

J. C. FABRICIUS' (1798) SPECIES OF ASTACUS, WITH
AN ACCOUNT OF HOMARUS CAPENSIS (HERBST) AND
EUTRICHOCHELES MODESTUS (HERBST)
(DECAPODA MACRURA)

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In his last revision of the genus *Astacus*, Fabricius (1798: 406-408) recognized eight species within that genus: *A. marinus* (= *Homarus gammarus* (L., 1758)), *A. fluviatilis* (= *Astacus astacus* (L., 1758)), *A. norwegicus* (= *Nephrops norvegicus* (L., 1758)), *A. Bartonii* (= *Cambarus bartonii* (Fabricius, 1798)), *A. coerulescens* (= *Hippolyte coerulescens* (Fabricius, 1793)), and three species that so far have been considered species dubia and have generally been ignored during the last 150 years. These three species are *Astacus fulgens*, *A. fulvus*, and *A. scaber*. *Astacus fulgens* Fabricius (1775: 415; 1793: 480; 1798: 408) is no Decapod Crustacean, but almost certainly a Euphausiacea. I have not been able to find any mention of it in modern literature on Euphausiacea, and it evidently is completely forgotten. Of *Astacus fulvus* the type specimen is still preserved in the Copenhagen Zoological Museum, and on examination proved to belong to *Homarus capensis* (Herbst). *Astacus scaber*, of which unfortunately no type material is extant anymore, most likely is identical with *Eutrichocheles modestus* (Herbst). *Homarus capensis* and *Eutrichocheles modestus*, both rare species, will be more extensively dealt with here and of both a complete synonymy is given.

NEPHROPIDAE

Homarus capensis (Herbst, 1792) (fig. 1)

Cancer (Astacus) capensis Herbst, 1792: 49, pl. 26 fig. 1; Huxley, 1879: 754.

Astacus fulvus Fabricius, 1793: 480; 1798: 408; Bosc, 1801-1802: 62; Latreille, 1802-1803: 241; Desmarest, 1830: 41; H. Milne Edwards, 1837: 335; Broderip, 1838: 274; Zimsen, 1964: 649.

Homarus fulvus - Weber, 1795: 94.

Cancer (Astacus) fulvus - Herbst, 1796: 171.

Astacus capensis - Latreille, 1802-1803: 240; H. Milne Edwards, 1838: 168; Huxley, 1880: 304; 1880a: 223; 1881: 255; 1883: 273; Stebbing, 1900: 34; 1901: 114; 1910: 378; Barnard, 1950: 526, fig. 98.

Cancer (Astacus) Fulvus - Turton, 1806: 756.

Homarus capensis - H. Milne Edwards, 1837: 335; De Haan, 1841: 161; Krauss, 1843: 54; De Haan, 1849: xxviii, 239; H. Milne Edwards, 1851: 291, pl. 11 figs. 1, 2; Huxley, 1879: 755; Herrick, 1895: 8; Calman, 1910: 54; Calman, 1911: 239; Herrick, 1912: 58; De Man, 1916: 96; Bouvier, 1917: 14; Gilchrist, 1918: 44-46, 48, pl. (1); Calman, 1927: 50; C. von Bonde &

Marchand, 1935: 6; Holthuis, 1946: 87; Burukovsky, 1974: 108; Holthuis, 1975: 818; Kamita & Maeda, 1977: 18; Wolff, 1978: 9; Phillips, Cobb & George, 1980: 65; Kensley, 1981: 29; Burukovsky, 1983: 152.

Homarus Capensis - Broderip, 1838: 274.

Cancer capensis - Huxley, 1879: 754, 755.

Vernacular names: "Der kapsche Flusskrebs" (Herbst, 1792), "Écrevisse fauve" (Bosc, 1801-1802; Latreille, 1802-1803; Desmarest, 1830), "Écrevisse du Cap" (Latreille, 1802-1803), "Homard du Cap" (H. Milne Edwards, 1837), "Cape Lobster" (Gilchrist, 1918; Von Bonde & Marchand, 1935; Barnard, 1950; Phillips, Cobb & George, 1980). All these names are artificial concoctions by zoologists and not true native names.

