling, 8.xii.1992, 1 specimen, paratype 3, RMNH 9387.— 'Oceanic Reefs' Expedition 1992-93. Sta. 612: Seychelles, Mahé, E coast, Cap Maçons/ Anse de Forbans, 04°46'S 55°31'E, to 7 m, tidal reef flat with isolated granite rocks, shore collecting and snorkeling, 12.xii.1992, 1 specimen, paratype 4, RMNH 9388.

Description.— Animal small, elongate oval, holotype, slightly curled, c. 9 × 5 mm, paratype flat, 7.8 × 4.3 mm, rather elevated (dorsal elevation of holotype, c. 0.66), subcarinate, valves slightly beaked. Colour of tegmentum dull white in holotype and paratypes 2 and 3, white blotched with dark greyish green in paratype 1, white blotched with dark slate-grey and black in paratype 4.

Head valve semicircular, hind margin widely V-shaped, not notched at the top, sculptured with ten flat, radiating, finely concentrically grooved, pustulose ribs, the interstices narrow, rather deep, pitted. Intermediate valves transversely rectangular, valve II relatively long, the front margin neatly rounded, hind margin almost straight, jugal sinus rather wide, short, rounded, central area with c. 12 fairly narrow, short, longitudinal, pitted grooves on either side, not reaching the front margin, separating 11 flat, little elevated ribs, lateral areas moderately raised, bicostate, the ribs identical to those on the head valve, the other intermediate valves are relatively shorter. Tail valve decidedly smaller than head valve, the mucro a little posterior, not raised, antemucronal area sculptured like central areas, 8-9 short longitudinal ribs on either side of the jugal area, c. 4 on the postmucronal area, posterior slope convex in the more or less eroded holotype and in paratypes 1, 3 and 4, concave in paratype 2.

Articulamentum white, solid, slit formula 10-1-c 15, teeth smooth, sharp, inequidistant in end valves.

