*Dedicated to the Sociedade Brasileira de Carcinologia*

# Marcgraf's (1648) Brazilian Crustacea

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An inventory is given of the Crustacea described and figured in N.E. Brazil during the governorship of Johan Maurits van Nassau (1637-1644). Of each of the 31 species the available sources of information are discussed and an identification has been attempted.

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## Contents

## Historical Introduction

The short period of Dutch colonial rule of North-eastern Brazil (1624-1654), and especially the time that Count Johan Maurits van Nassau-Siegen was the governor-general there (1637-1644), generated in that area an unusually great activity in the field of arts and sciences. The results of these activities not only added considerably to the contemporary European knowledge of north-eastern South America, but had also a deep and lasting impact on the study of natural history in its widest sense. Whitehead & Boeseman (1989, 1989a), after an intensive study and an extensive search all over Europe, in a splendidly illustrated volume gave an account of the ethnological and biological sketches and paintings made in Brazil under Johan Maurits' supervision or at his instigation, and discussed their present whereabouts.

The present paper is a result of my collaboration with the two above authors as far as the Crustacea figured on these paintings are concerned. The study of these

Crustacea led to so many interesting finds, that, with the consent of the two authors, it was decided that I should dedicate a special article to the species of Crustacea described and figured by Johan Maurits's staff, going into much more detail than was possible in the general account by Whitehead & Boeseman (1989, 1989a) or in a discussion by Boeseman et al. (1991) of the so-called Leningrad collection of plates (see below).

The central figure of all the activities discussed was the first (and only) governor-general of Dutch Brazil, Count Johan Maurits van Nassau. On 17 June 1604 Johan Maurits (or Johann Moritz as he was baptized), Count of Nassau-Siegen, was born at Dillenburg castle, the seat of the Nassau family, situated in the present state of Hessen, Germany. He was a son of count Johann der Mittlere von Nassau-Siegen and grandson of Johann der Ältere, the latter being a brother of Willem van Oranje-Nassau (William the Silent, 1533-1584). The German Nassau-Siegen and the Dutch Orange-Nassau branches of the Nassau family kept close contacts. Johan Maurits was named for Prince Maurits van Oranje, the son of William the Silent. In 1604 Maurits was stadholder of the Netherlands having succeeded his father, who was murdered in 1584. Johan Maurits, after a good education in Germany and Switzerland (he visited the universities of Basel and Genève), went to the Netherlands in 1618 and entered the military service of the Republic of the Seven United Netherlands in 1621. The twelve year's truce with Spain (1609-1621) had then just ended and the Dutch-Spanish war was resumed. Johan Maurits distinguished himself in several battles and became a well known figure in the Netherlands.

As part of the war against Spain (which since 1580 had annexed Portugal and its colonies) the Dutch had gotten a foothold in north-eastern Brazil in 1624 and gradually extended their territory there. In 1737 the Dutch West India Company, which had the jurisdiction of the territory, decided to send a governor-general to Brazil and invited for that post Johan Maurits van Nassau, who accepted. He arrived on 23 January 1637 in Pernambuco (at present Recife). His good qualities as a strategist, governor and statesman were unquestionable, but the West India Company criticized his expenditures and in 1644 he left Brazil after some difficulties with the Company. In 1648 the peace-treaty between The Netherlands and Spain was signed and in 1654 the colony in Brazil reverted back to Portugal.

In Brazil Johan Maurits had in his retinue a number of scientists and artists. The number of artists was said to be six (letter of Johan Maurits to the Marquis Simon Arnaud de Pomponne, Secretary of State of France), but this may have included map makers, architects, etc. The two best known among these artists are Frans Post, famous for his Brazilian landscapes, and Albert Eckhout, who devoted himself mostly to painting animals, plants and people. The paintings discussed in the present paper are almost exclusively Eckhout's. Among the "unofficial" artists there are two of importance for the present study. The first is Georg Marcgraf Johan Maurits' official naturalist, who evidently made drawings to illustrate his descriptions, and these will be repeatedly mentioned here. The other is Zacharias Wagener, "Küchenschreiber" (variously translated as "steward", and "quartermaster", being evidently the administrator of the food department) at Johan Maurits's palace. Wagener wrote a "Thierbuch", which was only recently (1964) published, and which con-

tained a large number of animal figures made in Brazil.

The scientists of Johan Maurits were (at least) two in number: Georg Marcgraf (born in Liebstadt, Germany, 10 September 1610 - died in Angola in 1644, on his way back to the Netherlands) joined the staff of Johan Maurits in Brazil in 1638 and was supposed to study the complete natural history, including zoology, botany, geography, anthropology, astronomy and meteorology; the first astronomical observatory of the southern hemisphere was built for him in Recife. The second scientist was Willem Piso, the personal physician of Johan Maurits. Piso was born in Leiden in 1611 and died in Amsterdam 24 November 1678. He arrived in Recife, together with Marcgraf, in 1638; he was to replace Johan Maurits' personal physician who had died in 1637. Johan Maurits presumably charged Piso with the study of the local diseases, the native remedies against these, including the medicinal herbs, and with the investigation of beneficial and harmful animals and plants.

It must have been Johan Maurits' inspiring interest in the work of the artists and scientists, his expertise and his enthusiasm that made that so much was accomplished. This is the more remarkable as his occupation with the arts and sciences did not in the least detract him from the fulfillment of his administrative an military duties and his many other interests and tasks.

When Johan Maurits in 1644 returned to Holland, he took care that the manuscripts by Marcgraf (who had died of fever in Angola on the journey home) and Piso were published, so that the information contained in them became available to his contempories and to the following generations. The interest in these works is shown by the fact that after more than 300 years they were reissued and translated.

In The Hague Johan Maurits had a large house built to contain his paintings and other Brazilian collections. This house, the so-called Mauritshuis, still exists as one of the public Musea of The Hague. However, Johan Maurits did not keep all his paintings to himself, but used many as gifts to royalty and heads of state, possibly as a way to obtain favours. Some of Eckhouts paintings were donated to King Frederik III of Denmark, to whom Johan Maurits was related; Louis XIV received sketches, evidently by Eckhout, that could be used as cartoons for the preparation of gobelin tapestries. But the most important gift, for our purpose, was a great number of paintings of animals and plants that Johan Maurits donated to the Elector of Brandenburg, Friedrich Wilhelm. The story of those gifts is extensively dealt with by Whitehead & Boeseman (1989, 1989a).

In 1647 Johan Maurits was appointed stadholder of the duchy of Cleve (West Germany, near the Dutch border) by the Elector of Brandenburg, a post that he occupied until his death on 19 December 1679. He remained a high ranking officer in the Dutch army, and saw active service in 1672, when the independence of the Netherlands was threatened by war. Much of his time was spent in the Netherlands.

Of course the investigations by Marcgraf and Piso and the paintings by Eckhout were not the first attempts to describe and illustrate the Brazilian fauna. Gabriel Soares de Sousa already in the sixteenth century wrote a treatise entitled "Tratado descritivo do Brasil em 1587" and around 1625 Frei Cristóvão de Lisboa wrote his "História dos animais e árvores do Maranhão". But the first remained unpublished until 1825, while the second was published for the first time in 1967. It

is possible that more similar manuscripts have existed or still exist.

What makes the efforts of Johan Maurits' staff so unique is that the descriptions of animals and plants, provided by competent scientists, were backed up by illustrations made by just as competent artists, the illustrations being of a high standard both artistically and scientifically. The wood-cuts published in Marcgraf's (1648) treatise were made after paintings, probably mostly those by Marcgraf himself, but possibly also after some by Eckhout. Comparing the zoological paintings made by the various artists, it is clear that often the same object was used by several of them, even though the animal was viewed from different angles or placed in different positions. Therefore, although Marcgraf did not illustrate all the species that he described, and notwithstanding the fact that the published wood-cuts are rather crude, the fact that many of the original figures made in Brazil (or copies of them) are still available, allows us now to identify most of Marcgraf's species.

## Consulted sources of information

The descriptive documentation of Johan Maurits' Brazilian Crustacea can be easily consulted as it is confined to two published sources, namely the books by Marcgraf (1648) and Piso (1648 and 1658). The illustrative documentation of the Brazilian animals, however, is widely scattered over a great number of sources located in numerous places in Europe and America. Nine of these sources contain information on Crustacea and are dealt with separately in the following paragraphs; they are repeatedly referred to in the main text of this paper, and cited there by the number assigned to them in the following list.

1. The work "Historia Naturalis Brasiliae". Under this title many of the results of Piso and Marcgraf's studies were published. Piso's part consists of four chapters ("libri" = books) entitled "De Medicina Brasiliensi libri quatuor"; in the third chapter "Liber tertius qui agit de venenis eorumque antidotis", on p. 47, he mentioned the use of the crab "Aracu" (= *Goniopsis*) as an antidote. Marcgraf's section "Historiae Rerum Naturalium Brasiliae, libri octo", in the fourth chapter "Liber Quartus de Piscibus", on pp. 182-193 deals with 28 species of Crustacea of which 18 are illustrated; further, on p. 155, in the text on the fishes, an isopod fish-parasite is described and figured. Most copies of this book have the illustrations in black and white, but there are some (listed by Whitehead & Boeseman, 1989, 1989a: 28) that have the figures hand-coloured. I have consulted the coloured copy in the library of the Rijksmuseum van Natuurlijke Historie in Leiden.

