RECORDS

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REVISION OF THE FRESHWATER CRAYFISHES OF SOUTH-WESTERN AUSTRALIA.

ΒY

ALLAN R. McCULLOCH, Zoologist, Australian Museum.

PLATES XXXII TO XXXV.

Most of the material on which the following notes are based, was received in January 1912 from Mr. Bernard H. Woodward, Director of the Western Australian Museum. At my request, he very kindly collected together a large series of specimens of all sizes from various scattered localities. These prove to belong to three species of the genus *Cheraps*, and may be reasonably supposed to be representative of the fresh water crayfishes of South-western Australia. I am indebted, also, to Mr. W. B. Alexander for information on other specimens, since received by the Western Australian Museum. There are also a few examples in the Australian Museum which were collected near Perth and at Albany by Mr. A. Abjornssen, Inspector of Fisheries, Western Australia.

While engaged on the preparation of these notes I learnt that Mr. Geoffrey Smith was to read a paper before the Zoological Society of London on the crayfishes of Australia, and I preferred to avoid confusion by waiting until it had been published.¹ The greater part of the material available to him was collected in Tasmania and Victoria, though he had a few specimens from South-western Australia. Those I have examined belong to the same species as identified by him, but having a large and apparently representative series of each, I have been able to describe and figure some noticeable variations in their specific characters.

¹ Smith, Proc. Zool. Soc., 1912, pt. I., pp. 144-171, pls. XIV-XXVII.

CHERAPS, Erichson.

Cheraps, Erichson, Arch. fur Naturg., XII, i., 1846, p. 101. Id., Von Martens, Monastb. Ak. Wiss. Berlin, 1868 (1869), p. 616.

Chaeraps, Smith, Proc. Zool. Soc., 1912, p. 165.

(Not Cheraps, Huxley, Proc. Zool. Soc., 1878 (1879), p. 768.)

The genus Cheraps was first defined by Erichson as a sub-genus of Astacus, Milne Edwards, for his C. preissii, but his definition does not include some of the most important characters by which the several genera of the family Parastacidae are distinguished.

Huxley, in 1868, raised it to the rank of a genus, and described the branchial structures in detail, but he only had a specimen from the Yarra River, Victoria, which he could not, with certainty, Taking into consideration Smith's identify as a true Cheraps. recent investigations on the Crayfishes of Australia, it is almost certain that Huxley's specimen was Astacus bicarinatus, Gray, which Smith made the type of his Parachaeraps. Therefore, Cheraps of Huxley, but not of Erichson, is identical with Parachaeraps.

Smith has again defined Cheraps, his definition being based on C. quinquecarinatus, Gray, C. tenuimanus, Smith, C. quadricarinatas, Von Martens, and C. intermedius, Smith, but unless these can be shown to be generically identical with the lost C. preissii, their claim to inclusion in Cheraps cannot be proved. For reasons given below, however I regard C. intermedius as synonymous with C. preissii; if this conclusion be accepted, it follows that Smith's definition correctly applies to Cheraps, Erichson.

CHERAPS PREISSII, Erichson.

Astacus (Cheraps) preissii, Erichson, Arch. fur Naturg., XII, i., 1846, p. 101. Id., Von Martens, Monatsbr. Ak. Wiss. Berlin, 1868 (1869), р. 617.

Astacofsis preissii, Haswell, Cat. Austr. Crust., 1882, p. 177. Chaeraps intermedius, Smith, Proc. Zool. Soc., 1912, p. 168, pl. XXIV., fig. 2, and pl. XXVII., fig. 34.

C. preissii was very imperfectly described from a specimen taken in South-Western Australia and has not again been recognised.¹ This unique specimen is apparently lost since Dr. Von

¹ I consider the specimens from Victoria which Ortmann (Zool. Jahrb. VI., 1891, p. 8, pl. I., fig. 1.) identified as *C. preissii* to be almost certainly *Parachaeraps* bicarinatus, since it is improbable that a species occurring in the fresh waters of South-western Australia would also be found in Victorian rivers. Some notes on the distribution of P. bicarinatus, are given under the heading of that species.

Martens was unable to find it in the Berlin Museum in 1868, and Professor A. Brauer, Director of that Institution, has very kindly informed me that it is not there now, and that he does not know where it is.

For the purpose of this paper, I have examined over one hundred crayfish from several widely separated localities in Southwestern Australia. Most of these were received from Mr. Woodward who made special efforts to secure good series of as many different species as possible. They represent only three species— *C. quinquecarinatus, C. tenuimanus, and C. intermedius* and hence I suppose that no other occurs in that part of the Continent. Therefore, the lost *C. preissii* is identical with one of these, and for reasons given below, I believe that one to be *C. intermedius*.