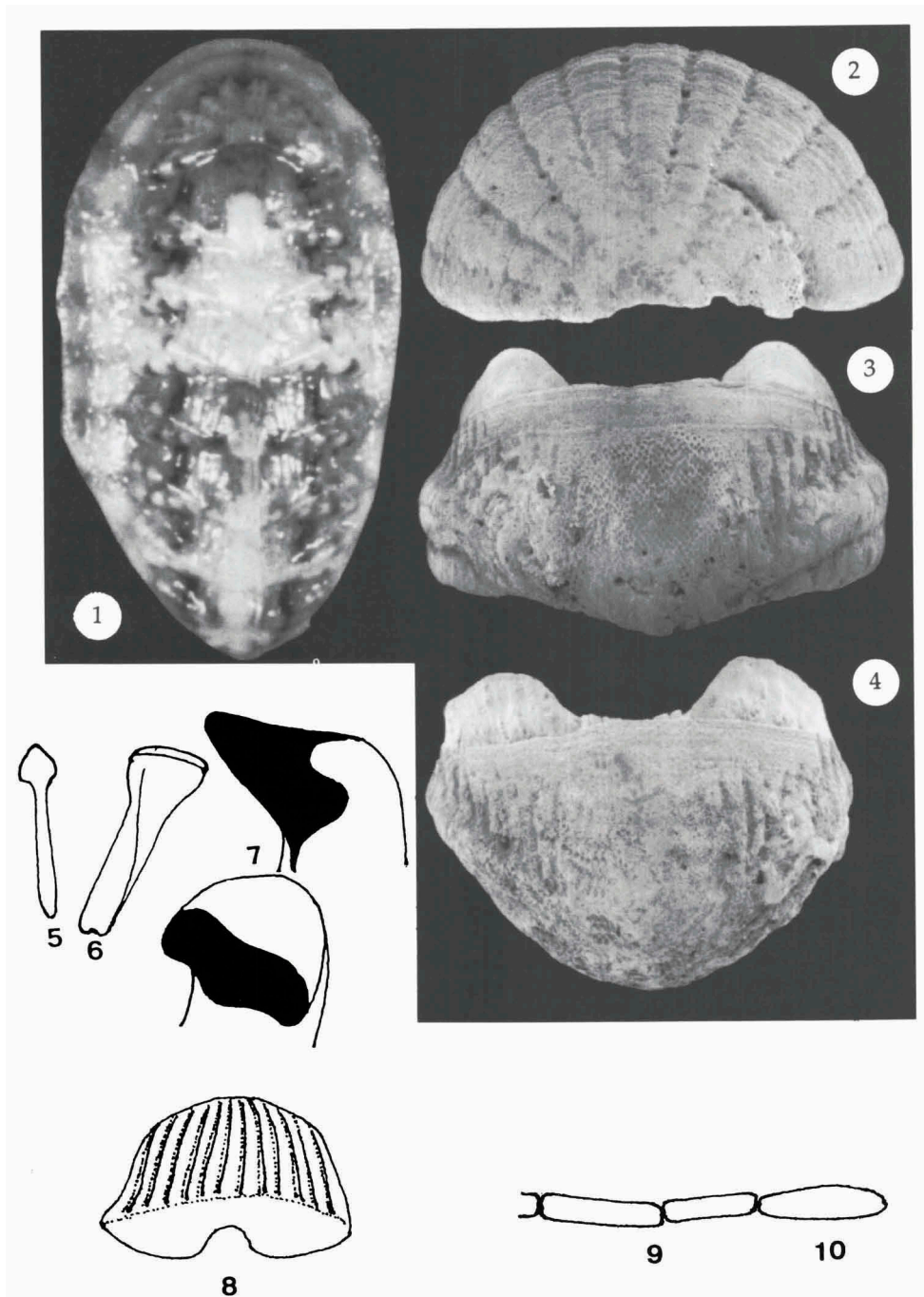
Girdle moderately wide, white, white with dark bands in paratypes 1 and 4, densely quincuncially covered with imbricating, weakly curved, regularly rounded scales, up to 132 × 104 µm, rather deeply emarginate at the base, sculptured with c. 12 flat, slightly converging ribs, the intersices narrow, vaguely pitted. Ventral side of girdle beset with radiating rows of rectangular, flat, smooth scales, up to 64 × 12 µm, both ends truncate, the rows ending in infra-marginal scales, somewhat widening towards the rounded top, 48 × 10 µm.

Radula of the holotype 2.5 mm long, with 36 rows of mature teeth. Central tooth very narrow, distally widening to a triangular blade, first laterals straight, parallel-sided with a narrow, roundish blade, major lateral relatively wide, with an entire, vaguely tridentate blade.

Gills merobranchial, abanal, c. 16 ctenidia per side.

Etymology.— I have pleasure in naming the new species after Mr J. Goud of the RMNH, department of Malacology, who collected most of the specimens in the area.

Observations.— *I. goudi* is quite unlike other *Ischnochiton* species described from the Indian Ocean. *I. feliduensis* E.A. Smith, 1903, reported from the Maldivé Archipelago, has the end valves and lateral areas regularly granular, *I. sansibarensis* Thiele, 1910, known from Zanzibar, Madagascar and Mozambique, is characterized by a network of squarish to lozenge-shaped pits in the pleural parts of the central areas, *I.*



Figs 1-10. *Ischnochiton (I.) goudi* spec. nov.; 1, paratype; 2-10, holotype; 1, whole specimen, dorsal view, $\times 10$; 2-4, isolated valves I, IV, and VIII respectively, dorsal view, $\times 20$; 5, central tooth of radula, $\times 250$; 6, first lateral radula tooth, $\times 250$; 7, dental cap of major lateral tooth, $\times 250$; 8, dorsal girdle scale, $\times 10$; 9, ventral scales, $\times 40$; 10, inframarginal scale, $\times 40$ (photos J. Goud & F.J.A. Slieker).