Several of Marcgraf's descriptions served Linnaeus (1758) and later authors for the establishment of new species, others were identified with known species. Both Sawaya (1942) and Lemos de Castro (1962) gave a complete review of Marcgraf's Crustacea, with, where possible, identifications.

In 1942 a Portuguese translation of Marcgraf's section, with annotations, was published in São Paulo. Six years later a similar edition of Piso's section was published there.

2. The work "De Indiae utriusque re naturali et medica". This work, edited by

Piso contains contributions by three authors: (1) J. Bontius devoted 6 chapters ("books") to medical and biological aspects of Java; (2) G. Marcgraf dealt in two chapters with meteorology and astronomy of Brazil, as well as with the inhabitants of Brazil and Chile; (3) the greater part of the volume, however, is occupied by Piso's own contributions, namely 6 chapters on health conditions and diseases of Brazil, on the edible animals and plants of Brazil, on the venomous and harmful animals and plants, and on the medicinal herbs. Crustacea are only dealt with in Piso's third and fifth chapters. The third chapter is entitled "Liber III. De Animalibus, aquatilibus, volatilibus, & terrestribus, edulibus". In it the "Crustacei Pisces" occupy pp. 75 to 78; the nine illustrations are taken from Marcgraf (1648), the descriptions are somewhat similar to Marcgraf's, without being directly copied, and great stress is laid on the edibility of the species. In "Liber V. De Noxiis & Venenatis, eorumque Antidotis", crabs are mentioned on pp. 274, 285, 299, 300 as antidotes. A Portuguese translation of Piso's first 5 chapters of this volume was published in 1957.

Piso has for a long time been accused of plagiarism of Marcgraf's work, among other by Linnaeus, but as shown by Whitehead & Boeseman (1989, 1989a: 30), such criticism is far too harsh, if deserved at all; the study of Piso's crustaceans bears this out completely.

3. Zacharias Wagener's "Thier Buch" (see Whitehead & Boeseman, 1989, 1989a: 48-51). Wagener was not an official artist of Johan Maurits but held an administrative function in the household of the Governor-General. In his spare time he tried to make coloured drawings of objects which were mostly brought to him by the Indians, as he stated in the introduction to his book. Apart from this introduction the book contains 69 plates showing 110 numbered and several unnumbered figures; the text is solely formed by the explanation of the plates. The crustacean figures are numbered 23 to 27, being followed by an unnumbered figure of a crab. According to Whitehead & Boeseman (1989: 49) Wagener as an artist "was not particular gifted"; they base this on the sketches of Brazilian scenes in his book which are rather primitive. However, many of the animals drawn by Wagener, and certainly the Crustacea, show him as an experienced artist. The poorest of his crab figures, no. 27, proves to be unfinished as "Der Krebs, nach welchem ich solches habe angefangen zu zeichnen, hat so gestunken, dass ich ihn hab müssen wegwerfen und dieses unfertig lassen"; even this unfinished figure shows a quality that compares well with that of the other crustacean figures, most of which are excellent; they often are more accurate and detailed than Eckhout's paintings. Whitehead & Boeseman's surmise is that these drawings of Crustacea by Wagener are "taken from a sketch (now lost) by Eckhout or perhaps Frans Post" and that the Indian scenes (figs. 101-107), which are definitely less satisfactory than the crustacean paintings are the work by Wagener himself. This supposition seems unlikely to me as Wagener in his introduction mentions specifically that he made drawings from objects brought to him by the natives, and in particular his remark that he did not finish fig. 27 of the decomposed crab strongly supports the accuracy of his statement. Nowhere in the introduction of his book, and not even in its title, does Wagener refer to the figures numbered 93 to 110, or indicate that they were made by himself. It seems most likely that the figures of people (nos. 93-100, which definitely are based on Eckhout paintings), the scenes of

every day life (nos. 101-107), the plans and the map (nos. 108-110) were added later, after the introduction and the title were finished. A complication, however, is that one of the paintings of Schloss Schwedt (see source no. 8 below), which are said to have been painted by Eckhout, shows several Crustacean figures which strongly resemble those in Wagener's Thierbuch and have no direct counterpart in the known Eckhout paintings. Could Eckhout have copied these from Wagener?

The manuscript of Wagener's book is the property of the Kupferstich Kabinett in Dresden, Germany. It remained unpublished until in 1964 an edition appeared giving the original German text with a Portuguese translation and reproduction of all illustrations in black and white; annotations on the figures and text were added (both in German and Portuguese) by O. Pinto. An interesting account of Wagener, especially of his stay at Cape of Good Hope, was published by Spohr (1967), who reproduced several of the Thierbuch figures, among which as only Crustacea nos. 24 (*Lepas*) and 25 (*Cardisoma*). Whitehead & Boeseman (1989: pls. 20-29) published several of Wagener's figures in colour, among which 3 Crustacea (nos. 23-25).

Zacharias Wagener was born in Dresden, Germany, as the son of a judge with the same name, and baptized on 11 May 1614; in 1633 he went to Holland, worked there with the cartographer Blaeu and in 1634 left for Brazil as a common soldier. In 1643 he went to Batavia (now Jakarta, Indonesia) and was employed there by the V.O.C. (= Vereenigde Oost-indische Compagnie, = United Netherlands East India Company) in the cartographical service. His qualities were soon recognized and the East India Company sent him between 1656 and 1658 as ambassador to Canton, China; he also went to Japan. From 1662 to 1666 he was made governor of the Cape of Good Hope, succeeding Jan van Riebeeck there. After having been back in Batavia, he returned to Holland in 1668 and died the same year (1 October 1668) in Amsterdam.

4. The Kraków paintings, "Libri picturati"(Whitehead & Boeseman, 1989, 1989a: 33-44). The most important iconographical source of Brazilian Crustacea made during Johan Maurits' governorship are some of the seven volumes (Libri picturati A32-38) of watercolours and oil paintings, at present held in the Bibliotheka Jagiellonska in Kraków, Poland. This collection (or a great part of it) was given by Johan Maurits in 1652 to the Elector of Brandenburg Friedrich Wilhelm. Two of the volumes contain mostly water colours and are usually indicated as Handbooks vol. 1 and 2, they became Libri picturati 36 and 37. These two volumes were donated in a bound condition to the Elector by Johan Maurits and are often indicated as Libri Principis (L.P.). As shown by Whitehead & Boeseman (1989, 1989a: 40), at some time after 1829 the two volumes were rebound and their volume numbers switched, so that the pre-1830 indications "Libri Principis 1 and 2", refer to "Handbook 2 and 1" respectively. The other paintings that Johan Maurits donated to Friedrich Wilhelm, being mostly oil paintings, were not bound and were indicated by Johann Horkel (see par. 5, p.11) as Icones Postii (I.P.) as he was of the mistaken opinion that these paintings were by the hand of Frans Post; they actually are painted by Albert Eckhout. Friedrich Wilhelm had them bound into four volumes under the supervision of his personal physician Christian Mentzel. Each of these four volumes is provided with a hand-written title page which is illuminated with figures of ani-

mals dealt with in the volume. These 4 volumes were given the title "Theatri Rerum Naturalium Brasiliae" Tomus I to IV; the name of C. Mentzel is also mentioned on the title pages (fig. 1). The volumes are catalogued as Libr. pict. 32-35. The seventh volume is named "Miscellanea Cleyeri" and is a composite volume with several plates, 35 of which of Brazilian subjects but no Crustacea (libr. pict. 38). This collection was first placed in the Elector's private library in Berlin, which later evolved into the Preussische Staatsbibliothek. During World War II the seven volumes were sent away for safety, first (1941) to Schloss Fürstenstein in Silesia, later (1943) to the Benedictine monastery at Grüssau (now in Poland and named Kreszów) from where they disappeared after the war; they were finally located in 1977 at their present location, the Bibliotheka Jagiellonska in Kraków, Poland. Since then the collection has been consulted by scientists, and photographs of all the plates were taken. The paintings in the Theatri volumes almost certainly have been made by Albert Eckhout, those in the Handbooks might be from the hand of Marcgraf himself, as many of these watercolours obviously are the originals (or copies of the originals) after which the wood-cuts in Marcgraf's (1648) book were made.

In only three of the seven Libri picturati illustrations of Crustacea can be found, namely in nos. 36 and 37, i.e., Handbooks 1 and 2, and in no. 32, "Theatri" vol. I, which on its title page (fig. 1) bears the following inscription: "Theatri Rerum Naturalium Brasiliae. Tomus. I. continens Icones Aquatilium Iussu Serenissimi ac Potentissimi Principis ac Domini, DN. Friderici Wilhelmi, Marchionis Brandenburgici, S.R. Imperii Electoris Principis, &c. &c. &c. Digestus a Christiano Mentzelio. D. Anno M DC LX." (fig. 1). In the text of the systematic part of the present paper these three books are indicated as Handbook 1, Handbook 2, and Theatrum 1.

I have not seen the Libri picturati myself, but photographs of most Crustacean illustrations in them were kindly placed at my disposal by Mrs Petronella Albertin and Drs M. Boeseman and P. H. Whitehead. So far as I have been able to find out, Handbook 1 had watercolours of Crustacea on pp. 314, 316, 320, 324, 326, 328, 338, 348, 352, 366 and 384, and Handbook 2 on p. 319 (the uneven pages of Handbook 1 and the even pages of Handbook 2 all are blank). In Theatrum 1 Crustacea figures are found on the title page (as ornament) and on pp. 15, 311, 313, 315, 319, 323, 329, 331, 335, 337, 339, 341, 343, 347, 349, 351, 357 and 359; on several of these pages only the legend for the figure is present, the figure itself being lost or never made; all figures in the Theatrum are oil paintings.