According to Erichson the margins of the rostrum are entire while he does not note the presence of any keels on the carapace. In C. tenuimanus the rostrum is armed with several strong lateral teeth, and the carpace bears three keels in addition to the two extending backwards from the rostrum. C. quinquecarinatus also has five keels. C. intermedius, on the other hand, has only two which are more obtuse and less elevated than those of the other species, while the teeth of the rostrum are sometimes so small as to be easily overlooked; in addition to these facts, such other characters as Erichson has given, agree very well with my specimens of C. intermedius. Erichson's specimen was only three inches five lines long, and the chelae measured one inch in length and five lines in breadth. These proportions agree much better with Smith's C. intermedius than with another which I propose to separate as var. angustus, in which the chelae are much narrower, particularly in young specimens.

The following are the principal characters of the species as exhibited by eighteen specimens 95-161 mm. long from the tip of the rostrum to the end of the telson.

Carapace finely pitted above, minutely tubercular on the lower parts of the sides, the tubercles a little larger anteriorly ; a series of slightly enlarged tubercles on the sides behind the cervical groove. Two obtuse keels, each terminating anteriorly in a very blunt spine or tubercle. Rostrum almost horizontal or obliquely deflexed, not reaching the end of the antennal scales; it is flat above and the margins are defined by very narrow, scarcely raised keels.

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It ends in a spine and there are two, inconspicuous, lateral serrations on each side near the tip. Abdomen with pits, but otherwise smooth.

Chelipeds massive, the hand either half, or usually more than half as broad as long. It is smooth and rounded above with minute, rather scattered pits which become larger and more crowded on the outer surface. Inner margin raised, with seven to nine serrations which form rounded tubercles in large specimens; a tomentose patch inside this margin. Fingers either meeting along their whole length or more or less widely gaping. Mobile finger with a rounded tubercle about the middle of its length, which may be either extremely small, or large and followed by several smaller ones. Immobile fingers with a row of larger or smaller tubercles along the basal half. Wrist with a large blunt internal spine and sometimes a second smaller one at its base.

The colours are faded, but the chelae appear to have been purplish with many lighter spots.

Of the eighteen specimens, eleven are from Kojonup; six were collected in a billabong at Harvey, Harvey River; and one from Guildford, near Perth. Mr. Alexander has also seen it from streams outside the Mammoth Cave and inside the Calgardup Cave, in the cave district, South-western Australia. The specimens from the latter were living absolutely in the dark.

CHERAPS PREISSII, var. ANGUSTUS, var. nov. Plate XXXII.

This variety differs from the typical form only in having more slender chelipeds and legs, and a slightly narrower carapace. The chelae are particularly narrow in my smallest specimen, and in this respect differ greatly from others of the typical form of about the same size in which they are almost similar to those of the adults. The colour, after long preservation, is a dark violet with light bluish areas on the sides and under parts.

The plate illustrates the only three specimens I have seen which were collected for the Australian Museum by Mr. A. Abjornssen, near Albany. They are 141, 102, and 78 mm. long from the tip of the rostrum to the end of the telson, and the largest and smallest are females.

CHERAPS QUINQUECARINATUS, Grav. PLATE XXXIII.

Astacus quinque-carinatus, Gray, in Eyre, Journ. Exped. Centr. Austr., I, 1845, p 410, pl. III, fig. 3. Astacus (Cheraps) quinquecarinatus, Von Mastens, Monatsbr. Akad. Wiss. Berlin,

1868 (1869), p. 616. Astacopsis quinque-carinatus, Haswell, Cat. Austr. Crust. 1882, p. 176. Chaeraps quinque-carinatus, Smith, Proc. Zool. Soc., 1912, p. 165, pl. XXIII and XXVII, fig. 25-29.

I have examined thirty-eight specimens of all sizes between 45 and 131 mm. long, from the tip of the rostrum to the end of the telson, and find but little variation in the essential characters of this species. There are some differences in the form of the chelae, which consist chiefly of an alteration in the shape of the fingers, they being narrow and somewhat pointed in some, and much broader and more obtuse in others. A tomentose patch on the upper surface of the hand, near the inner margin, is usually present, but may be absent.

Carapace finely pitted above; large specimens with some very minute tubercles on the lower anterior parts of the sides. A row of enlarged tubercles behind the cervical groove. Back with five keels, of which two are backward extensions of the lateral margins of the rostrum. The median keel arises between these last, and may run backward to the cervical groove or terminate well before that point; the outer keels form two sharper or blunter points anteriorly. Rostrum either horizontal or rather obliquely deflexed not reaching the ends of the antennal scales ; its sides are elevated, leaving the upper surface more or less concave. It ends in a spine, and there are usually two, rarely one or three denticulations on each side near the tip. Its length and breadth is subject to a little variation. Abdomen pitted but otherwise smooth.

