

Types of Parastacidae (Crustacea: Decapoda) held in the Museum of Victoria

Helen M. Lew Ton and Gary C. B. Poore

Department of Crustacea, Museum of Victoria, Swanston Street,
Melbourne, Victoria 3000, Australia

Abstract. Lew Ton, H.M. and Poore, G.C.B. (1987). Types of Parastacidae (Crustacea: Decapoda) held in the Museum of Victoria. *Occasional Papers from the Museum of Victoria* 3: 21-29.

Type designations, identifications, and locality labels of type specimens of 40 nominal species of Parastacidae held in the Museum of Victoria are reported and some problems over type status resolved.

Introduction

The Australian freshwater crayfish are placed in the family Parastacidae. The fauna is diverse with 10 genera and about 100 valid species.

The Museum of Victoria is a major repository of parastacid specimens. Its collection contains a significant number of type specimens but many of these were unidentified as to type status, or were wrongly labelled. With a resurgence of interest in parastacid taxonomy it is timely to resolve problems and publish a type list.

The Museum of Victoria's parastacid collection has been studied by three major workers, Geoffrey Smith, Ellen Clark and Edgar Riek. Their taxonomic publications (Smith, 1912; Smith and Schuster, 1913; Clark, 1936, 1939, 1941a, 1941b, Riek, 1967, 1969, 1972) described most of the species and specifically mentioned material in the Museum of Victoria. Until 1983 these collections were part of the National Museum of Victoria.

Only a few parastacid types were registered before 1980. As neither Smith nor Clark nominated a type specimen (as defined by article 72 in the International Code of Zoological Nomenclature) extensive series of syntypes exist. These were traced by comparison of specimens with published specimen and locality lists. It is now apparent that some type material, especially that of Clark, is lost.

This contribution lists the Museum of Victoria's type holdings of species described by the three authors mentioned, as well as those of Morgan (1986).

For each species listed the following information is given:

1. Registration numbers (with a J prefix)
2. Numbers of specimens and their status.
3. Transcripts of all labels.

All specimens are stored in 70% alcohol.

Parastacid types of G. W. Smith

Smith (Smith, 1912; Smith and Schuster, 1913) did not nominate any types and thus all the material which he or

they examined has syntype status. The material on which he worked was not returned to the Museum of Victoria until 1920. In several parts of the collection there are labels which state (in part) "Specimens named from descriptions, and labelled by Assistant at Oxford Museum" (our emphasis.) Thus there are none of Smith's own labels with specimens. These labels from Oxford are hand-written in ink on poor quality paper which is disintegrating ("Oxford label" in text).

It seems that when the material was unpacked, a staff member of the National Museum of Victoria (who also wrote the label described above) wrote labels in the following style (referred to as "Smith labels"):

Each label has locality and collecting data hand-printed on one side, and on the other side, the identification of the specimen written in script.

The labels were then tied on to the specimen which was wrapped in gauze, together with any other labels which may have accompanied it, and stored in a large jar with other similarly packed specimens.

Not all this material can be readily identified. Because of the method of bulk storage, and subsequent use of the specimens, labels and specimens have become separated and mixed over the years.

Parastacid types of E. M. Clark

In none of her taxonomic papers did Clark nominate holotype and paratype specimens, nor did she clearly limit her type series. Thus all of the material listed as having been examined has type status [ICZN Article 72(b)(i)]. Accordingly, all specimens have been regarded as syntypes.

Clark's normal practice was to list localities from which specimens were examined. The first locality was given as "type locality". Usually a sentence followed which stated "Type in National Museum, Melbourne" or "Types in National Museum, Melbourne". Specimens from the stated type locality usually have a label in Clark's handwriting

which gives their status as type(s) quite clearly. Specimens from other localities were not labelled as types by Clark but may have her identification label with them.

Much of the material examined by Clark cannot be found in the Museum of Victoria. In most cases, material from her type locality has been found but much of the other material appears to be lost. It is possible that some of this material, especially from non-Victorian localities is in other Australian museums.

Apart from the material from her "type locality" Clark placed very few identification labels with her specimens. Generally type material has been located by comparing the identification (usually as made by subsequent workers) and the locality list as published by Clark.

The labels in Clark's material are of four main kinds:

Type 1. Hand-written—these are in Clark's own writing and generally bear her name or initials.

Type 2. Printed (type-set) with the words "det. E. Clark" and with other information (species name, date, type status) in Clark's hand-writing.

Type 3. Printed (type-set) with the words "det. H. Clark, 1935" and with Clark's identification and the date "11-1935" in her hand-writing.

Type 4. Printed (type-set) with the words "det. E. Clark, 1939" only.

It seems that when Clark began work on parastacids she was known, at least by some, as Helen (not Ellen which is the name under which she published). A letter in the files of the Museum of Victoria refers to her as "Miss Helen Clark". The earlier hand-written labels (dated 1934) have the initials "H.C." on them. Later labels have either "E.C." or "E. Clark" written on them. The label of 1935 (type 3) is printed as "H. Clark".

Parastacid types of E. F. Riek

All Riek's type material is labelled by him in his own hand-writing with identification, type status and locality. Riek also identified numerous non-type specimens.

Taxonomic implications of Riek's (1969) revision

In parts of this paper (e.g., *Cherax bicarinatus* p. 899), Riek makes clear unambiguous lectotype designations but his nomination of a "type" for other species of which only syntypes exist may also be interpreted as designation of a lectotype (ICZN 74(a)).