An interesting feature of the Crustacea illustrations in this collection is that many show pencil inscriptions giving post-Linnean scientific names to the species shown. A comparison of the handwriting of these identifications with that of letters and reports by Wilhem de Haan in the archives of the Rijksmuseum van Natuurlijke Historie in Leiden, show that the inscriptions are made by De Haan. Wilhem de Haan (born in Amsterdam, 7 February 1801, died in Haarlem, 15 April 1855) was curator of Invertebrates of the Rijksmuseum van Natuurlijke Historie from 1 January 1823 until 1846 when he was pensioned for reasons of health. De Haan's excellent monograph of the Japanese Crustacea in Ph.F. von Siebold's Fauna Japonica (1833-1850) made him to one of the foremost carcinologists of his time. That De Haan indeed examined the paintings of this collection becomes clear from a "Report of a

voyage through Germany executed in the course of the year 1826", dated "Leijden 10 October 1826", which he submitted to the Department of Education, Arts and Sciences of the Netherlands. During this voyage, undertaken in the months July, August and September, De Haan visited Hamburg, Kiel, Charlottenburg, Berlin, Breslau, Dresden, Nürnberg, Frankfurt, Bonn and Crefeld. In the account of his visit to Berlin he stated (in translation): "The Director of the Berlin Museum, Mr. Lichtenstein, has made it possible for me to lay the foundation for a Species Crustaceorum, a project which can only be undertaken in Berlin, because of the extent of the collections that are deposited there and that are especially important by containing the original specimens of the work by Herbst. In studying this collection I hope to be able to give a worth-while contribution to a more accurate knowledge of this group. At the same time I was allowed to use the manuscripts of Prince Maurits, Mentzelius and Daldorff". With "the manuscripts of Prince Maurits and Mentzelius" the present collection evidently is meant. Prince Maurits stands for Johan Maurits, and Mentzelius is Christian Mentzel, the private physician of the Brandenburg elector Friedrich Wilhelm, who was responsible for the arrangement of the plates of the four volumes of the Theatri and for having them bound in the way as they are at present. Ingobert Karl Daldorff was a Danish collector in India during the last part of the 18th century and a correspondent of Herbst. He is not involved with the present paintings. There can be little doubt that the pencil inscriptions found with the Crustacea of the Theatri and the Handbooks were made by De Haan in the summer of 1826 as no later visits by De Haan to Germany are known.

5. The Leningrad drawings. A second collection of zoological illustrations based on the work of Johan Maurits' artists is held by the Archives of the Academy of Sciences of the USSR in Leningrad. These drawings are extensively discussed by Whitehead & Boeseman, 1989, 1989a(: 44-48) and more especially by Boeseman et al. (1991). These authors came to the conclusion that the Leningrad drawings are copies of those in the Cracow library, and were made in the 17th century. The artist who made the copies is not known, neither is their purpose, nor the way in which they came to Leningrad. Whitehead & Boeseman (1989, 1989a: 45) think it not unlikely that they were made as a record for Johan Maurits before the originals were sent to Berlin. There is a possibility that these copies were obtained in 1717 by Czar Peter the Great when he visited Holland. During that visit the Czar acquired many objects of interest to science to be taken to Russia. The whole collection of drawings was sent in 1832 by the Russian zoologist J.F. Brandt on loan to Berlin, where they were compared by prof. Johann Horkel with the originals in the libri picturati. Horkel marked on the Leningrad set the page numbers of the Handbooks and Theatri and returned it with his annotations. Later, the drawings were commented upon in a paper by Soloviev (1934). When in 1965 the Brazilian Dom Clemente da Silva Nigra rediscovered the drawings in Leningrad, he managed to receive them on loan for the exhibition "Os Pintores de Maurício de Nassau" held in 1968 in Rio de Janeiro. During a visit to Leningrad in 1977 by Drs M. Boeseman and A. Diakonoff, both curator at the Rijksmuseum van Natuurlijke Historie in Leiden and Mr E.L.M. van Esch, photographer of said museum, a complete photographic documentation of the collection was made; this documentation is now held by the Leiden Museum and could be studied

by me. It is published and commented upon by Dr Boeseman et al. (1991).

The collection is divided into two series (by J. Horkel): series A contains figures that are copied from the Handbooks, series B those copied from the Theatri. Series A shows Crustacea (6 figures) on pp. 17 to 20, series B has 16 Crustacean figures on pp. 43, 143-149, 152.

6. Griebe's Naturalienbuch (Whitehead & Boeseman, 1989, 1989a: 53-55). In the Sächsische Landesbibliothek, Dresden, Germany is the manuscript of a book entitled "Naturalien-Buch in fünff Theilen, darinnen I. Früchte und Blumen II. Insecten III. Fische IV. Vögel V. Thiere, alle nach dem Leben in Farben abgebildet, befindlich sind, de Ao. 1680 bis 1708... gesammelt". The author (or collector) is Jacob Wilhelm Griebe. Whitehead & Boeseman (1989, 1989a) discuss the manuscript extensively and show that the only Crustacean figured there (on pl. 32b) is "Potiatinga f.208 (Leningrad f.152; Theatri, 1: 329, top right, but different)". This figure reproduced by Whitehead & Boeseman (1989: pl. 32 fig. b), shows *Panulirus echinatus* (see pp. 31-35). It is an oil painting, which matches the drawings of Potiatinga of p. 152 of the Leningrad drawings; however, in the Theatrum, 1: 329 the painting from which the Leningrad drawing is said to be copied is missing. There is the possibility that the Griebe pl. 32b actually is the oil painting missing from the Theatri. The Griebe collection contains similar oil paintings of other animals, which likewise are missing in the Theatri.

7. The Copenhagen paintings (Whitehead & Boeseman, 1989, 1989a: 65-83). Around 1650 Johan Maurits donated to King Frederik III of Denmark, who was a distant cousin, 26 paintings, mostly of Amerindians and negroes. One of these, the so called portrait of a Tupinamba man (fig. 17), shows two land crabs (the left shown in fig. 18) in the foreground; this painting, like most of the others of the donation, was made by Albert Eckhout. The other paintings of this set show no Crustacea.

8. The Schwedt paintings (Whitehead & Boeseman, 1989, 1989a: 99-107). Schloss Schwedt (the castle of Schwedt a.d. Oder, in eastern Germany, near the border with Poland) before the last war contained 10 large wall paintings of exotic subjects, which were ascribed to Albert Eckhout by Thomsen (1938), who made a study of that painter. Unfortunately the castle and all its murals were destroyed by fire at the end of World War II, and the only documentation that we have of the paintings are the photographs published by Thomsen. In some of these paintings the Brazilian influence is very noticeable and in them several of Eckhout's paintings are copied. Usually these Brazilian elements are mixed with figures of people, plants and animals from other tropical and non-tropical regions. Only one of the 10 paintings shows Crustacea (fig. 19). This is the one indicated by Whitehead & Boeseman (1989: 102-104) as "5. Indonesian (?) soldiers, also Africans, at dockside" and figured as their pl. 64a. In the foreground a number of fishes and crustaceans is shown. It is interesting that many of the Crustacea show most resemblance to the figures found in Wagener's Thierbuch (see source 3, p. 8 above); this might be an indication that some of Wagener's figures indeed are made by Eckhout, or that Eckhout here used Wagener's illustrations, or that the attribution of the Schwedt paintings to Eckhout might be dubious.

9. The gobelins of the two series "Les Anciennes Indes" and "Les Nouvelles

Indes" (Whitehead & Boeseman, 1989, 1989a: 107-150). One of the most unexpected sources for illustrations of Brazilian Crustacea, is provided by two series of gobelin tapestries made in Paris at the order of Louis XIV. In July 1679 Johan Maurits sent as a gift to Louis XIV a set of about forty larger and smaller paintings of Brazilian objects that could be used as examples for tapestry work. The history, distribution and other details of these gobelins have been extensively discussed by Jarry (1976: 52-59), Joppien (1979: 353-361), Krotoff (1984; with coloured illustrations of all eight gobelins of either series), and Whitehead & Boeseman (1989, 1989a: 107-150). These gobelins consist of two series: (1) "Les Anciennes Indes" made between 1687 and 1730 from cartoons painted by Albert Eckhout (and possibly also by Frans Post), showing Brazilian animals and other subjects, being the drawings donated by Johan Maurits to Louis XIV; and (2) "Les Nouvelles Indes" made between 1740 and 1768 (with occasional additional sets between 1771 and 1941) from cartoons painted by F. Desportes in 1739, but largely copied (and very exactly so) from the original Eckhout cartoons. Each series consists of eight different gobelins. The gobelins of "Les Nouvelles Indes" are very similar to those of "Les Anciennes Indes", but with important modifications in several details. The similarity of the two series is such that the eight gobelins in either are indicated with the same names, only "Le roi porté" of "Les Anciennes Indes" has become "La négresse portée" in "Les Nouvelles Indes".

Only four of the eight gobelins show Crustacea. These are depicted so accurately that in most cases they can be identified to species and correlated with figures from the sources discussed above.