Description. — *Astacus fulvus* was first described by Fabricius (1793) who gave a short latin diagnosis and a slightly longer, likewise latin, description. In 1798 Fabricius repeated the diagnosis. Since 1793 the species has been mentioned by several authors: Herbst (1796) cited the latin diagnosis and translated the description in German, Weber (1795) just listed the name and placed the species correctly in the genus *Homarus* (being the only author to do so), Bosc (1801-1802), Latreille (1802-1803) and Desmarest (1830), translated Fabricius' diagnosis in French, Turton (1806) gave an abbreviated English translation of Fabricius' account, but none of these authors added anything new and evidently did not see any material. However, all treated *Astacus fulvus* as a good species. H. Milne Edwards (1837), however, stated "L'*Astacus coeruleus*, l'*Astacus fulvus* et l'*Astacus fulgens* du même auteur [J. C. Fabricius] nous sont inconnus, et sont considérés par Latreille comme des espèces douteuses". The last statement is incorrect, as Latreille (1802-1803) treated only the two other species, but not *Astacus fulvus*, as doubtful. H. Milne Edwards' authority was so great that his 1837 remark killed the species. Except for a short statement by Broderip (1838) repeating what H. Milne Edwards said, *Astacus fulvus* was not mentioned anymore in carcinological publications. It was completely ignored until Zimsen (1964) in her list of Fabrician types indicated that the type of *Astacus fulvus* is still extant.

Thanks to the kindness of Dr. Torben Wolff of the Zoological Museum at Copenhagen, I was allowed to examine this type which is now preserved in the collection under his care. Until recently the specimen, which originally formed part of the Fabricius collection at Kiel, was preserved dry, but is now transferred to alcohol. The specimen is in a rather good condition. The carapace and the six abdominal somites are complete. The telson, however, is missing and so are most appendages. The third maxillipeds and the first pereopods are present and complete, but of the other appendages only a few fragments are left. The uropods are present, but not so the pleopods. The carapace length of the specimen is 38 mm. The sex could not be determined. A photograph of the specimen, when still dry, is reproduced here (fig. 1), it was kindly made available by Dr. Wolff.

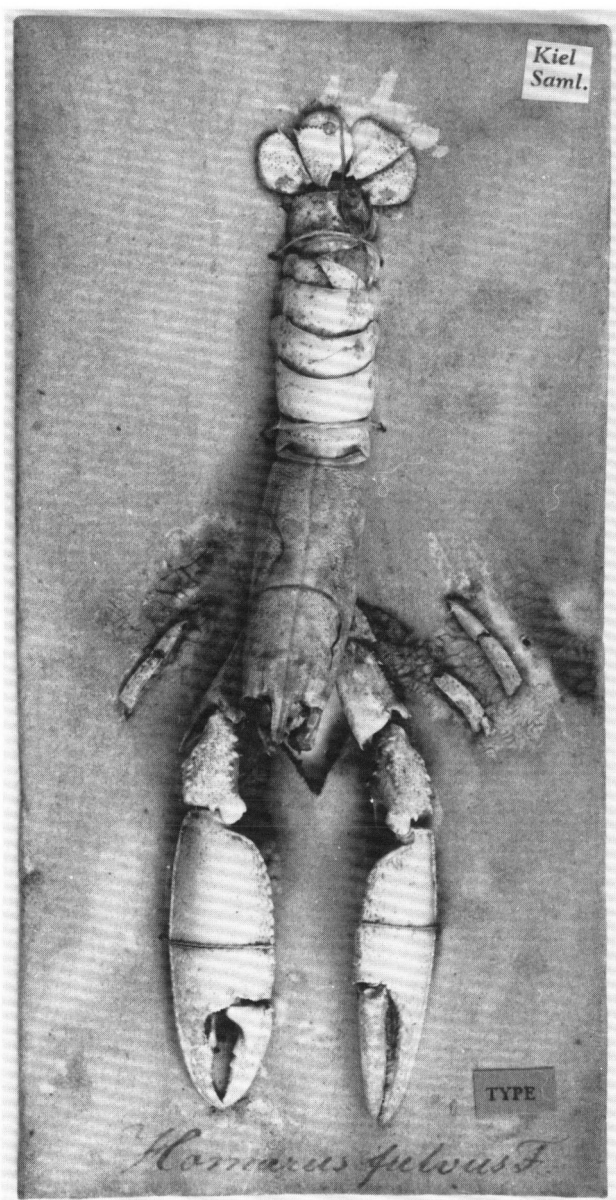


Fig. 1. Type specimen of *Astacus fulvus* Fabricius, 1793.