It is not clear whether Riek was aware of the existence of syntypes and what he intended by use of "type". Nevertheless, use of "type" for species of which only syntypes existed must be interpreted as a lectotype designation (ICZN 74(a)). Where an individual fitting his "type" description can be identified (e.g., for *Astacopsis kershawi*) a lectotype and paralectotypes are here recognized.

More often, his nominated "type" specimen cannot be uniquely reconciled with a single animal from the syntype series and has not been labelled as "type" by Riek. In these cases no lectotype is recognized. In view of the apparent loss of numerous specimens from the collection it is possible that these "types" (lectotypes) were properly labelled as such and are also now lost. Evidence of the existence of such specimens would allow some specimens (now labelled as syntypes) to be relabelled as paralectotypes.

ASTACOPSIS

Astacopsis gouldi Clark, 1936

It is clear that Clark had a series of specimens when she described this species. Only a single specimen, labelled as "type", is in the collection.

J870 LECTOTYPE designated by Riek (1969)

"*Astacopsis gouldi* Clark. Type. det. E. Clark 1939"—type 2 label. It is assumed that this specimen comes from the designated type locality (Circular Head, Tasmania).

Astacopsis kershawi Smith, 1912

Smith (1912) described two varieties of *A. kershawi* which he referred to as "the large Gippsland crayfish" from the Moe River and "the small Gippsland crayfish" from the Narracan River. Specimens of both varieties are in the Museum of Victoria collections. As Smith did not nominate a holotype, when Riek (1969: 894) stated that a holotype, allotype and paratype are in this collection, he effectively designated a lectotype. This predates the lectotype designation of Morgan (1986).

J869 LECTOTYPE designated by Riek (1969)

"*Astacopsis kershawi* Smith"—Oxford label.

"*Astacopsis kershawi* Smith Moe River, Gippsland West, Victoria. Collected W. Kershaw -.12.1886"—Smith label.

J4528 5 PARALECTOTYPES designated by Riek (1969)

"*Astacopsis kershawi* Smith"—Oxford label

"*Astacopsis kershawi* Out of Narracan River, Gippsland. Collected by W. Kershaw -.3.1890"—Smith label.

These specimens have become paratypes of *Euastacus woiwuru* Morgan, 1986.

J11962 2 PARALECTOTYPES designated by Riek (1969) and removed from J869.

Astacopsis tricornis Clark, 1936

Clark described this species from five specimens. In the collection, there are two specimens and a small vial with gills and a pereopod which have been dissected from a third specimen. Two localities are given on a single label in this jar.

In her original publication (Clark, 1936) Clark did not nominate a type specimen. However in a subsequent publication (Clark, 1939) an effective lectotype designation was made ("the type of this species is only 105 mm in length"). When this length figure is combined with the type locality data it is clear that Clark was referring to a single specimen identified by Smith (1912: 56) as *Astacopsis franklini* var. *tasmanicus*. Smith stated that this animal is 100 mm long and Clark's (1939) statement that the type measures 105 mm is regarded as a minor discrepancy in measurements.

The presence of Clark's type label and the original locality label (in the same handwriting as "Smith" labels) makes it clear that the larger specimen (our measurement of total length, 98 mm) is the one to which Clark (1941) referred to as the "type".

Neither specimen in the jar is likely to have come from Sandridge (the second locality mentioned on the label). *A. tricornis* is known only from the Lake St Clair district. The second animal is assumed to be one of the specimens from Cradle Mountain, the second locality mentioned by Clark in her publication (1936: 37). It is assumed that the

Saundridge locality refers to another specimen since removed.

J896 LECTOTYPE, PARALECTOTYPE (fragments of another paralectotype) designated by Clark (1939)

"*Astacopsis tricornis* Clark Types det. E. Clark 1936" – type 2 label.

"*Astacopsis tasmanicus* 1 spm Lake St Clair, Tas. 1.93 Pres. by Sir W.B. Spencer. 1 sp. Saundridge near Launceston, Tasm. Pres. by A. Bartholemew 24.9.88."

AUSTROASTACUS

Austroastacus cymus Clark, 1936

Only seven syntypes of the 38 examined by Clark from a single locality are in the collection. An additional Riek label also recognized these as types.

J895 7 SYNTYPES

"Dondangadale, Buffalo River, Vict. Dec 1935. E. Clark" – hand-written by Clark.

CHAERAPS

Chaeraps intermedius Smith, 1912

This species was described from two syntypes.

J11623 2 SYNTYPES

"*Chaeraps intermedius* Smith. W. Australia from (unclear) 30.4.80" – Smith label.

CHERAX

Cherax albidus Clark, 1936

Clark stated that she examined 247 specimens of *C. albidus* from ten localities. Of these 29 are found in the Museum of Victoria. The status of most of the syntypes was deduced by comparing the locality labels (mostly hand-written by Clark) and her published list of localities (Clark, 1936: 29).

Recent work by A. Sokol (1986) has led him to conclude that Clark's type series is not monospecific. He considers J10662, J11877 and J11878 to be *Cherax destructor*. Based on Sokol's identification J13414 is herein designated as lectotype.

J872 2 PARALECTOTYPES

No locality label. "*Cherax albidus* Clark Types det. E. Clark 1936" – type 2 label.

J10662 4 PARALECTOTYPES

"Bordertown S.A. L. Larwood 1936 Don. by Sth. Aust. Mus. 1-7-1936."

"det *C. destructor* A. Sokol Aug 1986"

J10672 4 PARALECTOTYPES

"Bordertown S.A. L. Larwood 1936 Don. by Sth. Aust. Mus. 1-7-1936."