Of either series of gobelins several sets were woven: 8 of the "Anciennes Indes", more of the "Nouvelles Indes"; of some of the gobelins separate additional copies were made. These sets are now distributed over a great part of Europe and also reached America (see Whitehead & Boeseman, 1989, 1989a: table opp. p. 120). So for example, of "Les Anciennes Indes" a set is present in the Mobilier National in Paris, in the Louvre in Paris, in the Grandmaster's Palace in Valletta, Malta, in the Académie de France in Rome (see Krotoff, 1984) and in other depositories. Sets or parts of sets of "Les Nouvelles Indes" may be seen in the Mobilier National in Paris (Krotoff, 1984), the Archbishop's Palace in Prague (Jarry, 1959), etc. Through the kindness of M. Jean Coural of the Mobilier National, Paris, I received of both series a set of photographs of the four gobelins showing Crustacea; M. Coural also provided me with close-ups of the foreground in the bottom part of the gobelins, as in all gobelins the Crustacea are concentrated in that part. Mr. Francis S. Mallia, director of the Grandmaster's Palace in Malta extended the same courtesy for the 4 "Crustacea" gobelins of "Les Anciennes Indes" in his Museum. I express my sincere gratitude to both gentlemen. The gobelins showing Crustacea are: "Le cheval rayé", "Le combat des animaux", "Le chasseur indien", and "Le roi porté" (Anciennes Indes)/"La négresse portée" (Nouvelles Indes).

A. The gobelin "Le cheval rayé" of the series of "Les Anciennes Indes" is figured by Krotoff (1984: 32, col. fig. [4]) and by Whitehead & Boeseman (1989, 1989a: 300, col. pl. 67). In it (fig. 20) a number of Crustacea (7 species) is arranged roughly in a triangle in the lower corner towards which the zebra jumps. In the gobelin shown by Krotoff (property of the Académie de France in Rome), the triangle is very distinct

and placed in the lower left hand corner of the gobelin. In the gobelin of the Mobilier National shown by Whitehead & Boeseman the triangle is in the lower right hand corner as this gobelin is the mirror-image of the Rome gobelin; this gobelin is heavily trimmed and of the Crustacean triangle only a small part is visible. The gobelin in the Grandmasters Palace in Malta is similar to that of the Mobilier National, but it is less severely trimmed and the "crustacean triangle" is practically complete.

In the gobelin "Le cheval rayé" of the series of the "Les Nouvelles Indes" (figured by Jarry, 1959: 64, fig. [7]; Anon., 1968: 83, fig. 78; Joppien, 1979: 360, fig. 164; Krotoff, 1984: 33, col. fig. [5]) the "crustacean triangle" is placed in the opposite corner (namely the lower corner towards which the zebra looks). The arrangement of the Crustacea in it, however, is entirely different from that of the "Les Anciennes Indes"gobelin, although the components are quite similar.

B. Did the previous gobelin show a large assortment of crustacean species, in the gobelin "Le combat des animaux" only a single species of crab is shown, be it in two specimens. This gobelin in the series of "Les Anciennes Indes" (fig. 21) has been figured by Anon. (1953: 54, fig. 34; 1968: 81, fig. 76), Krotoff (1984: 40, col. fig. [12]) and Whitehead & Boeseman (1989, 1989a: 304, col. pl. 71). That of the series "Les Nouvelles Indes" by Jarry (1959: 64, fig. [5]) and Krotoff (1984: 41, col. fig. [13]. The position of the two crabs (*Cardisoma guanhumi*) in both sets is very similar and will be dealt with under that species (pp. 60-61).

C. The gobelin "Le chasseur indien" shows in the lower half, facing the hunter, a triangular mound on which numerous Crustacea (9 species) are figured (fig. 23). This gobelin of the series of "Les Anciennes Indes" (figs. 22, 23) is figured by Schaeffer (1968a: 13, fig. [13], under "O Pescador"), Boeseman (1979: 174, fig. 211), Krotoff (1984: 38, col. fig. [10]) and by Whitehead & Boeseman (1989, 1989a: 303, col. pl. 70). In the same gobelin of the series "Les Nouvelles Indes" (fig. 24), illustrated by Jarry (1959: 62, fig. [1]), Joppien (1979: 362, fig. 165), Krotoff (1984: 39, col. fig. [11]), the arrangement of the Crustacea is very similar to that in the "Anciennes Indes", only a spiny lobster is added, while a shrimp, a slipper lobster and a crab are left out. Like in the "Cheval rayé" the crustacean triangle shows a great variety of species.

D. The fourth gobelin showing Crustacea is "Le roi porté" in the series "Les Anciennes Indes" (fig. 25); its is reproduced by Schaeffer (1968a: 12, fig. [11]), Jarry (1976: 65, fig. 3), Krotoff (1984: 42, col. fig. [14]) and Whitehead & Boeseman (1989, 1989a: 305, col. pl. 72). In this gobelin at least 5 species of Crustacea are shown among numerous fishes in the foreground of the scene, just above the lower margin of the gobelin. In the corresponding gobelin of the series "Les Nouvelles Indes", named "La négresse portée" (Anon., 1953: fig. 35; Jarry, 1959: 64, fig. [3]; Van Gelder, 1960: 10, fig. 5; Anon., 1968: 80, 84, fig. 80; Hoetink, 1979: 211, fig. 276; Krotoff, 1984: 43, col. fig. [15]) the arrangement of the Crustacea is almost the same as in "Le roi porté", except that two fishes and a crab at the extreme right are replaced by a pile of netting (fig. 26).

E. Another important document is a sketch (fig. 2) said to be made by F. Desportes as a cartoon for the gobelins of "Les Nouvelles Indes". In this sketch several Crustacea are shown; in the following text it is referred to as the "Desportes sketch". It is owned by the Manufacture Nationale de Sèvres, France. Through the kind

offices of Mme T. Préaud of the library of the Manufacture, I obtained a coloured photograph of this sketch, for which I express her my deep gratitude. This sketch has been published at several occasions, viz., by Jarry (1959: 66, fig. [14]; 1976: 67, fig. 5), Van Gelder (1960: 14, fig. 9), Boeseman (1979: 178, fig. 220) and, in colour by Krotoff (1984: 3, fig. [1]) and Whitehead & Boeseman (1989, 1989a: 310, pl. 77b). The colours of this sketch are very fresh and accurate, depicting the real live animals, while also the shape of the specimens is very natural. Therefore it is practically impossible that the (original) sketch was made anywhere else but in Brazil and from live animals, as in Crustacea the colour disappears in most species almost completely on preservation. If Desportes really made the sketch, he must have copied it very carefully and with the greatest attention to details, from paintings made by Eckhout (or Post) from living animals. Several of the Crustacea figured in the gobelins can be traced to this sketch.

Of all these 9 sources only the first two have been referred to in print by carcinologists. Several of Marcgraf's figures have been copied and commented upon by pre-Linnean authors like Jonstonus (1650), Sachs (1665), and Ruysch (1718). Authors like Linnaeus (1758), Herbst (1782-1804) and H. Milne Edwards (1834-1840) tried to fit Marcgraf's species into the Linnaean system and provided them with binomial names. Twice an interpretation of all of Marcgraf's Crustacea has been undertaken, namely by Sawaya (1942) and by Lemos de Castro (1962). In several instances, especially when no illustrations were provided in Marcgraf's work, these two authors were not able to give a positive identification; with the help of the additional sources discussed here, several of those problems could be solved.

In the following text all of the Crustacea described and illustrated by Johan Maurits' scientists and artists in Brazil are discussed in a systematic order. Of each species first a numbered list is given of those of the above mentioned 9 sources in which information on it is found. Next, under the heading "References", references are made (a) to the (unpublished) information on them found in the Leningrad drawings (source 5) and the Cracow paintings (source 4; i.e., the Handbooks 1 and 2, and Theatrum 1), and next (b) to published books and articles, in which the actual specimens observed in Brazil during Johan Maurits' reign are dealt with, or are referred to. The second list of references (those under (b)) is not complete, but an effort has been made to include the more important items. In the text of each species the unpublished and published information is discussed and an effort is made to identify all the species dealt with.

## Systematic list of the species

### Subclass Cirripedia Fischer de Waldheim, 1813

There is some doubt as to the author of the name Cirripedia. Lamarck (1806: unpaged; pages 139, 142, 143, 144, 147, 148 of the 1907 reprint edition) was the first to consider the present group a distinct class which he indicated with the French ver-

nacular name Cirrhipèdes. The first use of a latin name for the group that I can find is by Fischer (1813: 10, 200 in footnote, 425), who used the spelling Cirripeda, while Rafinesque (1815: 137) wrote Cirrhipedia. Cuvier (1816: 359, 504) used the vernacular names Cirrhopodes or Mollusques Cirrhopodes. By various authors these names were latinized to Cirrhopoda, Cirrhipoda, Cirrhipeda, or Cirripedes, until Burmeister (1834: 1, footnote) showed that the correct name should be Cirripedia, which since then has become generally accepted.

Order Thoracica Darwin, 1854
Lepadidae de Blainville, 1825
**Lepas hillii** (Leach, 1818)
(figs. 27, 28a)

Present in sources 1, 3, 4 and 5.

References: (a) unpublished: Reriapiya Leningrad drawings, A: 17 (p.p.); Reriapiya Handbook, 1: 314 (not seen);

(b) published: Reri apiya Marcgraf, 1648: 188, fig. (p.p.); *Lepas anatifera* Linnaeus, 1758: 668 (p.p.); *Lepas anatifera* Linnaeus, 1767: 1109 (p.p.); Reri Apiya Marcgraf, 1942: 188, fig. (p.p.); *Lepas* Sawaya, 1942: lxiv (note 482); Langk hälse Wagener, 1964: 189, 299 (Langhaelse (= pescoçudo)), fig. 24 p.p.); Pescoçudo (Langhälse) Pinto, 1964: 242, 348, fig. 24 (p.p.); *Lepas* Lemos de Castro, 1962: 42; Langk Hälse Spohr, 1967: 30, 31, fig. 24 (p.p.); *Lepas hillii* Whitehead & Boeseman, 1989, 1989a: 49, 226, 227, col. pls. 18b (on p. 249), 22a (on p. 253).