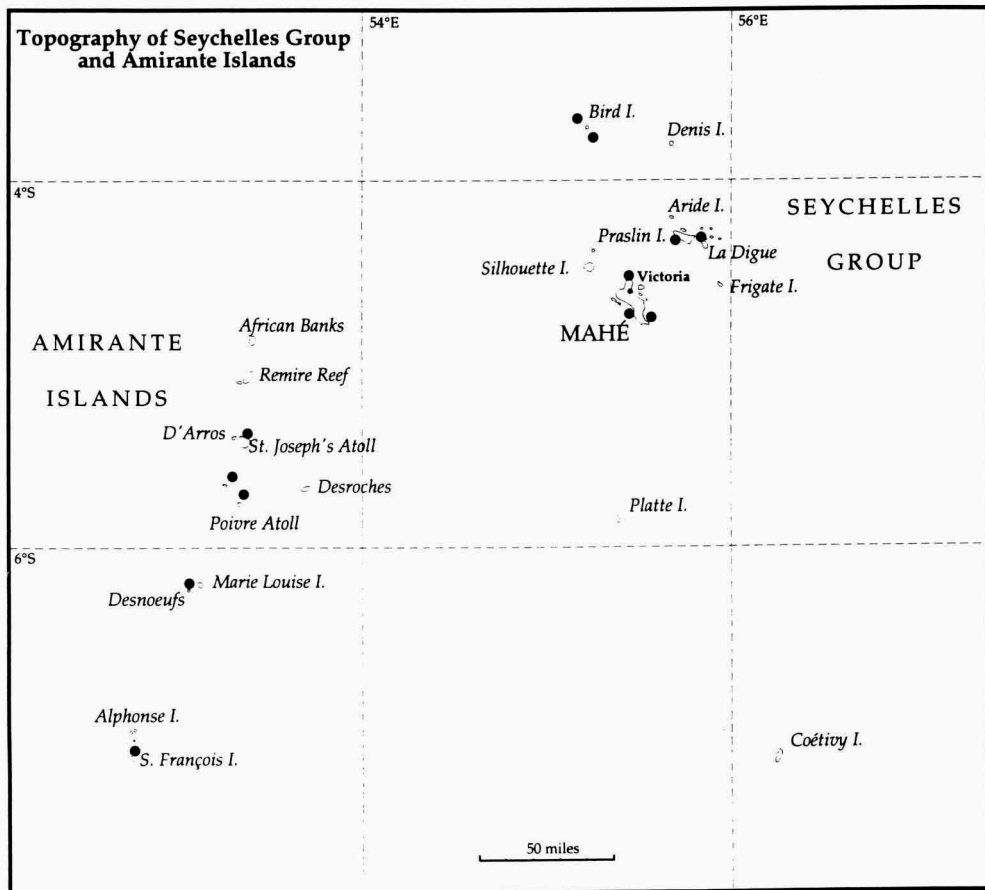


Fig. 11. Map of Seychelles group and Amirante Islands, ● = localities mentioned in this paper.

crassus Kaas, 1985, from the Mozambique Channel, has the tegmentum evenly granulated, without any stronger sculpture, *I. bigranosus* Kaas & Van Belle, 1990, from South Andaman Island also lacks any ribbing on the central areas of the valves and the same is true for *I. indianus* Leloup, 1981. *I. yerburyi* (E.A. Smith, 1891) from Aden, *I. gallensis* von Knorre, 1925, and *I. winckworthi* Leloup, 1936, from Sri Lanka also differ widely from the new species.

Schizochitonidae

Schizochiton incisus (Sowerby, 1841)

Chiton incisus Sowerby, 1841: 61; E.A. Smith, 1884: 82; Haddon, 1881: 31; Melvill & Standen, 1891: 181. *Chiton elongatus* Reeve, 1847: pl. 7: sp. and fig. 40a,b (type: BMNH, type-locality: Raines Island, Torres Strait); Brazier, 1877: 75. Non: *Chiton elongatus* de Blainville, 1825: 542 = *Ischnochiton elongatus* (de Blainville, 1825).

Schizochiton polyops Iredale & Hull, 1926: 271, pl. 38: figs 16-17, 19-21 (type: Queensland Museum, type locality: Howick Island, Queensland).