The rostrum of the type has 4 and 5 lateral teeth in the distal part. The outer orbital angle is rounded. The shape of carapace, abdomen and first chelipeds clearly show that the animal is identical with *Homarus capensis*. The sixth abdominal somite shows 4 tubercles on the sternum.

The type of *Astacus fulvus* is the only specimen ever assigned to that species,

and the identity of it with *Homarus capensis* has never been suspected. It is most fortunate that the name *Cancer (Astacus) capensis* Herbst, 1792, has one year priority over *Astacus fulvus* Fabricius, 1793. The latter name thus disappears in the synonymy of the former and causes no nomenclatural confusion.

The original description of *Cancer (Astacus) capensis* is rather short, but the figure clearly proves the identity of the species. One feature that has puzzled many authors is Herbst's statement "pedibus omnibus cheliferis", repeated in the German description ("Die Füße haben insgesamt scheerenförmige Spitzen"), while also the figure shows chelae on all the pereopods. H. Milne Edwards (1851) figured the species correctly with simple 4th and 5th legs and in 1837 (: 327) gave that as a character for the whole family "Astaciens". Huxley (1879: 754-755, footnote) was much troubled that Herbst so emphatically stressed this character: "It is impossible to suppose that Herbst should have made a mistake on such a point as this; and therefore it must be concluded that his *Cancer capensis* is neither a Crayfish nor a Lobster". Stebbing (1900: 35) very ingeniously found the most likely solution to the problem: Herbst described "the hands... as everywhere coated with long, yellow, transparent hairs. He declares that all the four following pairs of feet have chelate apices, in contrast with the common river Crayfish, in which only the first two pairs are so constructed. This account agrees very well with the figure given on Herbst's plate. It agrees almost too well, suggesting a suspicion that the author wrote his description from the figure rather than from the specimen, for there is reason to suppose that the hands of the chelipeds have the long hairy coating only on the outer and not on the inner surface and that the fourth and fifth pairs of trunk-legs are simple, not chelate". Herbst's work itself provides strong indications that Stebbing is correct. In the first place the specimen of *Cancer capensis* was not from Herbst's own collection but formed part of "Museum Spengler". Furthermore in his introduction Herbst (1782, vol. 1, p. 8) stated: "Durch Vermittlung der Herren Chemnitz und Spengler in Copenhagen, habe ich von einem geschickten Mahler die in den Copenhagenschen Cabinettern befindlichen und mir fehlenden Originale mit vielen Kosten abmahlen lassen". Evidently the type of *Cancer capensis* was in the Spengler collection in Copenhagen and a painting of the specimen was sent to Herbst, who never saw the type himself. Enlightening also are the remarks made later by Herbst (1801: vol. 3 pt. 2, pp. 14-15), when he expressed displeasure with this painter about a figure of *Cancer pagurus* (see Herbst, pl. 9 fig. 59) in which he supposed the fingers to be incorrectly drawn: "Allein ich [p. 15:] fürchte, dass es bloss ein Versehen des Mahlers ist; diese Zeichnung ist weder von mir selbst noch unter meiner Aufsicht gemacht, sondern der Hr. Kunstverwalter Spengler in Kopenhagen hatte mir diese Zeichnung so wie mehrere Abbildungen mir damals fehlender und in seiner Sammlung befindlicher Krabben von einem dortigen Mahler besorgen lassen, von dem ich mir viel versprach, weil er eben der war, der die Konchilien zur Chemnitzischen