Annotations with the figures. The annotations with the Handbook figures are unknown to me. The following annotation is found with the Leningrad drawing (fig. 27): "p. 314 [evidently a reference to Handbook 1] Reriapiya so gross als das leben henckt sich mit solcher macht an die schiffe dass ein schiff nicht segeln kann, werden lang halsen genannt u. ist bey den muscheln ein lebendiges thier" (Reriapiya at natural size. Attaches itself with so much power to ships that these cannot sail. They are named "Langhalzen" [by the Dutch, = long necks] and the shell-bearing part is a living animal). Wagener gave the following explanation with his figure: "I have never been able to find out the name given by the Brazilian natives to this peculiar creature. The Dutch call it Langhälse. Under water they stick to the outside of ships with the blue buds [= the peduncle], boring in the wood and causing large holes and the sailors have quite a job to remove them. Five, ten, twenty or more are attached to each other without a central body, which is most puzzling" (in free translation). Evidently Wagener confused the present species with the shipworm *Teredo*.

The Leningrad figure (fig. 27), although unfinished and only partly coloured, is clearly based on the original of Marcgraf's (1648: 188) wood-cut (fig. 28a), or both are based on a third picture. The number, arrangement and position of the various individuals is exactly the same in this figure as in Marcgraf's wood-cut. The Leningrad figure has been published in colour by Whitehead & Boeseman (1989, 1989a: 249, pl. 18b). Of the twelve specimens shown in the Leningrad drawing, eight are finished and coloured, of the four others there are only rather faint outline sketches, 2 of

which are partly coloured. The calcareous pieces are bluish, the cirri pale yellowish brown, the peduncles purplish grey with dark rings, while at the base of the capitulum there is a bright red ring. This colour agrees perfectly with that in the coloured copy of Marcgraf's (1648) book consulted by me.

Is the resemblance between the Leningrad figure and Marcgraf's (1648) woodcut perfect, that between it and Wagener's (1964, fig. 24) illustration of "Langk hälse" (also reproduced by Spohr (1967) on p. 30) and, in colour, by Whitehead & Boeseman (1989, 1989a: 253, pl. 22a)), is less striking, although it seems possible that both are made from the same bunch of specimens. Wagener shows many more individuals and in a different, although similar position, but the way in which each individual is figured (e.g. the ringed peduncle, the shape of the cirri, etc.) is strikingly similar in the two figures.

Linnaeus (1758) cited Marcgraf's figure in the synonymy of *Lepas anatifera*, and did so also in the later editions of Systema Naturae. Later authors usually ignored Marcgraf's animals. Even in the monographic treatises, like those by Darwin (1851), Gruvel (1905) and Pilsbry (1907), Marcgraf is not mentioned at all. This evidently is partly due to a lack of interest in pre-Linnaean literature, partly to the fact that Marcraf's account and the rather crude wood-cut, if uncoloured, made a certain identification impossible. Sawaya (1942) and Lemos de Castro (1962) arrived at the conclusion that Marcgraf's animals certainly belong to the genus *Lepas* but they did not venture a specific identification.

An examination of the coloured edition of Marcgraf's work, and especially of the coloured Leningrad figure, however, makes it possible to reach a definite decision as to the identity of the material. In the coloured figure the animals look very natural and life-like. The valves are whitish blue and smooth without any apparent structure, they are bordered here and there with orange-red. Most conspicuous is the red band at the distal part of the peduncle just below the capitulum. That this red band intrigued the artist is shown by the fact that in the Leningrad drawings in both partly coloured specimens this band is indicated, in one it even is the only colour applied to the figure. The presence of this red ring makes the identity of Marcgraf's specimens clear. The general shape of the *Lepas* specimens and the smooth valves show that Marcgraf's animals are either *Lepas anatifera* L. or *Lepas hillii* (Leach), but the latter species is characterized by a red coloured band below the capitulum, which lacks in *Lepas anatifera*. Thus we may safely conclude that Marcgraf's animals belong to Leach's species.

*Lepas hillii*, like *L. anatifera*, is a common species with an almost worldwide distribution. It is found on floating objects.

### **Conchoderma virgatum** (Spengler, 1790)
(figs. 27, 28a)

Present in sources 1, 3, 4 (?) and 5.

References: (a) unpublished; Reriapiya Leningrad drawings, A: 17 (p.p.); ? Reriapiya Handbook, 1: 314 (not seen);

(b) published: Reri apiya Marcgraf, 1648: 188, fig. (p.p.); Reri Apiya Marcgraf, 1942: 188, fig.

(p.p.); Langk hälse Wagener, 1964: 189, 299 (Langhaelse (= pescoçudo)), fig. 24 (p.p.); Pescoçudo (Langhälse) Pinto, 1964: 242, 348, fig. 24 (p.p.); Langk Hälse Spohr, 1967: 30, 31, fig. 24 (p.p.); *Conchoderma virgatum* Whitehead & Boeseman, 1989, 1989a: 49, 226, 227, col.pls. 18b (on p. 249), 22a (on p. 253).

Marcgraf's (1648: 188; 1942: 188) wood-cut of Reri apiya (fig. 28a) shows 11 specimens of *Lepas hillii*, but there is also a lepadid specimen (extending over de peduncle of the lower left *Lepas*) which is different in that it does not show calcified valves. The presence of cirri shows that it indeed is a Cirriped, but the rest of the wood-cut figure of the animal is too crude to allow a guess at the identity of the specimen, which even might be a poorly drawn *Lepas*, or one that had lost its valves. In the Leningrad drawing (fig. 27), as well as in the coloured edition of Marcgraf's book, the specimen is shown to have a pale greyish colour with a dark streak on one side of the body extending over almost the full length of the animal. This drawing shows that it might well be that of a specimen of *Conchoderma virgatum* seen in oblique view. This supposition is strengthened by the fact that in Wagener's figure of "Langk hälse" a much more distinct *Conchoderma virgatum* is shown in side view, directed downward and placed in the lower half of the figure just left of center.

The specimen has not been referred to in the zoological literature.

*Conchoderma virgatum*, like *Lepas hillii* and *L. anatifera*, is known from practically all seas, where it is found on floating objects. It is often associated with *Lepas anatifera* or *L. hillii*.

## Balanidae Leach, 1817
## **Megabalanus tintinnabulum** (Linnaeus, 1758)?
## (fig. 29)

Present in sources 1, 4 and 5.

References: (a) unpublished: Reriapiya Leningrad drawings, B: 43; Reriapiya Theatrum, 1: 15 (not seen);

(b) published: "alia Reri apiya" Marcgraf, 1648: 189; "outra Reri Apiya" Marcgraf, 1942: 189; *Balanus* Sawaya, 1942: lxiv (note 483); *Balanus* Lemos de Castro, 1962: 42.

Annotations with the figures. With the figure in the Leningrad drawing (fig. 16) on p. 43 are the following inscriptions: "I.P. Tom 1. p. 15. Reriapiya. p. 188 HB". I.P. stands for Icones Postii (see p. 9 ), i.e. the Theatri; H.B. stands for H[istoria naturalis] B[rasiliae], i.e. Marcgraf, 1648. The other inscription on this page refers to the illustration of a fish shown on the same page.

The Leningrad water colour (fig. 29), which bears no resemblance to any of the illustrations in Marcgraf's (1648) or Piso's (1658) works, shows (a) a group of four large elongate balanids, two of which are still provided with scuta and terga, (b) a single large dead balanid shell which houses a fish, *Parablennius pilicornis* (Cuvier, 1829), and (c) an oval rock or shell with two large balanids, one with terga and scuta. The shape of the balanid specimens and their size (as compared to that of the fish) is such that among the balanids known from Brazil, this most likely is *Megabalanus tintinnabulum* or a related species. The small conical lumps on the outside of the bar-

nacle shells may be juvenile specimens of this or a different species. On the group of four large balanids a small crab is figured; this may be a species of the Xanthid *Eurypanopeus* or a similar species. It will be dealt with later (p. 54, 55).

This sketch is possibly made after the specimens that Marcgraf (1648: 189) indicated as "alia Reri apiya" after having dealt with *Lepas hillii* (see p. 16 above) as "Reri apiya". Judging by Marcgraf's description (no illustration was provided) his "alia Reri apiya" are undoubtedly balanids. Sawaya (1942) and Lemos de Castro (1962) arrived at the conclusion that Marcgraf's species belongs to the genus *Balanus*, but that the data at their disposal made a specific identification impossible; at that time the genus *Megabalanus* had not yet been split off from *Balanus*.

*Megabalanus tintinnabulum* has a wide distribution in tropical and subtropical seas of the world and is one of the most common species found attached to ship's bottoms.

## Subclass Hoplocarida Calman, 1904
## Order Stomatopoda Latreille, 1817

Latreille (1816: 6, 8, 40) introduced the French vernacular name Stomapodes for this group. One year later (Latreille, 1817: 493) he used the latin term Stomapoda for it. This name is grammatically incorrect, and Jarocki (1825: 159, 165) changed the name to Stomacopoda. Voigt (1836: 188) introduced the correction Stomatopoda, which is now generally accepted.

