

NOTES ON SOUTH AUSTRALIAN DECAPOD CRUSTACEA.  
PART III.

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PLATES XXXII. TO XXXVI.

The following notes deal with some species of *Anomura*. The first three are true hermit crabs of the family *Paguridae*, which are closely allied to each other, belonging to that division of the family whose chief characteristics are the possession of a pair of modified appendages on the first, and another on the second, abdominal somite in the male, and a pair on the first in the female. The female also is provided with a brood pouch, which arises from the fourth somite on the left side, and covers the unpaired biramous appendages which serve for the attachment of the eggs. These three species are referred to the genus *Paguristes*. Of the four remaining species, three belong to the *Porcellanidae*. *Petrocheles australiensis*, Miers, is a fine species, showing well the transition to the *Galatheidae*, and as far as I know has never been figured. Of *Polyonyx transversus*, Haswell, the same may be said; so it is here figured, and the description extended. Lastly, a *Galathea*, belonging to the group which contains *G. australiensis*, Stimpson; *G. aculeata*, Haswell; and *G. magnifica*, Haswell, is described—though provisionally—as *G. setosa*, for the first time.

Family PAGURIDÆ, Dana.

Section I., *Pagurinae*, Ortmann.

Genus *Paguristes*, Dana.

For latest description of genus see Alcock Cat. Ind. Decap. Crust., part 2, p. 30, 1905.

*Paguristes frontalis*, M.-Edw. Pl. xxxii., figs. 1-7.

*Pagurus frontalis*, M.-Edw., An. des Sci. Nat., 2e série, t. vi., p. 283, pl. xiii., fig. 3. Hist. Nat. Crust., t. ii., p. 234.

*Paguristes frontalis*, Alcock Cat. Ind. Decap. Crust., part 2, p. 155, 1905.

*Eupagurus frontalis*, Cat. Aust. Crust., Haswell, p. 154.

The carapace anterior to the cervical groove is only slightly convex from side to side, anteriorly depressed, rather oblong viewed from above, the sides behind the curve of anterior angles being nearly straight; its surface is smooth and polished except for some small scattered punctations, but towards the sides it becomes somewhat rough or rugose. The

triangular rostriform tooth is acute, quickly acuminate to its apex, depressed and projecting between the bases of the scales of the ocular peduncles. The margin of the front is raised, and the antennal projections, which do not reach as far as the rostrum, are each tipped with a small tooth. A depression behind the rostral tooth sends off an oblique branch towards each side marking off the hepatic regions, and also a median longitudinal groove, which, however, is short. In the region of this groove the carapace is slightly rugose transversely. The hepatic regions are prominent and rounded. The antero-lateral portions of the carapace scarcely project forward as far as the tubercles of the first joints of the antennæ; their descending margins carry two or three spinules. The cervical groove is deeply marked, and the carapace behind it is membranaceous, and is marked with some faint, irregular, longitudinal lines; there is a narrow median region expanding anteriorly, and running to a depression behind. The branchial regions are moderately tumid. The carapace is sparingly hairy at the sides.

The narrow tergum of the first abdominal segment is triangular, firm, and bears a few setæ. The remainder of the abdomen is soft, except in some specimens a little leathery underneath; it is glabrous, except the margin of the oviferous sac in the female. The sixth segment is strongly calcified dorsally, and is divided into two main unequal portions by a deep, transverse, irregular furrow, the anterior portion thus divided is irregularly pitted, the posterior has a median, shallow furrow, which broadens out behind.

The ocular peduncles are long, as long as the greatest breadth of the anterior portion of the carapace, moderately robust, not expanding distally, and with a tendency to become slightly unequal in length. The basal scales are rather small, spiniform, close together, and anteriorly depressed. The eyes are rather small.

The basal joint of the antennular peduncle is flattened and hollowed above, its external margin is compressed, and each edge bears distally a minute spine (stylocerite). There is a small distal spine below also. The second and third joints and the thick portion of the upper flagellum are subequal in length; the lower flagellum is about half the length of the upper, and is naked, as is also the short distal portion of the upper flagellum.

The first joint of the antennal peduncle has a prominent tubercle below, which bears the aperture of the green gland. The second joint is produced distally on the outer side, ending in three converging spines, with a group of setæ immediately below, the inner distal angle is less produced, and ends in a

downward curved spinule. The upper surface of the joint is hollowed. The third joint is produced below to a strong spine, which projects one-third the length of the fifth joint; the fourth joint is short and bears a small distal spinule above. The fifth joint is cylindrical, slightly curved, and expands slightly towards the distal end, reaching to about half the length of the ocular peduncle. The acicle is short and stout, reaching about as far as the spine on the third joint; it bears, besides the acute apex, two short, strong spines externally, and one near the base above; it also carries several fasciculi of coarse setæ. The flagellum is short, not much more than twice the length of the peduncle, and is non-ciliate.