J11875 5 PARALECTOTYPES

"Nurrabiel, Victoria. (F.E. Hutchinson, Nov. 1935)"

J11876 7 PARALECTOTYPES

"Nurrabiel, Vict"

J11877 3 PARALECTOTYPES

"Angaston, S.A. Don. by Sth. Austrl. Mus. 1-7-1936"

"det *C. destructor* A. Sokol Aug 1986"

J11878 5 PARALECTOTYPES

"Bordertown, S.A. L. Larwood 1936" – modern transcription of damaged original label.

"det *C. destructor* A. Sokol Aug 1986"

J13414 LECTOTYPE

"det *C. albidus* A. Sokol Aug 1986"

"Nurrabiel F.E. Hutchinson Nov 1935" removed from J11875.

Cherax barretti Clark, 1941

This species was described from a single male specimen. The holotype is not in the Museum of Victoria.

Cherax davis Clark, 1941

This species was described from "a large series of specimens" from a single locality (Clark 1941: 34). The syntypes held in the Museum of Victoria do not comprise the entire series and were not labelled by Clark.

J877 5 SYNTYPES

"Dumaresq Creek, Armidale. 3000' Consett Davis. Nov. 36"

Cherax destructor Clark, 1936

This species was described from a series of over 400 specimens from four states of Australia. Material from most of the localities listed for Victoria and South Australia is in the Museum of Victoria collections. The lectotype was collected from a pond in the grounds of the University of Melbourne and an extensive series of material from this locality exists. Smith (1912: 162) previously identified this series as *Parachaeraps bicarinatus* Grey. The pond no longer exists. The Hawthorn series mentioned by Clark is represented by 91 specimens (J1158, J10877, J10881). It appears that some of Clark's identification labels were put with the specimens some time after publication (e.g., J11891 – the identification is dated 1939, yet the locality and collector are included in the list published in 1936).

Sokol (1986) did not believe that Clark's type series is monospecific. He considered that J11884, J11890 and J13415 are *Cherax albidus*. Based upon Sokol's identification J871 is herein nominated as lectotype.

J871 LECTOTYPE

"*Cherax destructor* Clark Types det. E. Clark 1936" – type 2 label.

"Pond in University Grounds, Melbourne, Vic." – hand-written by Clark.

J11880-J11889, J11894, J13415 24 PARALECTOTYPES

"Pond in grounds of University of Melbourne." Various collecting dates 1877-1888. This is the material identified by Smith (1912) as *Parachaeraps bicarinatus* Grey.

J1558 19 PARALECTOTYPES

"Quarry Hole, Hawthorn, Vic. Coll. Len. & Reg. Jones, Hawthorn, Jan. 1936" – hand-written by Clark.

J1559 17 PARALECTOTYPES

"Hawthorn, Vic. Len. & Reg. Jones, Jan. 1936" – hand-written by Clark.

J10877 28 PARALECTOTYPES

"*Cherax destructor* Clark det. E. Clark, 1939" – type 4 label. Hawthorn, Vic. (T. Quigley, Jan 1936)" – hand-written by Clark.

J10881 29 PARALECTOTYPES

"Hawthorn, Vic., (T. Quigley, Jan 1936)" – handwritten by Clark.

J11890 2 PARALECTOTYPES

"*Parachaeraps bicarinatus* Mortlake, Victoria (from Salt Creek). Colld H. Quiney Esq. 20.1.1904. D. S.W. Fulton

23.5.1906"—Smith label.

"det. *C. albidus* A. Sokol Aug 1986"—hand-written by A. Sokol.

J11891 1 PARALECTOTYPE

"*Cherax destructor* Clark det. E. Clark 1939"—type 4 label.

"from swamp at Pyramid Hill. Prestd. by Rev. E.H. Hennell 18.9.90"

J11892 1 PARALECTOTYPE

"*Parachaeraps bicarinatus* Muckleford Creek, Victoria. Colld. F.L. Billingham, — 11.1894. D. Sir W.B. Spencer."

J11893 5 PARALECTOTYPES

"Caught in a dam about 1/2 mile from Main Street, Murchison. Pres. by Neville Lyons, Murchison, 18-12-1935"—handwritten by Clark.

J11895 1 PARALECTOTYPE

"*Parachaeraps bicarinatus* Grey Det. H.C. 1934 Castlemaine, Victoria. Colld T.S. Hall. D. Sir W.B. Spencer April 1920"—Smith label annotated by Clark ("H.C.")

J11896 3 PARALECTOTYPES

"Yacka S.A. (C. Laube, 1935) Don. by Sth. Austrl. Mus. 1-7-1936."

J11897 4 PARALECTOTYPES

"Blanchetown, S.A. No. 1 Lock, R. Murray (G. Brooks, 1935) Don. by Sth. Aust. Mus., 1-7-1936"

J11898 5 PARALECTOTYPES

"Lower Light, via Two Wells, S.A. (H.T. Donnelly, 1935) Don. by Sth. Aust. Mus. 1-7-1936"

J11899 7 PARALECTOTYPES

"Ayponga S.A. Don. by Sth. Aust. Mus., 1-7-1936"

J11900 5 PARALECTOTYPES

"Mosquito Creek, 8 mls. Sth. of Naracoorte, S.A. H.A. Lindsay, 1936. Don. by Sth. Aust. Mus., 1-7-1936"

J11901 4 PARALECTOTYPES

"Onkaparinga S.A. (F.R. Ball, 1936). Don. by Sth. Aust. Mus. 1-7-1936"

J11902 5 PARALECTOTYPES

"Renmark, S.A. No. 6 Lock, R. Murray (Kennewell, 1935). Don. by Sth. Aust. Mus., 1-7-1936"

J11903 2 PARALECTOTYPES

"Kapunda, S.A. (H.L. Haines, 1935). Don. by Sth. Aust. Mus., 1-7-1936"

***Cherax punctatus* Clark, 1936**

Of the nine specimens examined by Clark, seven can be found in the Museum's collections. The type locality as published by Clark contains a typographical error and is Cooran (not Coorari).