Type: BMNH.

Type locality: Philippine Islands, Cebu.

Material.— 'Oceanic Reefs' Expedition, 1992-93. Sta. 753: Amirante Islands, St. Joseph's Atoll, NW rim; 5°24'S 53°19'E, reef slope, Scuba diving, 26.xii.1992, 1 specimen, now disarticulated.

Observations.— In contrast to what one might expect the unique specimen is a true *S. incisus*. It does not show any feature characterizing the related *S. jousseaumi* Dupuis, 1917, known from the Red Sea, the Gulf of Aden and Socotra Island.

Chitonidae

Chiton (C.) mauritianus Quoy & Gaimard, 1853

Chiton mauritianus Quoy & Gaimard, 1835: Voy. Astrolabe, Zool. 3: 397, pl. 73: figs 1-3; Bullock, 1972: 243 (bibliography and synonymy).

Chiton angusticostatus Quoy & Gaimard, 1835: Voy. Astrolabe, Zool. 3: 398, pl. 73: figs 4, 4'.

Chiton rusticus Deshayes, 1863: Cat. Moll. Reunion: 39, pl. 6: figs 1-3.

Type: MNHN.

Type locality: Mauritius.

Material.— 'Oceanic Reefs' Expedition 1992-93. Sta. 684: Seychelles: SW-coast of Mahé Island, 2 km S of Quatre Bornes, Anse Corail, 4°47.5'N 55°30.5'E, large granitic rocks, shore-collecting, 17.i.1993, 7 specimens, up to 3 cm long.— 'Oceanic Reefs' Expedition 1992-93. Sta. 709: Praslin Island, SW coast near Miller's Point, 4°17'S 55°41'E, sandy shore with boulders, snorkeling, 17.xii.1992, 2 specimens, up to 4 cm. long.

Remark.— *C. (C.) mauritianus* is by far the commonest chiton in the Seychelles Islands. Apart from the two samples mentioned here, there are many more which have not been enumerated.

Chiton (Rhyssoplax) affinis Issel, 1869

Chiton affinis Issel, 1869: 234-235; Strack, 1993: 13, pl. 4: fig. 1 (bibliography and synonymy). *Rhyssoplax affinis*; Ferreira, 1983: 268, figs 22, 24 (bibliography and synonymy).

Chiton (Clathropleura) affinis; Thiele, 1910: 91, pl. 9: figs 41-44.

Type: MNHN.

Type locality: Gulf of Suez.

Material.— 'Oceanic Reefs' Expedition 1992-93. Sta. 605: Seychelles, W coast of Mahé Island, Port Launay N.P., 04°38'S 55°23'E, intertidal, snorkeling & Scuba diving, Jan. 1993, 1 specimen, juv., dry. Seychelles, NE side of Mahé Island, Anse Royale, near Souris Isl., under stones, 0.3-1 m, 1/5.xi.1989, 40 specimens dry of which 2 disarticulated, J.P. Buys leg. et coll. no. 1864.

Remark.— Thiele (1910: 91) reported the species from the Seychelles (coll. Brauer), but Ferreira (1983: 269), after a collecting trip to Mahé in March 1981, could not corroborate that finding. The specimens brought to light by the *Tyro* Seychelles Expedition and by Mr J.P. Buys definitely confirm Thiele's report.

Acanthopleura brevispinosa (Sowerby, 1840)

Chiton brevispinosus Sowerby, 1840: 287, pl. 16: fig. 1.

Acanthopleura brevispinosa; Ferreira, 1986: 233, figs 28-34, 112-B (bibliography and synonymy).

Type: unascertained (*vide* Ferreira, 1986).

Type locality: Ins. Johanna (= Anjouan Island, Comores).