The mandibles have the edge of the cutting plate entire; a narrow and not deep cleft separates it from the molar process; into this the terminal joint of the palp dips. The molar process is narrow. The palp is three-jointed, the second joint markedly compressed, its plane being transverse to the edge of the cutting plate; the third joint, which is about as long as the two preceding ones together, is compressed and much expanded, its plane being parallel to the same edge.

In the first maxillæ the external branch has the second joint articulated below the apex of the preceding, presenting a bifid arrangement; the distal portion is strongly reflexed. This branch bears a strong setum on the inner side near the base.

In the second maxillæ the third joint is compressed, tapering irregularly, the apex being without setæ.

In the first maxillipeds the third joint is twisted and turned aside so as to be partially hidden behind the exopod. The exopod is flagellate.

The exopods of the two succeeding maxillipeds are very robust, compressed, and flagellate. The third maxillipeds have their coxal joints contiguous, the ischium bears a row of corneous teeth on the inner side, and the merus a few spinules on the same side.

The chelipeds are large and very unequal, the left one is the larger; in it the merus is trigonous, reaching a little beyond the eyes; it bears a few small, low tubercles, which become more numerous and larger towards the distal end; some are minutely punctate at their summits. The upper surface of the carpus is strongly tuberculate, the tubercles becoming almost spiniform on the inner margin. The hand is large and swollen, whitish (in contrast to the rest of the appendages, which are red), and finely granulate, the granules becoming larger towards the inner side. The fingers open transversely, and are excavate, especially the immobile one, the

contiguous surfaces having some punctations, from which a few hairs spring. The mobile finger is corneous at the tip. There is a broad, rather obscure, ridge on the outer side of the immobile finger reaching some distance on the hand; at the inner end of this ridge is a small area of well-defined, reddish granules. The hand, including the fingers, is more than twice as long as the carpus. On the outer side the fingers show no hiatus, but a prominence on the immobile one fits into a corresponding slight hollow in the mobile one. The right cheliped has the carpus and hand bearing larger tubercles and granules, and a few fasciculi of hairs on the inner margin.

The second and third pairs of legs are long, almost glabrous and robust, exceeding the chelipeds in length. The third is more robust than the second. In these the meris and propodi are very slightly serrate above and below, the carpi have a distal spine above, and two or three on the outer side, on the distal margin. The dactyli, which are longer than the penultimate joints, are moderately curved and compressed, that of the third pair is more flattened on the outer side, and bears a well-marked, spinulate ridge above; the inner side is rounded and has scattered spinules, the lower margin is acute and serrate, especially towards the end. The spinules usually arise from dark red spots. The dactyli terminate in small black claws.

The fourth pair are much shortened, the joints are setose on their anterior and posterior margins, non-chelate, the propodi becoming narrower distally. The dactyli are short, and bear some stout teeth. The fifth pair are shorter, smaller, and minutely chelate, the pad of scale-like setæ covers the whole breadth of the distal end of the propodus.

The first and second abdominal segments bear sexual appendages in the male, the rami of the first being coalesced to form a semi-cylinder, the inner ramus is provided with a tuft of brown stiff setæ, which originate about the middle of the inner side, and extend beyond its end, intermingling with those of the opposite limb, the outer ramus is thickened, compressed, rounded at the end, which is slightly recurved outwards, bearing a row of minute teeth. The second pair of abdominal appendages are long, slender, and uniramous, and are terminally slightly spatulate and setose. The three succeeding segments are each provided with a weak uniramous appendage on the left side.

The uropods, as usual, are very unequal, the external ramus of the pair of the left side is much larger than the inner, falcate, and expanded with the usual pavement of scale-like setæ.

The telson bears a few setæ in groups, and is divided dorsally into four lobes, with a small lozenge-shaped area in the middle; the two terminal lobes are unequal, with a median cleft between them. The two anterior lobes have each an ear-shaped pit.

The female has a large brood pouch.

This littoral species is one of the largest and commonest hermit crabs of our coast, and varies much in size.

Specimens in the Adelaide Museum.

Length of a medium-sized specimen, 6 cm.

Length of carapace, 26 mm.

Breadth of the anterior portion of the carapace, 10 mm.

Length of large cheliped, 4 cm.

Length of ocular peduncle, 10 mm.

Length of second ambulatory leg, 47 mm.

**Paguristes brevirostris**, *n. sp.* Pl. xxxiii., figs. 1, 1a.

The animal is somewhat hairy, especially on the chelipeds, the hairs there, however, not thick enough to hide the armature.