Fortsetzung des Martinischen Konchilien-Werks mahlte¹). Allein ob ich gleich für jede Abbildung 4 Dukaten bezahlen musste, so fand ich doch nachher, dass sie weder schön, noch, da ich nach und nach die Originale selbst bekam, dass sie treu gezeichnet waren". This, thus, solves Huxley's problem and shows the correctness of Stebbing's surmise. The whole history raises the question, whether the type of *Cancer capensis* could not be the same specimen as the type of *Astacus fulvus*. Zimsen (1964: 15) speaks of "Lorenz Spengler, whose name Fabricius mentions particularly in connection with crustaceans". It would therefore be strange that Fabricius would not have seen Spengler's *Cancer capensis* specimen; it is more likely that Spengler forgot to mark the specimen as being Herbst's *Cancer capensis*, and that Fabricius used it to describe the new *Astacus fulvus*. It is true that Fabricius' dry specimen has the chelipeds in a different position than in Herbst's figure of *C. capensis*, and that the locality of the two species is cited differently, but otherwise the theory seems quite acceptable, although unprovable.

H. Milne Edwards' (1837) description of *Homarus capensis* is the third to be based on actual material, all previous authors just cited either Herbst or Fabricius. Milne Edwards' description is not much longer than that by Herbst, unless one includes in it the characters listed in the description of the genus *Homarus* (pp. 333, 334) and of the family "Astaciens" (pp. 326-328). An excellent figure of the species (so far the best ever published) was given by H. Milne Edwards in 1851. Valuable descriptions of *Homarus capensis* have furthermore been provided by Stebbing (1900: 34-38), Gilchrist (1918: 44-46, 48, pl.), and Barnard (1950: 526, fig. 98), the last two authors providing excellent figures. No other illustrations than those by Herbst (1792), H. Milne Edwards (1851), Gilchrist (1918) and Barnard (1950) have ever been published of the species.

Colour. — The published colour descriptions are few and moreover somewhat contradictory, perhaps due to the condition (preserved or fresh) of the specimens. Herbst (1792: 49) described the colour of his specimen as follows: "Die Farbe ist corall-roth, und er hat einen herrlichen Glanz, die dem *Carniol* gleicht. Ob dies aber seine natürliche Farbe sey, oder ob er dieselbe erst durchs Kochen erlangt, kann ich nicht entscheiden. ...Die Hände sind... überall mit langen, gelben, durchsichtigen Haaren überzogen". Fabricius did not mention the colour of his specimen other than in the specific name *fulvus*

¹) This painter proves to be Franz Anton von Scheidl (1731-1801) from Vienna who became well known as illustrator of Nicolaus Joseph von Jaquin's "Flora Austriaca" (1773-1778) and "Hortus botanicus Vindobonensis" (1770-1776). He left Vienna around 1778 for Denmark and started to work there for J. H. Chemnitz, illustrating vols. 6-8 and 11 of F. H. W. Martini & J. H. Chemnitz's "Neues systematisches Conchylien-Cabinet" (1768-1829). Having several of Scheidl's originals in my possession (among which the one of Herbst's pl. 9 fig. 59) I can only say that Herbst's criticism of that painting is undeserved, unless Spengler sent Herbst a poor copy of it.

(= tawny or reddish-yellow). Stebbing (1900: 35) translated Herbst's colour description and added (:36) the following remarks on his own material: "The male specimen when first received in England retained plentiful traces of a rich red colouring" and he mentioned the eyes as black. Gilchrist (1918: 45), however, pointed out that the species "in the fresh state... is of a rather dark olive colour, not dissimilar to that of the Northern lobster" [= *Homarus gammarus* (L.)]; on p. 48 Gilchrist gave the colour of the species as "Greenish or olive-brown". Barnard (1950: 527) cited it as "dark olivaceous". The red colour reported by Herbst and Stebbing is therefore most likely caused by post-mortem influences.

Size. — Fabricius (1793, 1798) described the type specimen of *Astacus fulvus* as "Medius", correctly translated by Turton (1806) as "middle-sized". The first author to provide a more accurate measurement was H. Milne Edwards (1837: 335): "Longueur, environ 5 pouces" (based on the material in the Paris Museum). Stebbing (1900: 38) indicated his specimens as "less than four inches long", while Gilchrist (1918) and Von Bonde & Marchand (1935: 6) said the species to be "4-5 inches". Holthuis (1946: 87) gave the total length of his single male as 83.5 mm. Barnard (1950) cited as total length "up to 102 mm" and as carapace length 47 mm. Wolff (1978: 5) gave measurements of the 9 largest specimens then known (of 13): total length 102, 97, 94, 92, 90, -, 87, 84, and 84 mm; carapace length 47, 45, 42, 42, 40, 40, 36, 38, and 37 mm, respectively.