Material.— 'Oceanic Reefs' Expedition 1992-93. Sta. 682: Seychelles, Mahé Island, E. coast, St Anne, Anse Mare Jupe, 4°36.5'S 55°30'E, rocky shore, snorkeling and shore-collecting, 15.i.1993, 5 specimens up to 9 cm long.— 'Oceanic Reefs' Expedition 1992-93. Sta. 709: Seychelles, Praslin Island, SW coast, near Miller's point; 4°17'S 55°41'E; rocky, sandy shore with granite boulders, shallow sublittoral; shore-collecting; 17.xii.1992.— 'Oceanic Reefs' Expedition 1992-93. Sta. 711: Seychelles, Aride Island, S coast; 4°13'S 55°40'E; sandy and rocky shore, calcareous reef and slope; shore-collecting; 18/19.xii.1992.— Seychelles, NE coast of Mahé Island, Anse Royale, near Souris Island, in crevices of huge granite rocks, 5 specimens dry, up to 6.0 × 3.7 mm, 5.xi.1989, leg. et coll. J.P.Buys, no. 1276.

Remark.— According to Mr Goud the species is rather common in the Seychelles Islands.

Lucilina carnosa (Kaas, 1979)

Tonicia (Lucilina) carnosa Kaas, 1979: Ann. Natal Mus. 23 (3): 869, pl. 3: figs 1-10. Non: *Tonicia (Lucilina) carnosa*; Ferreira, 1983 = *Lucilina (L.) sueziensis* (Reeve, 1847).

Type: Natal Museum.

Type locality: Mozambique, Conducia Bay.

Material.— 'Oceanic Reefs' Expedition 1992-93. Sta. 721. Seychelles, N of Bird Island, 3°42'S 55°13.1'E, 45-55 m, rectangular dredge, 21.xii.1992, 1 specimen.— 'Oceanic Reefs' Expedition 1992-93. Sta. 723. Seychelles, Bird Island, off N.coast, 3°42'S 55°12'E, coral reef, near drop-off, 8-21 m, Scuba diving, 21.xii.1992, 1 specimen.— 'Oceanic Reefs' Expedition 1992-93. Sta. 783. Amirante Islands, Île Desnoeuvs, northern slope of platform, 6°12'S 53°02'E, Scuba diving, 02.i.1993, 1 specimen.— 'Oceanic Reefs' Expedition 1992-93. Sta. 604. Seychelles, Mahé, NE point of NE coast, 04°35'S 55°28'E, intertidal to 5 m, reef flat and slope with many corals, snorkeling, 8.xii.1992, 2 specimens in alcohol.

Observations.— Ferreira (1983: 274) synonymized *Tonicia carnosa* Kaas, 1979, with *Lucilina (L.) sueziensis* (Reeve, 1847), without giving any arguments to justify this action. Of course, he may be right, as the differences between the two supposed species are rather subtle. As long as no convincing arguments to the contrary are given, I consider all specimens from the western Indian Ocean to be conspecific, naming them *Lucilina (L.) carnosa*.

Acanthochitonidae

Acanthochitona penicillata (Deshayes, 1863)

Chiton penicillatus Deshayes, 1863: 41, pl. 6: figs 8-10.

Acanthochitona penicillata; Strack, 1963: 23, pl. 5: fig. 6. (bibliography and synonymy).

Type: ? Probably lost.

Type locality: Réunion.

Material.— 'Oceanic Reefs' Expedition 1992-93. Sta. 711: Seychelles, Aride Island, S. coast, 4°13'S 55°40'E, sandy and rocky shore, diving and snorkeling, 19-20.xii.1993, 1 specimen, in alcohol.— 'Oceanic Reefs' Expedition 1992-93. Sta. 612: Seychelles, Mahé, E coast, Cap Maçons/Anse de Forbans, 04°46'S 55°31'E, to 7 m, tidal reef flat with isolated granite rocks, shore collecting and snorkeling, 12.xii.1992, 1 specimen in alcohol.— Seychelles, Mahé Island, Anse Royale, near Souris Island, under stones at 0.5 m, 29.x.1989, 1 specimen dry, J.P. Buys leg. et coll., no 1863.

Remark.— Another specimen of *Acanthochitona* was collected at Sta. 694 on the NW coast of La Digue, Anse Severe, 4°20.5'S 55°50'E, shore sampling, 24.01.1993, but it is too much eroded to attach a name to it.