The anterior portion of the carapace is rather flat above, sparingly pitted, rough or rugose towards the front and sides, with a depression behind the front, marked on each side by a short, slightly oblique ruga, then another small, depressed area lies between this and the hepatic region. The rostral tooth is very short, obtuse, and scarcely projecting farther than the prominences external to it; these are rounded, and each is tipped with a very small denticle. The hepatic regions are rounded and slightly tuberculate; they are separated from the other regions by a faintly marked, very irregular, longitudinal groove, which joins the cervical groove behind. The frontal margin is thickened. The portion of the carapace behind the cervical groove is thin, and shows some small disconnected areas of calcification. The branchial regions are moderately tumid and sparingly setose; there is a tuft of setæ on each side of the cardiac region.

The ocular peduncles are moderately robust, not as long as the breadth of the anterior portion of the carapace, and somewhat constricted towards the middle. The basal scales are rather small, and bear five or six small red denticles on each. They are well separated from each other.

The antennular peduncles reach nearly to the level of the eyes.

The outer side of the first peduncular joint of the antennæ bears one or two denticles. The second joint is hollowed above, its outer distal angle is produced, bearing four or five spinules, and there are one or two denticles at the inner angle. The acicle is moderately robust, quickly tapering

to a terminal spine, with three or four others on its external border, and two on its inner border near the base; it reaches more than half the length of the fifth joint. The third joint is produced below to a prominent spine, and a small spinule terminates the fourth joint above. The fifth joint is short, reaching about two-thirds the length of the ocular peduncle. The flagellum is short, much shorter than the carapace, the internodes of the joints bearing rather long setæ.

The chelipeds are moderately robust, nearly equal. The merus reaches a little beyond the level of the eyes, its lower external border is spinulate, and it is slightly rugose on the external surface; it bears some spinules on the distal margin, and one or two also above a little removed from the distal end. The carpus is short, its anterior surface is covered with white, more or less spiniform tubercles, which become larger on the inner margin. The palm is not much longer than the carpus, and is covered anteriorly with similar spiniform tubercles, which extend on to the fingers; on a side view the joint is strongly wedge-shaped, being swollen proximally and tapering quickly to the end of the immobile finger. The fingers are slightly longer than the palm, transverse, corneous at the tips, and denticulate on their opposable margins, with a small hiatus.

The second and third pairs of legs are nearly equal in length—the carpi and propodi of the more posterior pair being slightly longer—and exceed the chelipeds by about the length of the dactyli. The more anterior pair is more spinulate, spinules being situated on the posterior edges of the meri, and on the anterior edges of the carpi and propodi. The carpi and propodi also show squamose markings, from which hairs arise; these, again, are more evident on the more anterior pair; the dactyli of both pairs are longer than the propodi; they are scarcely compressed, slightly sulcate, and end in dark, corneous claws, and are distally more or less spinulate.

In the male the pairs of appendages to the first and second abdominal segments are well developed, as also are the unramous appendages on the left side of the third, fourth, and fifth segments; these bear very long setæ.

In the female the brood pouch is a widely open sac, springing from the fourth segment. This covers the biramous unpaired appendages of the second, third, and fourth segments, and carries the ova.

The ultimate segment is four-lobed, with minute teeth and some hairs on the margin of the terminal lobes.

Length of body, 28 mm.

Length of carapace, 11 mm.

Breadth of carapace, anterior portion, 5 mm.  
 Length of cheliped, 17 mm.  
 Length of third leg, 19 mm.  
 Dredged by Dr. Verco, S.A. coast, 20-30 fms.  
 Types in Adelaide Museum.

**Paguristes sulcatus**, *n. sp.* Pl. xxxiv., figs. 1, 1a.

The animal is very hairy, especially on the chelipeds; the hairs are plumose or pinnate.

The carapace anterior to the cervical groove is medianly smooth, except for a few scattered pits; towards the sides, however, it becomes rough and irregularly furrowed. There is a rather deep depression behind the rostral tooth, and the portion of the carapace immediately behind this dips into it rather abruptly. In this region there are a few slight, irregular furrows, which appear as branching from a median, shallow groove, which extends from the frontal depression for a short distance behind. The lateral portions of the frontal depression are marked on each side by a short, oblique ruga (more pronounced than in the preceding species), and the hepatic regions, which are full and sparingly pitted, are marked off from the rest of the carapace by irregular longitudinal grooves, which join the cervical groove behind. The rostral tooth is triangular, acute, slightly depressed, reaching nearly as far as the ophthalmic scales. The front between the two antennal projections is strongly thickened; these do not project as far as the rostral tooth, and each is tipped with a small denticle.