J890 SYNTYPE

"*Cherax punctatus* Clark. Type det. E. Clark 1936"—type 2 label.

"*Parachaeraps bicarinatus* Cooran, Queensland, October 1891. In field on hillside. D. Sir W. B. Spencer April 1920."—Smith label.

J11874 6 SYNTYPES

"*Cherax punctatus* Clark"—hand-written by Clark.

"Eumundi, Queensland, (unclear) coll. J.A.K."

***Cherax rotundus* Clark, 1941**

Clark did not say how many specimens she examined but it is clear that there was more than one ("Length of average adult specimen. . ."). There is a single syntype in the Museum of Victoria collections.

J11624 SYNTYPE

"*Cherax rotundus* Clark Type"—hand-written by Clark. "Muddy R. Severn Crayfish from E. Sutton, Fletcher, Q."

ENGAEUS

***Engaeus affinis* Smith & Schuster, 1913**

Almost all of the specimens listed by Smith and Schuster are in the collections. Those missing are at least one specimen from Warburton (Smith and Schuster had at least six) and a single specimen from Victoria.

J38451 possible SYNTYPE, 1 other specimen

"*Engaeus affinis*"—Oxford label.

"*Engaeus affinis* Upper Yarra, F.J. Williams, 2.12.1869."

Smith and Schuster stated that a single specimen with this locality and collection date was examined and that "the chelae are equal in size". Of the two specimens in this lot, one has a chela missing (the possible syntype) and the other has unequal chelae.

J3846 SYNTYPE

"*Engaeus affinis*"—Oxford label.

"*Engaeus affinis* Fernshaw, J.A. Kershaw, 12.1882"—Smith label.

J3849 SYNTYPE

"*Engaeus affinis*"—Oxford label.

"*Engaeus affinis* Upper Yarra, F.D. Williams, 1871"—Smith label.

J3853 3 SYNTYPES

"*Engaeus affinis*"—Oxford label.

"*Engaeus affinis* Warburton, S.W. Fulton, 13.11.1905"—Smith label.

J3921 2 SYNTYPES

"*Engaeus affinis* Top of Black Spur, Fernshaw, 1880"—Smith label.

J4057 2 SYNTYPES

"Warburton, 13.11.1905"

Since this specimen was registered, the original labels have been lost. The identification and locality are given as they appear in the register. Also in the jar is a label with a description of the specimen when it was alive.

***Engaeus australis* Riek, 1969**

J910 HOLOTYPE

"*Engaeus australis* Riek HOLOTYPE"—hand-written by Riek. "Lilly Pilly Gully, Wilson's Promontory Vic. 4-9-1966 R.P. Cooper"

J3910 PARATYPE

"*Engaeus australis* Riek PARATYPE"—hand-written by Riek

"Lilly Pilly Gully, Wilson's Prom Coll: J. Furphy /vi/62"

***Engaeus connectus* Riek, 1969**

Originally all Riek's type material was stored in a single jar. The holotype has been removed and registered individually. It is impossible to separate the allotype from the paratypes as two of the specimens are the same length as that given for the allotype.

J882 HOLOTYPE

"*Engaeus connectus* Riek. Holotype, Allotype and Paratypes"—hand-written by Riek, locality data as published.

J11618 ALLOTYPE, 3 PARATYPES

Removed from J882.

Engaeus fultoni Smith & Schuster, 1913

Two of the three syntype specimens examined by Smith and Schuster are in the collection. Riek (1969) erred when he recorded a specimen from Beech Forest (J901) as the "holotype" as this specimen is not part of the original syntype series.

There is a note enclosed with J3967 which indicates that the second specimen from Ferntree Gully was sent out of the Museum on loan during the 1930s. It cannot now be found.

J3967 SYNTYPE

"Engaeus fultoni Cape Otway forest, Victoria. D. S.W. Fulton Esq. 28.5.1907"—Smith label.

J3968 SYNTYPE

"Engaeus fultoni Ferntree Gully, Victoria"—Smith label.

Engaeus hemicirratulus Smith & Schuster

The majority of Smith and Schuster's syntypes are in the collection. Only the specimen from "Kongwak via Jumbunna" is definitely missing. As there are six syntypes in the collection which could be Riek's (1969) "type" this lectotype designation is disregarded.

J903 SYNTYPE

(HOLOTYPE of *Engaeus jumbunna* Riek) This specimen is labelled as coming from Kongwak but it is more likely to have come from Moyarra (see comments under *Engaeus jumbunna*).

J3991 5 SYNTYPES

"Engaeus hemicirratulus near Thorpdale. Coll. by W. Kershaw 3.90"—Smith label.

J3995 SYNTYPE

There are two labels with this specimen:

1. "Warragul, Gippsland D. Sir W.B. Spencer April 1920"—Smith label. This label has been annotated "Engaeus hemicirratulus det H.C. 1/9/34" by Ellen Clark.

2. "Kongwak near Jumbunna, S. Gippsland, Vic. Presented by A.E. Kitson Esq. 13.2.02"—old label written in pencil.