Abundance. — As already mentioned above the species is quite rare. Gilchrist (1918: 46) remarked that it "is not even known to Cape fishermen". Wolff (1978) managed to find only 13 specimens. Of these 8 are in South African museums: 5 ♂ in the South African Museum, Capetown, 2 ♂ in the Albany Museum, Grahamstown (according to Wolff's table V, in his text only 1 ♂ is mentioned), 1 ♂ in the East London Museum, East London. Outside South Africa Wolff found only 5 specimens: 2 ♂ in the British Museum (Natural History), London, 1 ♂ and 1 ♀ in the Muséum National d'Histoire naturelle in Paris, and 1 ♂ in the Rijksmuseum van Natuurlijke Historie, Leiden. To these, as 14th specimen, we now can add the type of *Astacus fulvus* (and of *Cancer capensis*?) in the Zoological Museum in Copenhagen. Fourteen known specimens (among which only a single female) for a species described as long ago as 1792!

Locality. — The type locality of *Astacus fulvus* was reported by Fabricius (1793, 1798) as "in Oceano". All the other records for the species were just translations of the original locality indication: "im Ocean" (Herbst, 1796), "dans l'Océan" (Bosc, 1801-1802; Desmarest, 1830), "the Ocean" (Turton, 1806). Only Latreille (1802-1803: 241), evidently in error, stated: "Elle se trouve dans l'océan Indien". Herbst (1792) cited the type locality of *Cancer (Astacus) capensis* as "auf dem Kap" (= Cape of Good Hope, South Africa), under similar names it was cited by most subsequent authors: Latreille, 1803:

“Cap de Bonne-Espérance”; Krauss, 1843: “Kapland”; Huxley, 1879: “Cape of Good Hope”; Huxley, 1880: “Cape Colony”; Huxley, 1880a: “colonie du Cap”; Huxley, 1881: “Cap-colonie”; Huxley, 1883: “colonia del Capo”; Herrick, 1895: “Cape of Good Hope”; Stebbing, 1900, 1901: “the Cape”; Calman, 1910, 1927: “Cape of Good Hope”. None of these authors (with the exception of Stebbing and Calman) had seen material of the species. H. Milne Edwards (1837, 1851) and De Haan (1841, 1849), and later also Holthuis (1946), did examine material, but this had no locality indication. Until 1900 no accurate localities were known of the species, but from that year on new information became known, which, surprisingly, confirmed all previous records, also the inaccurate ones (“in Oceano”, “Océan Indien” and “Cape of Good Hope”). The species namely inhabits the Indian Ocean coast of South Africa between the Table Bay and East London. The records are: Table Bay (De Man, 1916; Von Bonde & Marchand, 1935; Barnard, 1950; Burukovsky, 1974, 1983; Wolff, 1978; Kensley, 1981), Table Bay at Sea Point near Capetown, 33°55'S 18°22'E (Stebbing, 1900, 1901, 1910; Gilchrist, 1918; Barnard, 1950; Wolff, 1978), Port Elizabeth, 33°58'S 25°35'E (Barnard, 1950; Wolff, 1978), Algoa Bay, 33°50'S 25°50'E (Stebbing, 1900, 1901, 1910; De Man, 1916; Von Bonde & Marchand, 1935; Barnard, 1950; Burukovsky, 1974, 1983), Great Fish Point, Bathurst Division, 33°32'S 27°02'E (Barnard, 1950; Wolff, 1978), Rockclyffe-on-Sea, East London, 33°06'S 27°49'E (Wolff, 1978; Kensley, 1981).

Habitat. — Herbst (1792) reported the species “in solchen Flüssen..., die sich auf den Bergen befinden”, a statement copied by Krauss (1843): “In den Bergflüssen des Kaplandes” (Krauss did not see any material himself). Stebbing (1900: 37) made it clear that it “is certainly a mistake to say that it occurs in the rivers of the Colony”, and he reported the species from a “salt-water rock-pool” (Stebbing, 1900, 1901, 1910) after receiving very positive and detailed information on this point from the collector. Gilchrist (1918: 45) reported it from “shallow water at Sea Point”. Barnard (1950) mentioned a specimen found “washed up on beach” and one “found on Sea Point beach”. These scanty data form the extent of the known information about the habitat of the species.