Cryptoplacidae

Cryptoplax sykesi Thiele, 1909

Cryptoplax sykesi Thiele, 1909: 53, pl. 6: figs 83-86; Kaas, 1986: 21, figs 73-81; Strack, 1993: 27, pl. 5 fig. 9 (bibliography and synonymy).

Type: ZMHU.

Type locality: Red Sea, Gimsah Bay.

Material.— 'Oceanic Reefs' Expedition 1992-93. Sta. 792, Amirante Islands, St. François Atoll, W. rim, 7°05'S 52°44'E, outer slope, down to 27 m, Scuba diving and snorkeling, 5-6.i.1993, 2 specimens, juv., dry.

Remark.— *Cryptoplax sykesi*, originally described from the Red Sea, appears to be widely distributed in the Indian Ocean, where it is known from Madagascar north to the Red Sea coasts of Egypt, Jordan and Israel (Strack, 1993: 27).

Discussion

The chiton fauna of the Seychelles, however meagre in species, perfectly joins up with the faunas of the Red Sea and the northern Indian Ocean, although several species commonly found in the northern Indian Ocean appear to be replaced by related species from a more southern habitat. So, for instance, *Parachiton hylkiae* Strack, 1993, and an unnamed species of that genus, reported from the Red Sea by Strack (1993: 4-6), are replaced in the Seychelles area by *P. ronaldi* Kaas & Van Belle, 1985, originally described from the Andaman Islands.

Schizochiton jousseaumi Dupuis, 1917, of the northern Indian Ocean, appears to be replaced by the widespread *S. incisus*, which probably in the Seychelles reaches its northern limit. *Chiton peregrinus* Thiele, 1910, commonly found on both sides of the Indian Ocean up to the Arabian Gulf, the Gulf of Aden and the entrance of the Red Sea, is notably absent in the Seychelles region, where it is replaced by *Chiton mauritianus* Quoy & Gaimard, 1835, which has not been encountered in more northern waters. *Ischnochiton yerburyi* (E.A. Smith, 1891) known from Mozambique in the western and Pakistan in the eastern Indian Ocean, north to the Red Sea, is absent in the Seychelles, where hitherto only one *Ischnochiton* species has been found, described here as *I. goudi* spec. nov.

Rhyssoplax affinis (Issel, 1869), *Acanthochitona penicillata* (Deshayes, 1863) and

Cryptoplax sykesi Thiele, 1909, occur in the northern Indian Ocean as well as in the Seychelles. Of the seven species enumerated from the Seychelles by Winckworth, 1940, two were not found during the *Tyro* expedition, viz *Callochiton sanguineus* (Deshayes, 1863) (= *Callochiton deshayesi* Thiele, 1909) and *Tonicia maillardi* Deshayes, 1863 (= *Onithochiton m.*).

After the MS of the present paper had been completed, Mr H.L. Strack showed me 15 samples of chitons from Aldabra Atoll, some 1000 km W of the Seychelles, N of the Mozambique Channel which he had received for identification from the USNM. They contain 5 specimens (3 samples) of *Callochiton deshayesi* Thiele, 1909, 1 specimen of *Schizochiton incisus* (Sowerby, 1841), 4 specimens of *Chiton (Rhyssoplax) affinis* Issel, 1869, 4 specimens of *Lucilina (Lucilina) carnosa* (Kaas, 1979) and 6 specimens of *Cryptoplax sykesi* Thiele, 1909.

Summa summarum, we may conclude that the Seychelles form a transition zone between the northern and the central to southern Indian Ocean chiton faunas.

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Abbreviations

BMNH = British Museum (Natural History), now The Natural History Museum, London.
 RMNH = Rijksmuseum van Natuurlijke Historie, now Nationaal Natuurhistorisch Museum, Leiden.
 USNM = United States National Museum of Natural History, Washington.
 ZMHU = Zoological Museum of the Hebrew University, Jerusalem.

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