The abdomen is of the usual soft nature, the dorsal surface of its sixth segment is strongly calcified, and divided by a transverse groove into two unequal parts: the anterior portion is marked with three irregular pits, the posterior by a median sulcus, which is not so deep as the transverse one, and a few small pits.

The ocular peduncles are long and slender, scarcely expanding distally from about the middle; they are a little shorter than the widest part of the carapace anterior to the cervical groove. The ophthalmic scales are small, well separated, and each is tipped with three spinules, one of which is small.

The antennular peduncle reaches nearly as far as the eyes. The upper flagellum slightly exceeds the ultimate peduncular joint in length.

The first joint of the antennal peduncle bears externally two spinules. The upper surface of the second joint is slightly excavated: it is much produced exter-

nally, bearing four or five spines, the two apical ones being rather divergent; there is also a prominent spine on the inner angle, with a small spinule just below it. The acicle is robust, regularly tapering to end in two spines, with one just below them on the outer or upper side, and one on the inner side, near the base; the acicle reaches rather more than half the length of the fifth joint. The third joint is produced below to a strong spine, which reaches nearly as far as the fourth joint. The fourth joint has a small spinule above at the distal end. The fifth joint reaches about as far as the middle of the ultimate joint of the antennular peduncle. The flagellum is shorter than the carapace, and hairy.

The chelipeds are equal, and weak. The merus reaches to about the level of the acicle of the antennæ; it bears a few spines on the upper margin, near the distal end, and a few on the other two margins; the external surface is slightly rugose. The anterior surfaces of the carpus and palm are densely hairy—the hairs hiding the spines—flattened and covered with spiniform tubercles, mostly curved forwards, and many with acute, dark tips; these are larger on the inner margins. The palm is shorter than the carpus; it is not swollen behind, as in the preceding species. The fingers are longer than the palm, spinulose, corneous at their tips, and externally marked at their opposable edges with small, rather regular teeth. There is no hiatus.

The second and third pairs of legs are nearly similar, the third pair being slightly longer; they exceed the chelipeds in length by about half the length of the dactyli in the second pair. The meri are slightly rugose externally. The carpi are externally sulcate, as also are the propodi, and with them bear on their anterior margins spines similar to those on the chelipeds, which, however, are smaller and less numerous on the third pair. The propodi also are slightly squamose. The dactyli are about as long as the propodi; they are faintly sulcate and spinulate on their anterior and posterior edges, are slightly curved, and end in dark claws.

The fourth pair is short, non-chelate, the carpus and propodus nearly equal in length, the propodus distally narrowing. The dactylus is short, robust, and spinulate.

The first two pairs of abdominal appendages in the male are well developed: the single pair of the first segment in the female is weak. The other appendages are of the usual character.

The telson is four-lobed, the two anterior lobes larger than the posterior; the posterior lobes are unequal, rounded behind, and spinulate and setose on the margins.



Length of body, 37 mm.

Length of carapace, 16 mm.

Breadth of carapace anterior to the cervical groove, 7 mm.

Length of cheliped, 20 mm.

Length of third leg, 26 mm.

Length of ocular peduncle, 6 mm.

A littoral species. Port Willunga, S.A. coast.

Types in Adelaide Museum.

This species differs from *P. subpilosus*, Henderson, in the following particulars:—The ocular peduncles are longer and slenderer. The ophthalmic scales are smaller and trispinose. The rostral tooth is more acute, and there is a strong depression behind it on the carapace, and a short, median, longitudinal groove. The antennal flagellum is well ciliated. In the chelipeds the hand is not swollen behind. In the second and third pairs of legs the dactyli are not longer than the propodi, and the anterior borders of the last three joints are very spinose. Finally, the telson is quadrilobate.

#### Family PORCELLANIDÆ.

Genus *Porcellana*, Lamarck.

#### *Porcellana rostrata*, n. sp. Pl. xxxv., figs. 1, 1a, 1b.

The carapace is subpentagonal, slightly longer than broad, slightly convex behind the protogastric ridges. The surface is uneven, being marked by numerous minute transverse striæ; some of the striæ are more distinct, bearing groups of soft plumose setæ, especially in the female; two protogastric ridges are particularly thus indicated. The regions are well marked; the cervical groove distinct. The postero-lateral regions are rounded and rugose, the rugæ extending around the sides of the carapace to the pterygostomial region, but not uniting dorsally, as a nearly smooth space intervenes. The epibranchial regions are slightly tumid. A narrow, depressed area borders the antero-lateral regions. The front viewed from above shows two prominent lobes, divided by a median sulcation, which extends gradually, becoming shallower backward between the protogastric ridges: from a front view the margins of these lobes show as two arches, the outer limb of each being much shorter than the inner, the two inner limbs uniting to form an almost vertically depressed, acute, median lobe or rostrum; the outer lobes, which form part of the inner margin of the orbits, are also depressed; the edge of the front itself bears a series of small denticles, which extend to the antero-lateral margins. The antero-lateral margin is longer than the postero-lateral; it is cristate, and shows an acute prominence at the external angle of the orbit, a distinct

antennal spine, and two others further back; the crest is interrupted by a notch at the anterior end of the cervical groove, and on a slight lobe behind the notch are sometimes found two other small spines. The posterior border is raised and insinuate.