AXIIDAE

Eutrichocheles modestus (Herbst, 1796)

Homarus scaber Weber, 1795: 94 (nomen nudum).

Cancer modestus Herbst, 1796: 173, pl. 43 fig. 2; Latreille, 1816: 35; Stebbing, 1893: 206; Balss, 1933: 87.

Astacus scaber Fabricius, 1798: 407; Bosc, 1801-1802: 62; Latreille, 1802-1803: 241; Latreille, 1806: 52; Desmarest, 1830: 41; H. Milne Edwards, 1837: 335; H. Milne Edwards, 1837a: 383; Broderip, 1838: 274; Zimsen, 1964: 652.

Astacus Scaber - Lamarck, 1818: 217.

- Axius biserratus* Von Martens, 1868: 612; Nobili, 1903: 12; De Saint Laurent, 1979: 32.
Astacus modestus - Wood Mason, 1876: 231; 1876a: 264; Bouvier, 1917: 14; De Saint Laurent, 1979: 32.
Eutrichocheles modestus - Wood Mason, 1876: 231; 1876a: 264; Miers, 1880: 380; Stebbing, 1893: 206; De Man, 1916: 96; Bouvier, 1917: 14; Balss, 1933: 87; Chopra, 1933: 277, text fig. 1, pl. 6; Balasubrahmanyan & Jacob, 1961: 830, fig. 1.
Axiopsis (Paraxiopsis) biserrata - De Man, 1925: 138, fig. 6; 1925a: 7, 71.
Eutrichocheles Holthuis, 1946: 71.

Vernacular names. — Écrevisse hérissée (Bosc, 1801-1802; Desmarest, 1830), Écrevisse raboteuse (Latreille, 1802-1803).

Description. — The identity of *Astacus scaber* Fabricius, 1798, has puzzled many authors of the first half of the 19th century, but after 1838 it disappeared from the literature and now is almost entirely forgotten.

Fabricius's original description is as follows: "A. [stacus] thorace antice scabro, rostro breui subulato, chelis anticis oblongis pilosis. Habitat in Oceano Indico Dom. Daldorff. Praecedente [= *Nephrops norvegicus* (L.)] minor. Rostrum breue, subulatum, acutum. Thorax scaber dorso antico spinoso spinis utrinque duabus, maioribus, validioribus. Chelae quatuor, anticae maiores brachiis utrinque dentatis, carpis breuibibus, subtus dentatis, manibus oblongis, scabris, hirtis, posticae breuiores, filiformes". The sharp and pointed rostrum, the rough anterodorsal part of the carapace with two very strong teeth on either side, the fact that only the first two pairs of legs are chelate, the description of the large cheliped and that of the short and slender second leg, all fit *Eutrichocheles modestus* perfectly. There is no doubt in my mind that *Cancer modestus* and *Astacus scaber* are the same species. Herbst even may have obtained his specimen from Fabricius. The close cooperation between the two is clearly shown by Herbst's (1782, vol. 1, p. 8) remark: "Der Herr Prof. Fabricius in Kiel schickte mir alle seine auf seinen Reisen gesammelte Krebsarten, in Natura, die ich, so wie die meinigen selbst auf das genaueste gezeichnet und ausgemahlt habe". Unfortunately Fabricius' type of *Astacus scaber* is no longer extant (see Zimsen, 1964: 652), while also that of Herbst's *Cancer modestus* was already missing in 1933 (Balss, 1933: 87, "Leider ist der Typus in Berlin nicht mehr vorhanden"). Therefore absolute proof cannot be obtained. It is interesting that Latreille (1802-1803: 241) referred to "*Astacus scaber*. Fabr. Suppl. entom. syst. p. 407, n° 5 - Herbst, Canc. tab. 43, fig. 2", including both the description by Fabricius and Herbst's figure of *Cancer modestus* in his reference.