As the animal is not 50 mm long and does not have its right chela enlarged, like Schuster's specimen from "Kongwak near Jumbunna" it is likely to have come from Warragul.

J3999 SYNTYPE

"Engaeus hemicirratulus"—Oxford label.

"Engaeus hemicirratulus near Thorpdale Gippsd Coll. by W. Kershaw 3-90"—Smith label.

J4001 SYNTYPE

There are two labels in this jar:

1. "Moyarra, near Outtrim"

2. "South of Warragul, Gippsland, July 1982".

The specimen is too small, 41 mm, to be the specimen from Moyarra, stated by Smith and Schuster to be 65 mm long. It probably comes from South of Warragul.

J4101 SYNTYPE

"Engaeus hemicirratulus"—Oxford label.

"Warragul, Gippsland, Vic. Colld by Prof. Spencer"—old label hand-written in pencil.

"Warragul, Gippsland. D. Sir W.B. Spencer, April 1920".

Engaeus ignotus Clark, 1939

Described from an unknown number of specimens, the syntypes in the Museum of Victoria do not represent the entire series. Clark stated that the length of the average adult specimen is 75 mm, yet the largest syntype available is only 60 mm.

J878 3 SYNTYPES

"Engaeus ignotus Clark. Types det. E. Clark"—type 2 label.

"Smithton, Tasmania. R.H. Champion, 25-10-1935"—handwritten by Clark.

Engaeus jumbunna Riek, 1969

Riek (1969) based this species on a single specimen which he described as a male, 65 mm long, with equal chelae. The specimen (J903) labelled as holotype by Riek matches this description and therefore is his material. The type locality, Kongwak, published by Riek is identical to that given by Smith and Schuster (1913: 124) for one of the syntypes of *Engaeus hemicirratulus* and is written on the label with the holotype. However, this specimen does not match the description of the individual of *E. hemicirratulus* from "Kongwak near Jumbunna" mentioned by Smith and Schuster which was 50 mm long and with an enlarged right chela. It ties much better with their syntype from Moyarra which otherwise cannot be accounted for. It seems probable therefore that labels have been mixed and that "Moyarra near Outtrim (= Outtrim)" is the type locality of this species.

J903 HOLOTYPE

"Engaeus jumbunna Riek Holotype"

"Kongwak, near Jumbunna S. Gippsland, Vic. Presd by A.E. Kitson 13.2.02"—old label written in pencil.

Engaeus leptorhynchus Clark, 1939

None of Clark's types can be found in the collection. There is a single specimen of *E. leptorhynchus* from the type locality, but the collecting details are not as published. As none of the labels is in Clark's hand-writing it cannot be assumed that this specimen is a type. Riek (1969) stated that he had seen the "types". Whatever specimens they were, they can not now be found in the Museum of Victoria.

Engaeus marmoratus Clark, 1941

None of Clark's material can be found in the Museum of Victoria.

Engaeus orientalis Clark, 1941

Material from Scanlon's Creek and Orbost cannot be found. There is no single specimen which could be regarded as Riek's (1969) "type".

J11615 21 SYNTYPES (2 large males, 19 small juveniles)

"Cann River Valley, Vict. 11 miles North of Cann Riv. J.B. Ponder, Jan. 1938. Types Det. E. Clark."—handwritten by Clark.

J11616 2 SYNTYPES

Removed from J11615.

"E. marmoratus det. P. Horwitz, 1985."

Engaeus phyllocercus Smith & Schuster, 1913

The total number of specimens examined by Smith and Schuster is unknown. In the collections there are specimens from each of the localities listed. As in *E. orientalis* there is no single specimen which can be unambiguously identified as Riek's (1969) "type".

J3953 SYNTYPE

"Engaeus phyllocercus"—Oxford label.

"Narracan, near Narracan River, Gippsland, Vic. Collected by W. Kershaw 1889".

J3955 2 SYNTYPES (both partially dissected)

"Engaeus phyllocercus"

"Narracan River, Gippsland. Collected by W. Kershaw 1889."

Large specimen loose, smaller specimen with label tied on. Large specimen (TL = 60 mm), may be the illustrated specimen.

J11620 1 SYNTYPE

"Engaeus phyllocercus"—Oxford label.

There are three locality labels with this animal, two of which are in the standard Smith format.

1. "Top of hill near Thorpdale, Gippsland. Collected W. Kershaw 1890."

2. "Narracan, Gippsland. Collected by W. Kershaw 1889."

3. "Engaeus phyllocercus Fig spm. Top of hill near Thorpdale, Gippsland. W. Kershaw, -3-90."

The animal in the jar is definitely not the figured specimen (TL = 50 mm).

J11621 1 SYNTYPE

"Engaeus phyllocercus"—Oxford label.

"Engaeus phyllocercus"

"From small creek near Thorpdale. Collected by W. Kershaw 1890."

J11622 1 SYNTYPE

"Engaeus phyllocercus Trafalgar, Gippsland. J.A. Kershaw 2-88"—Smith label.

Engaeus quadrimanus Clark, 1936

There are six of Clark's 46 syntypes in the collection. The specimens identified as *E. cunicularius* by Smith and Schuster (J3948, J3950, J3951) are included where their locality agrees with that given by Clark. None of these specimens has labels written by Clark. Smith and Schuster identified one specimen from Lakes Entrance as *E. cunicularius*, yet there are two specimens with this locality in the collection. As there is no accompanying Clark label J3950 is regarded as a possible syntype only. There is no single specimen which could be identified as Riek's (1969) "type".