### Lysiosquillidae Giesbrecht, 1910
### **Lysiosquilla scabricauda** (Lamarck, 1818)
### (figs. 1, 3, 4, 22-24, 30, 31)

Present in sources 1, 4, 5 and 9A, C.

References: (a) unpublished: Tamaru guacú Leningrad drawings, B: 143, fig; Tamarû Handbook, 1: 324, fig.; Tamaru Theatrum, 1: title page, and page 311, figs.;

(b) published: Tamaru Guacu Marcgraf, 1648: 186, 187, fig.; Tamaru Guacu Jonstonus, 1650: 35, pl. 5 fig. 1; Tamaru Guacu Jonstonus, 1657: 27, pl. 5 fig. 1; Tamaru Guacu Jonston, 1660: 27, pl. 5 fig. 1; Tamaru Guacu Jonstonus, 1665: 27, pl. 5 fig. 1; Tamaru Guacu Sachs, 1665: 96; Tamaru Guacu Ruysch, 1718: 27, pl. 5 fig. 1; *Cancer Mantis* Linnaeus, 1758: 633; Tamaru Guacu Jonstonus, 1767: 35, pl. 5 fig. 1; *Cancer Mantis* Linnaeus, 1767: 1054; *Cancer Mantis* Gmelin, 1790: 2990; *Cancer (Mantis) digitalis* Herbst, 1793: 92; *Squilla Mantis* Fabricius, 1798: 416; *Squilla scabricauda* Latreille, 1828: 470; Gudger, 1912: 270, fig. 5; Tamaru Guacu Marcgraf, 1942: 186, 187, fig.; *Squilla scabricauda* Sawaya, 1942: lxiii (note 472); - Jarry, 1959: 62, fig. [1]; 64, fig. [7]; *Lysiosquilla scabricauda* Lemos de Castro, 1962: 41, pl. 4 figs. 24, 25; *Lysiosquilla scabricauda* Holthuis, 1967: 20; - Anon., 1968: 79, 83, fig. 78; - Schaeffer, 1968b: 13, fig. [13]; *Lysiosquilla scabricauda* Manning, 1969: 24, fig. on cover; - Schaeffer, 1976: 15, fig. 1; Tamaru- Squilla Wiesinger, 1976: 29; -Boeseman, 1979: 174, fig. 211; - Joppien, 1979: 360, 362, figs. 164,165; - Krotoff, 1984: 32, 33, 38, 39, col. figs. [4], [5], [10], [11]; - Albertin, 1985: 291, fig. 3; *Lysiosquilla scabricauda* Whitehead & Boeseman, 1989, 1989a: 103, 128, 229, 230 (only 1989a), 300, 303, col. pls. 67, 70.

The figure (fig. 3) of Handbook 1, p. 324, undoubtedly is the original of Marcgraf's (1648) figure (fig. 30), or a copy of the original. The two figures are very similar, even though Marcgraf's wood-cut is cruder and less complete. The dactylus of the left raptorial claw, which is missing in Marcgraf's figure is present in the Handbook drawing, where it is on the right side as the figures are each other's mirror image. The Handbook drawing is scientifically accurate and very detailed. The specimen in this figure has very little colour; it is uniformly whitish all over except for rather narrow dark bands over the posterior margins of the exposed somites, the almost black endopods of the uropods and a broad longitudinal black band over the middle of the telson; furthermore there is a narrow median line over the last segment of the uropodal exopod, a dark rim around the scaphocerite which has the blade stippled with brown, the eyes have the cornea brown (the left cornea with a most peculiar eye spot, which lacks in the right) and a pale brown spot in the middle of the anterior half of the carapace. Page 324 of the Handbook shows the following inscriptions: at the top, above the figure, is written in ink "Tamarû"; to the right of the figure, also in ink, the words "So gross als das Leben. Wirt eine See Katz genennt, ist gutt zu Essen" (= Natural size. Is called sea-cat, is good to eat). Below the last remark is written in pencil "*Squilla maculata* F." in W. de Haan's handwriting; this inscription evidently was made by De Haan during his visit to Berlin in 1826 (see pp. 10, 11 above). *Squilla maculata* at present is named *Lysiosquilla maculata* (Fabricius, 1793) and is the Indo-West Pacific counterpart of *Lysiosquilla scabricauda*; De Haan at that time evidently did not distinguish between the two species.

The figure (fig. 4) shown in Theatrum 1, p. 311, is an oil painting, possibly of the same animal, but viewed from a different angle. It is shown in oblique view, not in dorsal view. The position of the antennae is different: in the Handbook figure they are arranged symmetrically and the antennular peduncle reaches only slightly beyond the eyes, while in the Theatrum figure they are both turned to the left, and the antennular peduncle reaches much farther beyond the eyes. In the Handbook figure the free thoracic somites are shown slightly more than half as wide as the abdominal somites, in the Theatrum painting they are only slightly narrower than the abdomen. The last thoracic legs are directed obliquely posteriorly in the Handbook picture, being directed more sideways in the Theatrum painting. The anterior part of the body, especially the rostrum and the nearby area, is very accurately shown in the Handbook figure, but has hardly any detail in the Theatrum illustration; the same is true for the raptorial claw. The Theatrum painting is an beautiful forceful painting, somewhat lacking in detail, but it gives an excellent general impression of the animal; it is a painting as one could expect of an artist like Albert Eckhout. The Handbook water colour is excellent also, obviously made by someone with much artistic talent, but whose main attention was focused on the details, and it would not be surprising if it was made by a scientist like Marcgraf. The Theatrum painting has the following inscriptions in ink at the top of the page, above the oil painting: "Tamaru in L.Pr. 2. p. 324. Tamaru guacu Marg: in H.B. p. 187." The abbreviation L.Pr. 2 stands for Libri Principis 2 (= Handbook vol. 1); Marg: in H.B. means Marcgraf in Historia naturalis Brasiliae. That in this inscription Handbook 1 is indicated as L.Pr. 2 is explained by Whitehead & Boeseman (1989, 1989a: 40), who

remarked that some time after 1829 the two handbooks were rebound and then had the numbers switched, so L.Pr. 1 stand for Handbook 2 and likewise L.Pr. 2 refers to Handbook 1.

Just above the upper right hand corner of the oilpainting the page shows a pencil inscription "*Squilla*", clearly made by De Haan.

On the title page of volume 1 (fig. 1) of the unpublished Theatrum (figured by Gudger, 1912: 270, fig. 5; Schaeffer, 1976: 15, fig. 1; Albertin, 1985; 291) the text of the title is enclosed by a wreath made from the figures of fishes and marine invertebrates. *Lysiosquilla scabricauda* can be seen to the left of the lower center figure (the latter is a crab of the species *Carpilius corallinus*, see p. 51 below). This figure of *Lysiosquilla* has more affinities to that in the Theatrum and in the Leningrad drawings than to Marcgraf's wood-cut and the Handbook figure.

The figure (fig. 31) in ser. B p. 143 of the Leningrad drawings is clearly a copy of the Theatrum painting, showing all the characters of it in which the latter differs from the Handbook painting. Like in the Theatrum painting there is very little colour in the sketch: the tips of both exopod and endopod of the uropod are dark as well as the distal part of the telson; the longitudinal dark median band shown so clearly in the Handbook figure is lacking in the Theatrum and Leningrad figures; the scaphocerites are slightly darker than the rest, but do not show the characteristic line along the margin, which is conspicuous in the Handbook figure. The inscriptions on the page of the Leningrad drawing of the present species are the following: "I.P. Tom I.p.311. Tamaru guacú p. 187. HB", all in ink. I.P. (see p. 9) means Icones Postii (= Theatrum), and HB stands for H[istoria naturalis] B[rasiliae] (= Marcgraf, 1648).

Marcgraf's (1648) wood-cut (fig. 30) even though it lacks the left raptorial dactylus, is clearly based on the Handbook figure (fig. 3); it is rather crude, but still well recognizable as the present species. In the coloured copy of Marcgraf's book consulted by me, the animal is given a grey ground colour, over which the carapace, rostrum, scaphocerite, pleopods (as far as visible) and the tailfan have a pale yellowish brown colour. The antennal and antennular flagella are red, as are also the grooves and margins of the carapace, some longitudinal lines on the abdomen, two spots on one of the uropods, the tips of the teeth of the telson, and two transverse lines on the base of the telson. A narrow bluish grey band is present along the posterior margins of the free thoracic and abdominal somites; the same colour is found on the median carina of the telson and on the uropodal endopods.

Linnaeus (1758: 633) placed Marcgraf's Tamaru-guacu in the synonymy of *Cancer Mantis*. The specific name *mantis*, however, in the combination *Squilla mantis*, is used at present for a species from the Eastern Atlantic. This usage is legalized by the selection of a Mediterranean neotype for *Cancer mantis* (cf. Holthuis, 1969: 221). Most 18th century authors followed Linnaeus. Latreille (1828: 470) was the first to recognize the true identity of Marcgraf's species with *Squilla scabricauda* Lamarck, 1818, a species now placed in the genus *Lysiosquilla*. Latreille's identification has been accepted by all later zoologists, like Sawaya (1942) and Lemos de Castro (1962) in their identifications of Marcgraf's Crustacea; and also by Manning (1969) in his monograph of the Western Atlantic Stomatopoda (in which Marcgraf's figure is printed on the dust-cover and embossed in gold on the front of the hard cover), and Holthuis (1967: 20) in

his treatment of the Lysiosquillidae for Crustaceorum Catalogus.