The pleon is smooth, polished, and glabrous, except on the margins.

The *linea anomurica* reaches from beneath the antennal peduncle to the edge of the lateral wall of the carapace, just above the coxa of the third pair of legs, a short, oblique ridge immediately behind the marginal notch before mentioned reaches from the antero-lateral crest across to this suture.

The eyes are small, and scarcely projecting.

The first joint of the antennular peduncle has two oblique ridges, which converge and unite inwardly.

The basal joint of the peduncle of the antenna is somewhat triangular; it forms the external margin of the orbit; its upper portion reaches the margin of the carapace, its lower border bears three or four teeth towards the inner end, the innermost one of which is below the eye, is spiniform, and directed forwards, and is visible from above; the other three teeth are small, and point inward. The third joint is a little longer than the second, expanding towards the distal end, where there is an anterior projection; the fourth joint is small, and also has a slight projection. The flagellum is long.

In the external maxillipeds the ischium is moderately broad, sub-triangular, produced a little, and broadly rounded at the inner distal angle, its outer distal angle having a strong, obtuse tooth, which usually lies in a shallow groove of the exopod. The outer surface is slightly excavate, and the external margin thickened and defined by two ridges. The merus has the inner lobe marked with six or seven denticles. The carpus also has an internal lobe, with a strong tooth below, and a longitudinal lateral ridge, and its upper distal end terminates in an acute tooth. The joints are fringed with the long hairs, as is usual. The exopod is slightly curved, and tapers to an obtuse point. It reaches to more than half the length of the merus; its outer face is slightly excavate.

The chelipeds are usually equal in the female; they are rough, like the carapace. The merus is short, and bears a large anterior lobe, which is acute, with very small denticles on its edge; there is a small spine on the distal margin underneath. The carpus, which is about as long as the palm, is slightly excavate longitudinally on the inner surface; the upper surface has two longitudinal sulcations, with a prominent ridge between them marked by oblique striæ; the outer

margin bears a series of small forward directed teeth; the inner margin is divided into two acute lobes and a distal prominence, the two lobes bear marginal minute denticles; there are also a few spinules near the distal end above; the lower surface is nearly smooth. The palm is much compressed, it widens considerably from the proximal end; there is a broad ridge on the upper surface which extends to the base of the mobile finger; the inner margin is rather acute, with a small tooth near the distal end, besides a terminal one; the outer margin, which is nearly straight for most of its length, bears a series of spinules which extend to the end of the immobile finger; there are also a few spinules along with a dense mass of hair on the upper surface towards the outer margin; the under surface is nearly smooth. The fingers are very much compressed and rather unsymmetrical, meeting their whole length with some obscure longitudinal sulcations; the mobile one has a sharp ridge above, which near its distal end shows some small denticles, its apex is constricted to a hook, its inner surface is excavate. The immobile finger is excavate; its apical tooth is unsymmetrically placed. In the adult male the chelipeds are very unequal, one is often greater developed, the hairs are absent, and the asperities much reduced, the fingers do not meet except at their apices, and there is a tooth on each near the proximal end of their opposable edges. This cheliped takes a strong red colour.

The carapace of the male is much less hairy.

The three pairs of ambulatory legs are stout, rather rough, with groups of soft hairs, the propodi have a series of spines behind, the dactyli are strong, more than half as long as the propodi; they end in one strong claw, at the base of which there is a little tubercle, tipped with a small spine, and inwardly from this there are four spines.

The last pair of legs are very slender and chelate: they reach about half the length of the carapace.

Dredged by Dr. Verco, Investigator Straits, 20-30 fms.

Length of carapace, 6 mm.

Breadth of carapace, 5 mm.

Length of cheliped, female, 10 mm.

Length of cheliped, enlarged, male, 16 mm.

Types in Adelaide Museum.

Sub-genus *Polyonyx*, Stimpson.

**Polyonyx transversus**, Haswell. Pl. xxxvi, figs. 2, 2a.

*Porcellana transversa*, Haswell, Cat. Aust. Crust, p. 150.