Later, however, several authors (Latreille, 1806; Lamarck, 1818; H. Milne Edwards, 1837a) placed *Astacus scaber* with a considerable amount of doubt in the synonymy of *Thalassina anomala* (Herbst), which certainly is incorrect, as Fabricius' description does not fit any *Thalassina* at all. Also H. Milne Edwards' (1837: 335) suggestion that *Astacus scaber* might be synonymous with *Homarus capensis* is difficult to understand, unless H. Milne Edwards mixed up *A. scaber* and *A. fulvus*.

As for *Cancer modestus* Herbst, it is hard to explain why a species, that was so extensively described and excellently illustrated has been ignored completely for so long. The only reference to the species that I can find between 1796 and 1876 is the one by Latreille (1816: 35), who placed *Cancer modestus* in the synonymy of *Axius stirhynchus* Leach, 1815. Even H. Milne Edwards (1837) in his "Histoire naturelle des Crustacés" made no mention of *Cancer modestus*, although he usually gave some attention to dubious species and species that he could not place. Therefore it is the more remarkable that J. Wood Mason in Calcutta, when obtaining a specimen 80 years after the original description was published, recognized it as Herbst's species. He placed it in a separate genus *Eutrichocheles* which he considered intermediate between the Thalassinidea and Astacidea, but he assigned it to the latter. Stebbing (1893), De Man (1916), and Bouvier (1917) shared Wood Mason's views and placed *Eutrichocheles* in the Nephropidae. In 1933 both Balss and Chopra came to the correct conclusion that *Eutrichocheles* is an Axiid genus. Chopra (1933) gave an excellent redescription of Wood Mason's specimen (at that time still the only known specimen besides the type), with excellent illustrations. The only other record of the species known to me is by Balasubrahmanyam & Jacob (1961), who reported on two specimens and provided a not too clear photograph.

A specimen in the British Museum (Natural History), collected by T. Cantor at Penang, Malaysia, originally identified as *Axius biserratus* Von Martens, was re-identified as *Eutrichocheles modestus* (Herbst) by Mme M. de Saint Laurent of the Paris Museum. A study of the various accounts of *Axiopsis biserrata* (Von Martens) indeed showed such a close resemblance of that species to *Eutrichocheles modestus*, that I gladly follow De Saint Laurent's (1979: 32) synonymizing of the two.

Von Martens (1868) gave a rather short and unsatisfactory description of the two types of *Axius biserratus* in the Berlin Zoological Museum. Nobili (1903) also had two specimens, one of which was compared for him with the types by Dr. J. Thiele. Nobili provided a rather extensive description of the species, but like Von Martens provided no figures. De Man (1925: 138-139, fig. 6) gave an illustrated redescription of the species, basing himself on the previously reported specimens, all four of which were examined by him; he had no additional material. No other information on the morphology of the species is known to me.

Colour. — Herbst (1796) provided a coloured figure of his *Cancer modestus* and remarked: "Die Farbe des Krebses ist weiss, hie und da röthlich schattirt; auf dem Schwanze läuft der Länge nach an jeder Seite ein hellrother Streif; die Finger der Scheeren sind im natürlichen Zustande mit langen schwarzen Haaren besetzt". Chopra (1933: 281) described the colour of his old specimen (preserved for at least 58 years) as "uniformly white". According to Balasubrahmanyam & Jacob (1961) "The fresh specimens appeared rather pink in colour and with preservation they have tended to become white". In Herbst's

figure the eyes are shown greyish, the right one darker than the left; this is not enough evidence to judge the true colour of the eyes. In the specimen examined by Wood Mason and Chopra, according to the latter author (Chopra, 1933: 279) "the corneae are without pigment". De Man (1925: 139) described the cornea in the types of *Axius biserratus* as showing "eine weissliche Farbe"; in Nobili's specimens, however, he found the eye "mit einem intensiv schwarzen Pigmente ausgefüllt". Also Balasubrahmanyan & Jacob found the cornea in their specimens "to be pigmented". It seems most likely that in the living specimens the cornea is black, but that the pigment may dissolve when too long in a preservative.