The figure of *Lysiosquilla scabricauda* also found its place in two of the gobelins of source no. 9, both in the series "Les Anciennes Indes" and "Les Nouvelles Indes" (be it that there is a variant of one of the gobelins without Stomatopoda). The gobelin "Le chasseur Indien" of both series (figs. 22-24; also in Schaeffer, 1968b: 13, fig. [13]; Jarry, 1959: 62, fig. [1]; Boeseman, 1979: 174, fig. 211; Joppien, 1979: 362, fig. 165; Krotoff, 1984: 38, 39, col. figs. [10], [11]; Whitehead & Boeseman, 1989: 128, 303, col. pl. 70) shows a large *Lysiosquilla scabricauda* in the center of the "crustacean triangle" depicted in front of the hunter (fig. 22-24) (see p. 14, source 9C). This figure is very similar to that of the Handbook (1: 324) and the one published by Marcgraf (1648), differing from the Theatrum and Leningrad figures of the animal. Both raptorial dactyli are present. In Bergl's painting based on this gobelin of the series "Les Nouvelles Indes", the Stomatopod is absent (Joppien, 1979: 362, fig. 165).

In the gobelin "Le cheval rayé" of the series "Les Nouvelles Indes" (Jarry, 1959: 64, fig. [7]; Anon., 1968: 79, 83, fig. 78; Krotoff, 1984: 33, col. fig. [5]) and also in the cartoon of this gobelin (Joppien, 1979: 360, fig. 164) a figure of *Lysiosquilla* is shown some distance below the head of the rhinoceros and just above a tortoise. This figure resembles the Leningrad and Theatrum figures more than those of Marcgraf (1648) and the one of the Handbook. In the gobelin "Le cheval rayé" of the series "Les Anciennes Indes" (Krotoff, 1984: 32, col. fig. [4]; Whitehead & Boeseman, 1989, 1989a: 229, 300, col. pl. 67) *Lysiosquilla* is shown in about the same position (slightly above and partly covered by the tortoise at the bottom of the crustacean triangle(fig. 20); it is less distinct than the specimen in the gobelin of "Les Nouvelles Indes", being partly obscured by plants and a crab, so that it is difficult to make out whether it most resembles the Handbook or the Theatrum figure. The gobelin of this series in the Académie de France in Rome, reproduced in colour by Krotoff (1984: 32, col. fig. [4]) shows the animal in its full size; the same gobelin in the Mobilier National in Paris, shown in colour by Whitehead & Boeseman (1989, 1989a: 300, pl. 67) is so strongly trimmed that of the *Lysiosquilla* barely the telson and uropods are visible. The gobelin "Le cheval rayé" of "Les Anciennes Indes" in the Grandmaster's Palace in Malta, of which I received excellent photographs (fig. 20), however, must be a variant, as in it there is no trace of the *Lysiosquilla*: Its place is taken by a dark hole with some plants at one end.

*Lysiosquilla scabricauda* is a well known species in the Western Atlantic from Bermuda and South Carolina (U.S.A.) to southern Brazil. Its peculiar form and large size (up to 27.5 cm in total length) make it a conspicuous animal. It is eaten, but evidently not considered a great delicacy; it is not commercially fished.

Squillidae Latreille, 1802
**Squilla** spec. (? **S. obtusa** Holthuis, 1959)
(fig. 5)

Present in sources 3 and 8.
References: (b) published: -Thomsen, 1938: 115, fig. 56; Tamalu asu Wagener, 1964: 188, 298 ("Tamalu-açu

(= tamaru-açu)"), fig. 23; Tamalu-acu Pinto, 1964: 241, 348 ("Tamalu-açu (= tamaru-açu)"), fig. 23; *Squilla obtusa* ? Whitehead & Boeseman, 1989, 1989a: 103, 128, 227, 229, 252, 297, col. pl. 21, pl. 64.

Wagener (1964: fig. 23) figured a stomatopod (fig. 5), which is entirely different from Marcgraf's Tamaru guacu and from the Theatrum figure of *Lysiosquilla scabricauda* (fig. 4). It even belongs to a different genus, namely the genus *Squilla* Fabr. A coloured reproduction of Wagener's figure has been published by Whitehead & Boeseman (1989, 1989a: col. pl. 21).

According to Coelho & Koenig (1972: 251) only one species of *Squilla*, *S. neglecta* Gibbes, 1850, was known to them from the State of Pernambuco, while two other species of the genus, *S. prasinolineata* Dana, 1852 and *S. obtusa* Holthuis, 1959, could be expected there. As Wagener's drawing clearly shows 6 teeth on the raptorial dactylus, while in *S. neglecta* and *S. prasinolineata* that dactylus has only 5 teeth, the identity of Wagener's specimen with *S. obtusa* (which has 6) is a possibility. However, Wagener's figure, although reasonably detailed, is not so accurate that the identity of the species can be made out with full certainty. The artist may have made mistakes, and the specimen also could belong to a species so far not reported from the area.

In the oil painting (fig. 19) ascribed to Eckhout, formerly present in the Schloss Schwedt a.d. Oder (source no. 8), and reproduced by Thomsen (1938: 115, fig. 56) and by Whitehead & Boeseman (1989, 1989a: 103, 128, 297, pl. 64a), among the fishes and crustaceans in the foreground, a stomatopod is visible slightly to the left of center. This figure shows so much resemblance to that of the Stomatopod figured in Wagener's Thierbuch, that there can be little doubt that they are of the same origin. Unfortunately Schloss Schwedt was destroyed during World War II and the only documentation that we have of the painting seems to be the black and white photograph of it reproduced by Thomsen. A scrutiny of the photograph shows that the stomatopod in this painting lies partly over a second crustacean, which most likely is a stomatopod of the same species; not enough details are visible, however, to make this certain.

*Squilla obtusa* is a marine species, which so far has been reported from Puerto Rico and from the north coast of South America (Colombia to Brazil).

## Subclass Eumalacostraca Grobben, 1892
## Order Isopoda Latreille, 1817

Latreille (1816: 7, 48) introduced the name Isopodes, in vernacular French for the present group. The latin term Isopoda was used by him one year later (Latreille, 1817: 494). As shown by Roux (1976: 31) the date of publication of vol. 3 of Cuvier's Règne Animal (ed. 1), in which Latreille first used the term Isopodes, is November 1816, and not 1817 as printed on the title page and as usually accepted by zoologists.

## Cymothoidae Leach, 1814

The author of the name of the family Cymothoidae is usually cited as Dana, 1852, but the name actually was proposed (in the correct spelling) by Leach (1814: 433).

## **Cymothoa excisa** Perty, 1833
(fig. 28b)

Present in sources 1 and 2.

References: (b) published: "crustaceo ... animalculo" Marcgraf, 1648: 155, fig; "crustaceorum insectorum" Piso, 1658: 55, fig.; *Oniscus oestrum* Linnaeus, 1758; 636; *Oniscus Oestrum* Gmelin, 1790: 3010; *Cymothoa Oestrum* Fabricius, 1793: 505; ? *Cymothoa excisa* Schioedte & Meinert, 1884: 238; "animalzinho crustáceo" Marcgraf, 1942: 155, fig.; Cymothoidae De Paiva Carvalho & Sawaya, 1942: lv; "insetos crustáceos" Piso, 1957: 133, 134, fig.

In his chapter on the fishes, Marcgraf (1648: 155) figured a species of Cymothoid in both dorsal and ventral view (fig. 28b ). It was found to parasitize the fish "Acarapitamba", which has been identified as *Ocyurus chrysurus* (Bloch, 1791); actually, Bloch in the original description of *Sparus chrysurus* referred to Marcgraf's figure.

Marcgraf described the Cymothoid as 1.5 inch long and 1 inch wide (= about 37 x 25 mm). This is rather large for the species, but Trilles (1975: 987) reported upon an ovigerous female with a total length of 34 mm. Marcgraf's short description gives too few details to make a definite identification possible. The figure gives more information and makes the identity of the specimen with *Cymothoa excisa* quite likely, the more so as the latter species has also been reported as a parasite of *Ocyurus chrysurus*. Marcgraf remarked (in translation) "this small animal is found in the mouth of the fish and fixes itself in the throat with its claws, so that the fish is unable to free itself from this parasite". *Cymothoa excisa* has been reported from the mouth of several species of fish; the single record of its occurrence on the gills needs verification. The colour was described by Marcgraf as white. In the coloured copy of Marcgraf's book the animal is reddish pink.

Linnaeus (1758: 636) placed Marcgraf's species in the synonymy of *Cymothoa oestrum* (L., 1758) and was followed in this by several later authors of the 18th century like Gmelin (1790: 3010) and Fabricius (1793: 505). In the first half of the 19th century Marcgraf's records seem to have been more or less forgotten, until in 1884 Schioedte & Meinert (1884: 238), in their Cymothoid monograph, assigned Marcgraf's animal, be it with a question mark to *Cymothoa excisa*, which seems a very sensible solution. De Paiva Carvalho & Sawaya (1942: lv) in their comments on Marcgraf's fishes gave no more precise identification than "Cymothoidae".

*Cymothoa excisa* is known from the western Atlantic (Massachusetts, U.S.A. to Santa Catarina State, Brazil, including the Bahamas, the Gulf of Mexico and the Caribbean Sea). It has been found as a parasite on numerous species of fish belonging to the Order Perciformes (families Lutjanidae, Carangidae, Pomadasyidae, Sciaenidae, Sparidae, Kyphosidae, Scombridae and Mugilidae); furthermore there are single records from Clupeiformes and Echeneiformes. Most of the specimens are found in the mouth of their host.