J879 2 SYNTYPES

"Engaeus quadrimanus Clark TYPES. det. Clark—11-1935"—type 3 label.

"Warragul, Gippsland, W. Kershaw 1888."

J3928 1 SYNTYPE

"Engaeus quadrimanus Clark det. H. Clark 11-1935"—type 3 label.

"Near Lakes Entrance, W.K—87"

J3948 1 SYNTYPE

"Engaeus cunicularius"—Oxford label.

"Croydon, Victoria. S.W. Fulton. 28.5.1907"

J3950 1 possible SYNTYPE

"Engaeus cunicularius"—Oxford label.

"Near Lakes Entrance, Gippsland. Collected W. Kershaw 1887."

J3951 1 SYNTYPE

"Engaeus cunicularius"—Oxford label.

"Derby River, Wilsons Promontory. Collected J.A. Kershaw. Xmas 1905"—Smith label.

Engaeus sericatus Clark, 1936

Only nine of Clark's 30 syntypes can be found. There is no single specimen which can be identified as Riek's (1969) "type".

J905 2 SYNTYPES

"Engaeus sericatus Clark. Types det. E. Clark 1936"—type 2 label.

"Croydon, Victoria. S.W. Fulton" This label is in Clark's hand-writing.

J3939 3 SYNTYPES

"Engaeus sericatus Clark det. E. Clark 1936"—type 2 label.

"Mortlake, Victoria."

J3941 SYNTYPE

"Mortlake, Victoria. Colld H. Quiney Esp. 14.12.1903. D. S.W. Fulton 23.5.1906."

J3942 4 SYNTYPES

"Engaeus sericatus Clark. det. E. Clark 1936"—type 2 label.

"Engaeus sericatus Clark. Warburton, Victoria. S.W. Fulton & J.A. Kershaw"—hand-written by Clark.

Engaeus tuberculatus Clark, 1936

Only two of Clark's 43 syntypes can be found. There is no single specimen which can be identified as Riek's (1969) "type".

J883 2 SYNTYPES

"Engaeus tuberculatus Clark Types"—hand-written by Clark.

"Sherbrook Fall, Vict. (on hill). N.V. Favaloro Esq. 6.11.26"

Engaeus urostrictus Riek, 1969

All of Riek's types are in the Museum of Victoria.

J902 HOLOTYPE

"Engaeus urostrictus Riek HOLOTYPE"—handwritten by Riek.

"Dandenong Creek, at Alpine Road, Vic. J. Kane 24.3.1963."

J911 2 PARATYPES (females)

"Engaeus urostrictus Riek Type series"—handwritten by Riek.

Locality as for holotype.

J11619 3 PARATYPES (juveniles)

Removed from J911

Engaeus victoriensis Smith & Schuster, 1913

Described from an unknown number of specimens from nine localities. The Museum has 15 syntypes from seven localities in its collections. The "Oxford label" accompanies all lots except J3897. Riek's (1969) use of "type" uniquely identified the specimen from the Dandenong Ranges. This lectotype cannot now be found. All the remaining specimens are paralectotypes.

J3877 1 PARALECTOTYPE designated by Riek (1969)

"*Engaeus victoriensis* Victoria. J.A. Kershaw"—Smith label.

J3878 2 PARALECTOTYPES designated by Riek (1969)

"*Engaeus victoriensis* Emerald, Victoria. Collected E. Jarvis -8-04"—Smith label.

J3879 2 PARALECTOTYPES designated by Riek (1969)

"*Engaeus victoriensis* Ferntree Gully, Victoria. D. Sir W.B. Spencer, April 1920"—Smith label.

J3888 1 PARALECTOTYPE designated by Riek (1969)

"*Engaeus victoriensis* Ringwood, Victoria. Rev. E.H. Hennell -11-1890"—Smith label.

J3892 6 PARALECTOTYPES designated by Riek (1969)

"*Engaeus victoriensis* Victoria (-3-80) D. Sir W.B. Spencer April 1920"—Smith label.

J3895 1 PARALECTOTYPE designated by Riek (1969)

"*Engaeus victoriensis* Box Hill, near Melbourne, Victoria. D. S.W. Fulton 8-11-1905"—Smith label.

J3897 1 PARALECTOTYPE designated by Riek (1969)

"*Engaeus victoriensis* Sth. Gippsland, Victoria. July 1891. D. Sir W.B. Spencer April 1920"—Smith label.

J3905 1 PARALECTOTYPE designated by Riek (1969)

"*Engaeus victoriensis* Croydon (under logs) D. F.P. Spry 1.1.1904"—Smith label.

***Engaeus villosus* Clark, 1936**

None of the larger specimens examined by Clark is in the collection (maximum length of syntypes is 30 mm).

J3863 78 SYNTYPES

"*Engaeus villosus* Clark"—hand-written by Clark.

"Acheron River Flats. Nr. Marysville, Victoria. E. Clark, Jan. 1936"

EUASTACUS

***Euastacus bidawalus* Morgan, 1986**

The holotype is the only specimen held in this collection.

J4526 HOLOTYPE

"*Euastacus bidawalus* Ident. by G.J. Morgan"

"Chandlers Ck, 27 km N. of Cann River 37°20'S, 149°13'E coll. by G.J.M. & S.J.H. (9.11.81)."

***Euastacus bispinosus* Clark, 1941**

Clark described this species from an unknown number of specimens. She labelled one of her specimens from the Glenelg River as "type" and another as "paratype". This does not constitute designation of a holotype since it was not done in her paper. Morgan's (1986) use of the term "holotype" is a valid lectotype designation (ICZN 74(b)). J875 LECTOTYPE designated by Morgan (1986)

"*Euastacus bispinosus* Clark. Type Glenelg River, Victoria"—hand-written by Clark.