Size. — Fabricius stated that the type of *Astacus scaber* was smaller than *Nephrops norvegicus*. The specimen examined by Wood Mason and Chopra "is about 73 mm. from the tip of the rostrum to the posterior extremity of the telson" (Chopra, 1933: 281). Von Martens (1868) gave the total length of one of his specimens as 61 mm, the carapace length 18 mm (without rostrum) and 22 mm (with rostrum). Nobili's (1903) specimens had a total length of 51 and 47 mm and a carapace length (with rostrum) of 20 and 19 mm, respectively. The specimens of Balasubrahmanyan & Jacob (1961) were 80 and 75.2 mm in total length. The specimen from Penang in the British Museum has a carapace length of 30 mm.

Abundance. — Like *Homarus capensis*, this is a rare species. In the literature 4 specimens have been reported upon under the names *Cancer modestus* or *Eutrichocheles modestus* and 4 under the name *Axius biserratus* or *Axiopsis biserrata*. To these can be added the specimen from Penang in the British Museum, mentioned above, and a specimen from Selangor in the collection of the Rijksmuseum van Natuurlijke Historie. This makes 10 known specimens for a species first described in 1796.

Distribution. — The type locality of *Astacus scaber* is indicated by Fabricius (1798) as "Habitat in Ocean Indico Dom. Daldorff". As Ingobert Karl Daldorff was stationed in Tranquebar (S.E. India, 11°02'N 79°51'E) from 1790 to 1793 and did not return to India until 1798 (see Zimsen, 1964: 12), it is most likely that the specimen of *Astacus modestus* came from near Tranquebar. Herbst (1796) reported his *Cancer modestus* from "Ostindien"; there is, be it rather remote, possibility that Herbst's type also came from Tranquebar: not only did he receive material from Fabricius as pointed out above, but he also mentioned that "Am meisten bin ich vom Herrn Missionarius John in Tranquebar mit einigen ganz neuen seltenen Arten beschenkt worden" (Herbst, 1794, vol. 2, p. 150). Wood Mason did not provide the locality of his specimen, but Chopra (1933: 281) showed that it came from "somewhere off the Arakan coast of Burma". The two specimens reported upon by Balasubrahmanyan & Jacob (1961) both came from Porto Novo (S.E. India somewhat N. of Tranquebar, 11°29'N 79°47'E). As to the specimens of *Axius biserratus*, the types were reported by Von Martens (1868) from "Malakka" (= Melaka, or Malac-

ca, 2°12'N 102°15'E; unless, of course the whole of the Malay Peninsula was meant, as was customary at that time). Nobili's (1903) specimens came from Singapore. To these published records should be added those provided by the specimen in the British Museum from Penang, Malaysia, about 5°24'N 100°14'E (Dr. Theodore Cantor, no. 1879.32), and that in the Rijksmuseum van Natuurlijke Historie, from Ketam Island, Selangor, Malaysia, 3°02'N 101°15'E (2 July 1961, E.R. Alfred, reg.no. D.17656). Summarizing we can say that the species is known from the Bay of Bengal (westcoast: Porto Novo, ? and Tranquebar; eastcoast: Arakan coast of Burma) and the Straits of Malacca (eastcoast: Penang, Pulu Ketam, Malacca and Singapore).

Habitat. — The only ecological information so far available is that provided by Balasubrahmanyam & Jacob (1961), who remarked that the species is found 4 to 5 miles off shore in a depth of about 10 fathoms (= 18 m). The Porto Novo specimens were taken with a seine by local fishermen.

RÉSUMÉ

L'examen du spécimen type d'*Astacus fulvus* Fabricius, 1793, au Musée zoologique de Copenhague, montre qu'il appartient à *Homarus capensis* (Herbst, 1792). Des arguments sont avancés, indiquant que la même spécimen est aussi le type de *Cancer capensis* Herbst.

Astacus scaber Fabricius, 1798, apparaît comme un synonyme junior de *Cancer modestus* Herbst, 1796, aujourd'hui connu sous le nom d'*Eutrichocheles modestus*.

Homarus capensis et *Eutrichocheles modestus* étant l'un et l'autre des espèces rares (respectivement 14 et 10 spécimens connus) sont traités ici de façon extensive, avec une synonymie complète pour chacune, et des remarques sur la morphologie, la coloration et la distribution.

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