The carapace is nearly smooth, much broader than long, showing from above a transversely ovate shape, very convex in the antero-posterior direction, much less so in the trans-

verse, rather more depressed behind than in front. The regions are faintly defined; the postero-lateral strongly rugose. The protogastric lobes are slightly prominent. The front, when viewed from above, appears slightly arcuate, rather more than one-third the width of the carapace, marked by a distinct ridge or crest, the median lobe of which projects, and there are two lateral lobes very obscure. Slight insinuations mark the orbits above. Viewed from before, the front appears nearly straight, the median portion slightly depressed. The antero-lateral regions are two-lobed, the lobes separated by a wide notch of the cervical groove; they are faintly cristate, and the anterior one is depressed.

The basal antennular joint is ovate and slightly ridged above.

The eyes are small, scarcely projecting beyond the margin of the carapace.

The basal joint of the antenna is large, sub-triangular in shape; its lower margin very arcuate and prominent; a ridge runs nearly parallel to the inner margin, and there is a small tooth projecting inwards at its interior angle beneath the eye; its upper portion reaches the edge of the carapace, and both its inner and outer sides are strongly incurved. The third joint of the peduncle is narrower and longer than the second, the fourth is very short; these three joints are not crested or lobed.

The appendages are more or less iridescent.

The external maxillipeds are smooth. The internal margin of the ischium is almost semi-circular. The merus is sub-equal in length to the propodus, and there is on the inner side near the proximal end a prominent lobe. The carpus is a little shorter than the propodus; it is sub-triangular in shape from a side view. The joints are fringed with very long hairs. The exopod does not reach to the middle of the merus.

The chelipeds are slightly unequal—in this specimen the right is larger—they are long and well developed, and very hairy. In the right one the merus is short, its upper surface irregularly rugose; there is a small incision on the upper distal end. The carpus is nearly smooth, rounded behind, somewhat spindle-shaped viewed from above, nearly as long as the carapace; the inner and upper margin, which is a thin, very prominent ridge, bordering a deep longitudinal concavity, is entire and convex, and is clothed with very long plumose hairs, which extend to parts of the upper surface; the lower inner margin is scarcely prominent; there is a small incision at the distal end above. The palm is a little shorter than the carpus, it is compressed, rounded on its upper margin, which is marked by a longitudinal line, and bears a few spinules

towards the mobile finger. The lower margin is an acute ridge, bearing a row of small teeth, which reach to the end of the immobile finger. The oblique outer surface is covered with a dense mass of plumose or ciliate hairs, which end abruptly at the ridge, the under surface being quite glabrous. The mobile finger bears a longitudinal row of well-developed teeth on the outer side, on a ridge which sharply marks the hairy portion from the glabrous. The fingers are crossed at their apices, and each has an internal large tooth.

The three pairs of ambulatory legs are short, robust, and mostly smooth, very hairy. The propodi have a series of spines behind. The dactyli are short, curved, and end in two claws; behind these there are two or three strong spines. The last pair is very slender and chelate.

The pterygostomial regions are somewhat excavate, and are crossed by a rather sigmoid ridge.

The pleon of the female is very long and partially overlaps the external maxillipeds: it is smooth or slightly punctate. The first joint is narrow at first, but soon becomes as wide as the second, these become successively broader till the fifth inclusive, the sixth is slightly concave at the sides, and bears a pair of well-developed, biramous uropods. The last segment is composed of seven plates, one median and triangular, the others lateral, the most proximal of which is very small compared with the others, the two distal plates form the termination.

Length of carapace, 8 mm.

Width of carapace, 11 mm.

Length of cheliped, 19 mm.

Length of first ambulatory leg, 10 mm.

Dredged by Dr. Verco, 17 fms., off Newland Head, S.A.

One specimen, a female, in Adelaide Museum.

Genus *Petrolisthes*, Stimpson.

Sub-genus *Petrocheles*, Miers.

***Petrocheles australiensis***, Miers. Pl. xxxvi., figs. 1, 1a.

*Petrocheles australiensis*, Cat. Crust., N.Z., p. 61.

*Petrocheles australiensis*, Cat. Aust. Crust., p. 174.

The body is nearly flat, covered with scale-like prominences, which are small on the upper surface of the carapace, but larger on the appendages. From the scales arise short, harsh hairs, which, again, are more developed on the limbs.

The carapace is obcordate, slightly convex in the transverse direction, less so in the antero-posterior. The cervical groove is well marked and wide. The protogastric region bears anteriorly just behind the orbits two low spines, followed by some scale-like tubercles, more pronounced than those of

the rest of the carapace. Anterior to these spines the front is depressed, triangular, acute at the apex, each side having three strong spines, including the supra-ocular, which is large. The interocular space is more than one-fourth the width of the carapace.