J873 PARALECTOTYPE designated by Morgan (1986)

"*Euastacus bispinosus* Clark. Paratype"—hand-written by Clark.

"Glenelg River, Victoria. Coll H. Pritchard."

***Euastacus elongatus* Clark, 1941**

This species was described by Clark from more than one specimen. There are seven syntypes in the Museum of Victoria but these do not cover all the localities mentioned in the text.

J874 SYNTYPE

"*Euastacus elongatus* Clark Type Echuca, Murray River"—hand-written by Clark.

J6200 4 SYNTYPES

"Jamieson River, Vic. Pres. by Mr A. Hordern Dec. 1935"—hand-written by Clark.

J6201 SYNTYPE

"Murray River, Echuca, Victoria. Dr. Harris Oct. 1935"—hand-written by Clark.

J6216 SYNTYPE

"Murray River, Echuca, Victoria. Dr. Harris Oct. 1935"—handwritten by Clark.

***Euastacus neodiversus* Riek, 1969**

All Riek's type material is in the collection.

J4531 HOLOTYPE

"*Euastacus neodiversus* Riek HOLOTYPE"—handwritten by Riek.

"National Park, Wilsons Promontory, 25.11.22. D. J.A. Kershaw 28.11.22. In stream on E. slope of Sealers Cover track about 1,000 ft about sea level."

J4532 PARATYPE

"*Euastacus neodiversus* Riek PARATYPE"—hand-written by Riek "Vereker Range, Wilsons Promontory, J.A. Kershaw, Xmas 1912."

***Euastacus suttoni* Clark, 1941**

It is clear that Clark had a series of specimens of *E. suttoni*. Only one specimen is held in the Museum of Victoria. Riek (1969) designated a lectotype by the words "Holotype male in MN". The only specimen in this collection is a female, not labelled by Riek so may be considered a paratype only if the existence of Riek's male can be confirmed.

J877 SYNTYPE

"*Euastacus suttoni* Clark Wyberba, Qld. E. Sutton"—hand-written by Clark.

***Euastacus woiwuru* Morgan, 1986**

All of Morgan's types are in the Museum of Victoria.

J4527 HOLOTYPE male

"Dobson's Creek, Dandenong P. Horwitz, 9.6.82."

J4528 5 PARATYPES

See *Astacopsis kershawi*

J4529 2 PARATYPES

"*Euastacus woiwuru* Paratypes Det G.J. Morgan"—hand-written by Morgan.

"*Euastacus cf. kershawi* In a creek crossing Clegg Rd at its lowest point near a railway bridge between Mt Evelyn & Wandin. Taken in nets 4 pm—cloudy day in 2' water. J. Kane /9/63"

J4530 1 PARATYPE

"*Euastacus woiwuru* Paratype Det. G.J. Morgan"—hand-written by Morgan.

"*Euastacus nobilis*"

"Mason's Falls Coll. D. Dening 14.3.63"

GEOCHARAX

***Geocharax falcata* Clark, 1941**

Clark gave no indication of the number of specimens which she examined. The Museum of Victoria holds a series

of 21 syntypes. Riek's (1969) "type" (lectotype) is identified as J898, which contains his hand-written label.

J894 10 PARALECTOTYPES designated by Riek (1969) "Geocharax falcata Clark. Types"—hand-written by Clark.

"Fyans Creek"

"South of Divide Grampians Dec 21st-31st 1934"—handwritten by Clark.

J898 1 LECTOTYPE designated by Riek (1969)

"Geocharax falcata Clark Type series"—hand-written by Riek.

From Fyans Creek, the locality details are as in J894 (modern copy of an old label).

J11879 10 PARALECTOTYPES designated by Riek (1969)

"Grampians Dec 21st-31st 1934"—hand-written by Clark.

Geocharax gracilis Clark, 1936

The collection contains 33 syntypes and another seven possible syntypes (J11880). The possible syntypes have two locality labels, which differ, but one of these is the original Smith label belonging to animals collected from Clark's type locality. It appears that Clark separated some of these specimens (J907) and placed her own labels with them. Riek's (1969) "type" cannot be identified as a single specimen.

J907 5 SYNTYPES

"Geocharax gracilis Clark. Types"—hand-written by Clark.

"Gellibrand River, S. of Colac, Coll'd by W.H. Hill Esq. -3.96"—hand-written by Clark.

J11880 7 possible SYNTYPES

"Gellibrand River, S. of Colac, Victoria. Colld by W.H.F. Hill Esq. -3.1896. D. Sir W.B. Spencer, April 1920"—Smith label.

"Victoria. D. S.W. Fulton"—Smith label.

J13413 28 SYNTYPES

"Portland, Vic. L.R. Kurtze, Sept 1935"—hand-written by Clark.

Geocharax laevis Clark, 1941

Clark based this species on a single specimen (Clark 1941b: 35). There is no specimen in the collection with a Clark label. The holotype is considered to be the specimen of *Geocharax laevis* which comes from Clark's type locality. A second specimen, (J963) labelled by Riek as "Geocharax laevis Clark Type series" is presumably the "type" which he examined (Riek, 1969: 889). It carries no locality label and cannot be regarded as the type specimen.

J11617 HOLOTYPE

"D. Mahony Bunyip 1932"

"HOLOTYPIC *E. laevis* P. Horwitz det 1985."