Chelipeds rather massive. The hand is comparatively elongate, its breadth being always distinctly less than half its length. It is smooth and rounded above with small scattered pits, which are a little larger and more crowded on the outer surface; the two largest specimens have a narrow, irregular groove along the middle of the The inner margin is raised with seven to nine upper surface. serrations; usually there is a tomentose patch just within this margin. Fingers either meeting along their entire length, or with a larger or smaller gape between them. They are armed with one or more small rounded tubercles on their inner margins which are scarcely developed in the smaller examples. Wrist with a sharp internal spine, and often several smaller ones near its base.

Such specimens as retain any traces of colour appear to have been purplish with minute pale dots on the chelae.

The material described above was collected at the following localities in South-western Australia:—Chidlow's Well, north-east of Perth; near Perth; Cannington, south of Perth; seven miles above Harvey, Harvey River; Korijekup, Harvey River. According to Mr. Alexander, this species. which is known as the gilgie, is probably restricted to the smaller streams which do not dry up in the summer. In addition to the above noted localities, he has identified specimens from the Vasse River.

CHERAPS TENUIMANUS, Smith.

PLATES XXXIV & XXXV.

Chaeraps tenuimanus, Smith, Proc. Zool. Soc., 1912, pt. I., p. 166, pl. XXII., and pl. XXVII., fig. 30.

A well graduated series of forty specimens, ranging from 57-296 mm. long from the tip of the rostrum to the end of the telson, shows considerable variation in the form of the chelae and rostrum, as well as in the armature of the latter.

The chelae are always much more slender in young specimens than in adults, while large specimens always have the fingers bent more or less obliquely inwards. The teeth on the inner margin of the palm are scarcely developed in small specimens, but become very prominent in adults; there are usually seven or eight, but may be as few as three. Though these alterations are correlated with growth, yet specimens of the same size are not always equally changed, some retaining their juvenile characters longer than others. Some different forms of chelae are illustrated on plate XXXV.

The rostrum has from three to six denticulations on either side which, as often as not, are not paired but more or less alternate. Its length and breadth are also variable; it may reach well beyond the antennular peduncle, or only to the middle of the last joint, but it never attains the tip of the antennal scale. A few of the most striking variations shown in my series are figured on plate XXXV. The following are the principal characters of the species.

Carapace finely pitted above; large specimens have numerous sub-acute tubercles on the back and sides behind the cervical groove which can be traced more or less distinctly in all but the smallest specimens. There are usually four sharp spines on the sides directly behind the cervical groove. Back with five keels, of which two are backward extensions of the lateral margins of the rostrum. The median keel rises between these last and may run back to the cervical groove, or terminate well before that point. The outer keels each end in an acute spine anteriorly. Rostrum nearly horizontal or obliquely smooth in younger specimens but with numerous large and rounded tubercles in adults.

Chelae slender in young, massive in adults; the breadth varies from more than four to about two-and-a-half in the length, according to age. They are smooth and rounded above, with minute scattered pits which are more crowded on the outer surface. The inner margin is not raised upwards, and is usually provided with seven or eight tubercular denticulations. There is no tomentose patch on the upper surface in any of my specimens. Fingers either meeting along their whole length or with a greater or smaller gape between them. They each have a large tubercle on the basal halves o their inner margins, with one or two smaller ones behind them. Wrist with a moderately large internal spine.

This large and handsome species is apparently confined to the rivers of South-western Australia. Of the series examined the greater number were obtained in the Harvey River, seven miles above Harvey; one is from Korijekup, Harvey River; one from Margaret River; one from Balingup Brook; and three from the Warren River. Mr. W. B. Alexander informs me that it is known as the Marron, and that he has also seen it from Kojonup.

Genus PARACHAERAPS, Smith. PARACHAERAPS BICARINATUS, Gray.

Parachaeraps bicarinatus, (Gray) Smith, Proc. Zool. Soc. 1912, pt. I., p. 163, pl XXI., and pl. XXVI., figs. 15-24.

Smith has described specimens of this species from Victoria, and states that "it is widely distributed all over Central, Northern, and Western Australia and in Queensland." Unfortunately, the only definite localities he gives are a few in Eastern Australia. I am unable to find any records of its occurrence in Western Australia, though since it lives in the deserts of Central Australia, and at Port Essington it possibly extends into the central and northern parts of the Western State. As already stated it is not represented in a series of more than one hundred specimens from several widely separated localities in South-western Australia, its place being apparently taken by *Cheraps preissii* which resembles it both in appearance and in habits.



Cheraps preissii, var. angustus. PLATE XXXII.



A. R. McCulloch, del.]

Cheraps quinquecarinatus. PLATE XXXIII.



A. R. McCulloch, del.]

Cheraps tenuimanus, Smith. PLATE XXXIV.



Cheraps tenuimanus, Smith. PLATE XXXV.