The lateral margins of the carapace are strongly cristate anteriorly, furnished with eight spines, including the post-ocular; these have often a few spinules between them; these spines occupy about three-fifths the length of the lateral border, the postero-lateral remaining portion of which is rounded and marked with some oblique rugæ. The posterior border is strongly insinuate.

The pterygostomial region has a very strong oblique ridge, reaching well behind.

The pleon is broad, the segments marked with transverse, slightly elevated areas, coarsely hairy. The sixth segment is longer than the preceding ones and narrower, the lateral margins being deeply excavated to receive the peduncles of the uropods. The telson is composed of five plates, viz., one large, median, and triangular, two elongate and lateral, and two terminal ovate, with peduncle-like constrictions, and fringed with long, plumose setæ.

The eyes are moderately large, on short peduncles.

The basal joint of the antennule is strongly spined distally, as in *Galathea*.

Three joints of the antennal peduncle are distinct, the first of these is very short, and anteriorly bears a prominence tipped with two or three spines, the second, which is also short, is prominent in front, with one spine and a few spinules, the third, though scarcely shorter, is cylindrical; the flagellum is about as long as the chelipeds.

In the external maxillipeds the ischium is moderately broad, produced at the internal distal angle, and the margin broadly rounded and minutely crenulated, also a little produced at the external distal angle. The merus has the internal lobe only very slightly projecting, above it is a spine, and at the distal end a smaller one. The carpus has two longitudinal ridges on its upper surface, and is a little lobed internally and deeply hollowed below, to receive the process of the following joint. The propodus is much lobed internally, the lobe being hatchet-shaped. The joints bear the usual long, plumose setæ. The exopod is rather slender, reaching about half the length of the merus; it bears a few coarse granules on its outer border.

The chelipeds are long, well developed, very spinose to tuberculate. The merus joint reaches slightly beyond the level of the eyes, and is somewhat compressed, with two small

spines on the distal margin above, and with two or three on the inner surface longitudinally placed, with a large spine at the inner distal angle. The carpus is two-thirds the length of the carapace; it is rounded on the outer side with a row of seven or eight moderately-sized spines; the upper surface, which is nearly flat, bears a median row of a similar number of spines. The upper anterior border has six large, forward-directed spines, and besides these the anterior surface, especially towards the distal end, bears some more or less spiniform, scattered tubercles. The lower anterior border is almost entire, except for the ends of scale-like ridges, which are well marked on the under surface. The propodus is much compressed, the upper or inner margin of the palm is a little shorter than the carpus; it is covered by oblique rugæ, which extend for some distance on the under side. The upper or outer surface has a longitudinal granulate to spinulate ridge nearer the inner border than the outer, and between this and the outer margin is a flat area, covered by dense but very short hairs, with some spinules intermingled. The outer margin is slightly raised, granulate to spinulate, and a little sinuate in outline to the end of the immobile finger. The mobile finger is as long as the inner margin of the palm, it bears a row of spines on the inner margin, these project forwards and a little inwards. There is another row of spines on the outer side, near the cutting edge; the immobile finger has a similar row in the corresponding position. The cutting edges of both fingers are furnished with strong teeth, which become smaller and more numerous distally; an hiatus occupies about two-thirds the length of the fingers, and the tip of the mobile finger is long and hooked, and overlaps its fellow, which is almost straight. The under surface of the propodus is covered with scale-like tubercles and is almost glabrous; it has an indistinct, broad, longitudinal ridge, which corresponds in position to the one on the upper surface.

The three pairs of legs which follow are strong, the first reaches a little further than the end of the carpus of the cheliped. They are very setose, and are covered with the scale-like markings. The meri are compressed with a few strong spines on their anterior margins, and one strong spine near the distal end of the posterior border, and another just above it. The propodi, which are scarcely compressed, have three or four small spines behind, especially one at the distal end. The dactyli are short and stout, with one terminal slightly curved claw and four spines inward from this.

The last pair much reduced in size is minutely chelate, and bears terminally many stiff hairs.

Length of carapace in the median line from tip of rostrum to the insinuation of the posterior border, 23 mm.

Breadth, 23 mm.

Length of cheliped, 56 mm.

It is impossible to look at this species without recognising its strong likeness to the family *Galatheidæ*.

Dredged by Dr. Verco, St. Vincent Gulf; also a specimen from Port MacDonnell, collected by Dr. Torr.

#### Family GALATHEIDÆ.

Genus *Galathea*, Fabricius.

#### *Galathea setosa*, n. sp. Pl. xxxv., figs. 2, 2a, 2b.

This species is found with *G. australiensis*, Stimpson, and though closely allied to it is, however, I believe, distinct.