Geocharax lyelli Clark, 1936

Clark described this species from three specimens (two males and one female). Only the males can be found in the Museum of Victoria collections. The specimen which bears Riek's label is his "type" (= lectotype).

J904 1 LECTOTYPE designated by Riek, 1969

"Geocharax lyelli Clark. Type series"—Riek's hand-writing.

"Geocharax lyelli Clark Vic.; Gisborne. Col: G. Lyell. 21.9.36"—modern copy of old label.

J906 1 PARALECTOTYPE designated by Riek, 1969

"Geocharax lyelli Clark Types"—hand-written by Clark.

"Gisborne, Vict., G. Lyell, 21-9-1936"—hand-written by Clark.

GRAMASTACUS

Gramastacus gracilis Riek, 1972

Four of Riek's paratypes are in the Museum of Victoria.

J884 4 PARATYPES

"Dwyers Creek, Grampians, Vic. E.F. Riek, 23 Nov 1969"

Gramastacus insolitus Riek, 1972

Four of Riek's paratypes are in the Museum of Victoria.

J909 4 PARATYPES

"8 km SW Moyston Vic. E.F. Riek, 16 Nov 1969"

PARASTACOIDES

Parastacoides inermis Clark, 1939

It is not clear how many specimens Clark examined, but she gives the length of the largest as 50 mm. As Riek's "type" cannot be identified as a single specimen, these are considered still to be syntypes.

J889 2 SYNTYPES

"Parastacoides inermis Clark. Type det. E. Clark"—type 2 label.

"Adamson's Peak, Tasmania. 2850 ft. Coll. J. Thwaites, Hobart"

Parastacoides insignis Clark, 1939

Clark's syntype series consists of an unknown number of specimens, of which the adults measured an average 75 mm (Clark 1941b: 126). The largest specimen in the Museum of Victoria is 52 mm. There is no evidence that Riek (1969) made a valid lectotype designation.

J899 8 SYNTYPES

"Parastacoides insignis Clark. Types. det. E. Clark"—type 2 label.

"New Harbour, 27-1-26. In bottom grass. Copy of old label"

Parastacoides sternalis Riek, 1967

This species was described from a single specimen.

J897 HOLOTYPE

"Parastacoides sternalis Riek HOLOTYPE"—hand-written by Riek.

"Tas. NE of Mt. Bowes. A. Neboiss, 11 Feb. 1965"

Parastacoides pulcher Riek, 1967

All Riek's type material is in the Museum of Victoria.

J908 HOLOTYPE

"Parastacoides pulcher Riek. HOLOTYPE and 3 juveniles"—hand-written by Riek.

"Lake Pedder, Tasmania. A. Neboiss, 1 Feb. 1955."—3 juvenile specimens removed and registered as J11624.

J11624 3 PARATYPES (juveniles)

Removed from J908.

PSEUDENGAEUS

Pseudengaeus sternalis Clark, 1936

It is not known how many specimens Clark examined, but she clearly had more than one (Clark, 1936: 48). As

only one locality was given by Clark, the specimen in the collections should be regarded as a syntype. A label saying "HOLOTYPE" of unknown origin has been placed with this specimen. Riek's hand-written label suggests that this is his "type". This specimen is therefore the lectotype. J900 LECTOTYPE designated by Riek

"Pseudengaeus sternalis Clark. det. H. Clark -11-1935"—type 3 label.

"Warragul, Gippsland. J.A. Kershaw 12-1899."

"Engaeus sternalis (Clark) E.F. Riek, 1967"—hand-written by Riek.

Pseudengaeus strictifrons Clark, 1936

None of Clark's syntypes is in the collections.

References

- Clark, E.M., 1936. The freshwater and land crayfishes of Australia. *Memoirs of the National Museum of Victoria* 10: 5-58
- Clark, E.M., 1939. Tasmania Parastacidae. *Papers and Proceedings of the Royal Society of Tasmania* 1939: 117-128.
- Clark, E.M., 1941a. Revision of the genus *Euastacus* (Crayfishes, Family Parastacidae), with notes on the distribution of certain species. *Memoirs of the National Museum of Victoria* 12: 7-30.
- Clark, E.M., 1941b. New species of Australia freshwater and land crayfishes (Family Parastacidae). *Memoirs of the National Museum of Victoria* 12: 31-40.
- Morgan, G.J., 1986. Freshwater crayfish of the genus *Euastacus* Clark (Decapoda: Parastacidae) from Victoria. *Memoirs of the Museum of Victoria* 47: 1-57.
- Riek, E.F., 1967. The Tasmanian freshwater crayfish genus *Parastacoides* (Decapoda: Parastacidae). *Australian Journal of Zoology* 15: 999-1006.
- Riek, E.F., 1969. The Australian freshwater crayfish (Crustacea: Decapoda: Parastacidae), with descriptions of new species. *Australian Journal of Zoology* 17: 855-918.
- Riek, E.F., 1972. The phylogeny of the Parastacidae (Crustacea: Astacoidea), and a description of a new genus of Australian freshwater crayfishes. *Australian Journal of Zoology* 20: 369-389.
- Smith, G.W., 1912. The freshwater crayfishes of Australia. *Proceedings of the Zoological Society of London* 1912: 144-171.
- Smith, G.W. and Schuster, E.H.J., 1913. The genus *Engaeus*, or the land crayfishes of Australia. *Proceedings of the Zoological Society of London* 1913: 112-127.
- Sokol, A., 1986. *Morphological variation in relation to the taxonomy of the destructor group of the genus Cherax (Decapoda: Parastacidae)*. Ph.D. thesis, Monash University.