The transverse striæ of the carapace, which are much less numerous than in that species, are, especially on the gastric and hepatic regions, broken up into arcuate lobes or squamæ, from which spring very long, coarse, minutely serrate setæ, along with some shorter ones; these extend on to the rostrum, where they arise from small, round tubercles, and are longer than the rostral teeth. The rostral teeth are somewhat ovato-lanceolate in shape, especially the terminal one. The armature of the surface of the carapace is insignificant; there are two very small, obtuse teeth on the gastric region, placed on the most anterior arch, which are wider apart than the two spines of *G. australiensis*; two similar teeth are placed further back and wider apart than these, while there is one on each hepatic region. The first two teeth only are constant. The lateral spines of the carapace are seven, including the post-ocular, which is small.

The three anterior segments of the pleon, except the first, have deep, transverse sulcations, the posterior margins of which, and also faint transverse ridges close to the anterior margins, are fringed with similar forward-directed setæ, as those on the carapace. The fifth segment has a strong transverse ridge about the middle, the hairs of which and also those of its anterior faint ridge are directed backwards.

The eyes are rather large; they have a fringe of strong setæ at their bases.

The spines at the ends of the antennular joints are long, being visible beyond the eyes.

The flagella of the antennæ are longer than the chelipeds and are furnished with setæ at the internodes. (Those of *G. australiensis* are nearly naked.)

The chelipeds, as compared with *G. australiensis*, are shorter and stouter; they are squamose and clothed with long, coarse hairs, the spines also are longer and not so projecting



outwards. The fingers are nearly as long as the palm, elongate, and becoming more narrowed or acute at the ends; they are excavate, and have no hiatus in either sex, and are minutely serrate on their outer opposable edges. The immobile finger terminates in two strong, hooked teeth, with one more or less rudimentary on each side. The mobile finger has one hooked tooth, with a rudiment on each side.

The following three pairs of legs are very spiny and very setose. The dactyli are strong, with horny, curved claws and marginal spines.

In both species the telson of the male has on each side above the middle a group of strong, corneous bristles; these on stronger magnification appear to be hollow, and have their tips split, and in spirit specimens have a shiny appearance and golden colour. *G. australiensis* varies in colour, specimens from shallow water are greenish or bluish, those from 20-30 fms. are deep red. The present species has a remarkable colouration. The carapace is white in the middle, and towards each side is a band of colour, in which violet, orange, and brown are seen. The sternal surface is orange. The chelipeds are white, with red spots, the fingers are deep red. The legs are banded with violet, orange, and white. The antennal flagella are red.

Although the differences between these two species are small, they appear constant; a moderate series of specimens having been observed with no sign of intermediacy. In practice they are not difficult to separate.

Through the kindness of the Director of the Australian Museum, I have been able to compare this species with *G. aculeata*, Haswell, and note the following differences:—*G. aculeata* is much less setose and spinose on all parts, its rostrum is nearly smooth, and its terminal spine is much slenderer and lanceolate. The joints of the chelipeds are much less robust, the carpi being longer. The fingers are notably longer than the palm.

From *G. magnifica*, Haswell, it differs in the coarse and harsh hairs of the carapace. In the striæ of the gastric region being broken up into arcuate lobes. In the setose, rostrum, eye peduncles, and limbs. The colour markings are also different.

Length of carapace, 5 mm.

Length of cheliped, 10 mm.

Dredged by Dr. Verco, Investigator Straits, S.A., 20-30 fms.

Types in Adelaide Museum.

## DESCRIPTIONS OF PLATES.

## PLATE XXXII.

*Paguristes frontalis*, M.-Edw.

- Fig. 1. Antennal peduncle, side view, enlarged.  
 2. Mandible, enlarged.  
 3. First maxilla, enlarged.  
 4. Second maxilla, enlarged.  
 5. First maxilliped, enlarged.  
 6. Large cheliped, enlarged.  
 7. Appendage of first abdominal somite of male enlarged.

## PLATE XXXIII.

- Fig. 1. *Paguristes brevirostris* n. sp., enlarged.  
 1a. " " anterior regions, enlarged.

## PLATE XXXIV.

- Fig. 1. *Paguristes sulcatus*, n. sp., enlarged.  
 1a. " " anterior regions, enlarged.

## PLATE XXXV.

- Fig. 1. *Porcellana rostrata*, n. sp., enlarged.  
 1a. " " anterior regions, enlarged.  
 1b. " " third maxilliped, enlarged.  
 2. *Galathea setosa*, n. sp., enlarged.  
 2a. " " third maxilliped, enlarged.  
 2b. " " cheliped, enlarged.

## PLATE XXXVI.

- Fig. 1. *Petrocheles australiensis*, Miers, enlarged  
 1a. " " third maxilliped, enlarged.  
 2. *Polyonyx transversus*, Haswell, enlarged.  
 2a. " " anterior regions, enlarged.