Order Decapoda Latreille, 1802
Suborder Caridea Dana, 1852
Atyidae De Haan, 1849
**Atya scabra** (Leach, 1814)
(figs. 6, 32a)

Present in sources 1, 2, 4 and 5.

References: (a) unpublished: Guaricurû Leningrad drawings, (B): 152, fig.; Guaricurû Theatrum, 1: 331, fig.;

(b) published: Guaricuru Marcgraf, 1648: 187, fig.; Guaricuru Jonstonus, 1650: 36, pl. 9 fig. 16; Guaricuru Jonstonus, 1657: 28, pl. 9 fig. 16; Poti Piso, 1658: 78, fig.; Guarikuru Jonston, 1660: 27, pl. 9 fig. 16 (Guaricuru); Guaricuru Jonstonus, 1665: 28, pl. 9 fig. 16; Guaricuru Sachs, 1665: 89; Guaricuru Ruysch, 1718: 28, pl. 9 fig. 16; Guaricuru Jonstonus, 1767: 36, pl. 9 fig. 16; Guaricuru Marcgraf, 1942: 187, fig.; *Atya* Sawaya, 1942: lxiii (note 475); Poti Piso, 1957: 188, fig.; *Atya scabra* Lemos de Castro, 1962: 41, pl. 4 figs. 26, 27.

The Leningrad figure (fig. 6) has the legend "Poti. Hv 86. p. 78 Guaricurû". The abbreviation Hv is not very clearly written, it may stand for H[istoria] u [triusque Indiae], as the reference "Poti. Hv 86. p. 78" is clearly to Piso, 1658, p. 78, fig. 86. Piso's figure of Poti is not numbered, but it is the 86th figure in his book.

The Leningrad figure is extremely similar to, although being the mirror image of, the one published by Marcgraf (fig. 32a), they may be both copied from a third figure. In contrast to most other figures represented in this set of plates, the figure of *Atya scabra* is coarser and more inaccurate than Marcgraf's wood-cut. Especially the shape of the head and the abdomen in the wood-cut is superior to that shown in the present figure.

A counterpart of this figure, possibly the original of the three, is found in Theatrum I, p. 331. This page has an oil painting of the species well matching both the Leningrad figure of p. 152 and that published by Marcgraf. Unfortunately the coloured photograph of the Theatrum painting seen by me is somewhat overexposed, so that in the figure, which is already dark by itself, the details are not easy to discern. The figure in the oil painting, like that of the Leningrad collection (p. 152) is shown in lateral view facing right. The position of the body and the appendages in the two figures is very similar.

The Theatrum painting bears at the top center the inscription "Guaricurû" and in the right lower corner the number "59". On p. 331, above the painting are the two following inscriptions in ink:

"Guaricuru. Marg: in H.B. p. 187.

Poti. Piso in H.V.I. p. 78."

The indication "Marg: in H.B." stands for "Marcgraf in H [istoria naturalis] B [rasiliae]", and "H.V.I." for "H [istoria de] U [triusque] I [ndiae] (actually: De Indiae Utriusque Re Naturali et Medica).

No illustration of the present species is found in the Handbooks, and neither in any of the other paintings and gobelins discussed here.

Most authors ignored Marcgraf's "Guaricuru" and did not attempt to identify it. Sawaya (1942), so far as I know was the first to show it to be an *Atya* species and

Lemos de Castro (1962) correctly proved that it must belong to the species *Atya scabra* (Leach).

The coloured edition of Marcgraf's work depicts this species as a yellowish grey animal with green spots mostly laterally and ventrally, and white areas dorsally. In the Leningrad figure the colour is very pale greyish brown with numerous dark brown stipples on the abdomen and fewer on the carapace and third leg. The Theatrum figure in the photograph at my disposal has the body very dark, almost black, but that may be caused by overexposure.

*Atya scabra* is a fresh water shrimp found on the Atlantic side of the American mainland between Mexico and Brazil and in the West Indies. Both in Brazil and elsewhere it is eaten.

## Palaemonidae Rafinesque, 1815
## **Macrobrachium acanthurus** (Wiegmann, 1836)
## (fig. 7)

Present in sources 1, 4 and 5.

References: (a) unpublished: Potiguaçû Leningrad drawings, (B): 145; Potiguaçû Theatrum, 1: 329, fig.; (b) published: Potiguacu Marcgraf, 1648: 188; Potiguacu Sachs, 1665: 90; Potiguacu Marcgraf, 1942: 188; *Peneus ? brasiliensis* Sawaya, 1942: lxiii (note 479); *Penaeus* Lemos de Castro, 1962: 42; *Marobrachium acanthurus* Whitehead & Boeseman, 1989, 1989a: 227, 250, col. pl. 19 fig. d.

The figure of the Leningrad drawings (fig. 7), which is also reproduced in colour by Whitehead & Boeseman (1989, 1989a), shows a dark, practically black, shrimp with two long and slender, but heavy chelipeds and a long, slightly upturned rostrum. The species clearly is a *Macrobrachium* and of all Brazilian species of the genus it resembles most *M. acanthurus*. There can be little doubt that the figure represents that species, which is quite common in the Brazilian coastal plain. Although I do not know of any reports of black specimens of *M. acanthurus*, the species sometimes may be quite dark. *Macrobrachium amazonicum* (Heller), the only other Brazilian species to which the figured specimen of "Potiguacu" possibly could belong, is, even in the adult specimens, colourless transparent. Also the shape of the rostrum and of the large chelipeds resembles more those of *M. acanthurus* than of *M. amazonicum*. With this figure, apart from the name "Potiguacû", is a reference to "p. 329a". This obviously is to p. 329 of vol. 1 of the Theatrum, where, as the lower figure, the same species is illustrated. The figure in the Theatrum, an oil painting, is exactly similar to the Leningrad drawing of p. 145, having the same shape, position of the appendages, etc. The oil painting likewise is very dark, showing the animal as almost black, it is more detailed and complete than the Leningrad sketch and makes the identity of the species with *Macrobrachium acanthurus* completely certain. The rostrum in the oil painting is somewhat more curved and the pubescence of the fingers of the large chelipeds is distinct. The ink inscription with this figure is "Potiguacu. Marg: in H.B. p. 188. s.Ic.", the reference being to Marcgraf, 1648, p. 188 (s.Ic. stands for "sine Icone"). In pencil the word "Peneus" is written under the painting, in what proves to be the handwriting of W. de Haan, who in 1826 saw these paintings (see p. 10 above).

The other species figured on p. 329 of the Theatrum is *Palaemon pandaliformis* (see p. 29).

Marcgraf (1648: 188) devoted only a few lines to this species: "Potigvacv Brasiliensibus est praecedenti ([= "Poti Atinga", *Palaemon pandaliformis*, see p. 29] plane similis, excepto colore, qui in hoc est nigricans; brachia quoque eadem, verum tantum fili crassioris crassitie". This description clearly shows to be based on the specimen figured here. The briefness of Marcgraf's description, and the lack of a figure was the cause that later authors could not recognize the species. Both Sawaya (1942) and Lemos de Castro (1962) thought is possible that this and the next species both belonged to the Penaeidae (as evidently De Haan thought also). The rediscovery of the present illustrations now finally makes the identity of Marcgraf's "Potiguacu" clear.

*Macrobrachium acanthurus* lives in fresh and brackish waters and is known from Georgia (U.S.A.) to Brazil, including the West Indies.

## **Macrobrachium carcinus** (Linnaeus, 1758)
(figs. 7, 8)

Present in sources 1, 4 and 5.

References: (a) unpublished: Potipêma Leningrad drawings, (B): 145, fig.; Potipema Theatrum, 1: 323, fig.
(b) published: Potipema Marcgraf, 1648: 187; Potipema Sachs, 1665: 90; *Palaemon jamaicensis* Moreira, 1901: 78; Potipema Marcgraf, 1942: 187; Palaemonidae Sawaya, 1942: lxiii (note 477); *Macrobrachium carcinus* Holthuis, 1952: 114; *Macrobrachium carcinus* Lemos de Castro, 1962: 41; Palaemonidae? Whitehead, 1976: 418; "zwei Krebse" Wiesinger, 1976: 29; "Rivierkreeft" Whitehead & Duparc, 1979: 281, col. fig.; *Macrobrachium carcinus* Whitehead & Boeseman, 1989, 1989a: 226, 227, 239, 250, col. pls. 8 fig. a, 19 fig. d; Garnaten Kellein & Frei, 1990: 13, back endpaper.

The Leningrad figure (fig. 7) is a good representation of the species. It is put down in bold lines, without too much attention to details. The robust shape of the body, the relatively short rostrum and the heavy equal chelipeds with the short carpus leave not the least doubt as to the specific identity of the specimen. Evidently the specimen figured was cooked as its colour is uniformly reddish, and of the original colour pattern (broad longitudinal dark stripes) only at the most a few traces remain visible. A coloured reproduction of this figure has been published by Whitehead & Boeseman (1989, 1989a: 250, col. pl. 19 fig. d). Apart from the name Potipêma, the figure bears the indication "I.P.Tom.I p. 323" (= Icones Postii (= Theatrum), vol. 1, p. 323).

Page 323 of vol. 1 of the Theatrum carries an oil painting showing two large specimens of *Macrobrachium carcinus* together with a lizard (fig. 8). The left of the two shrimps can immediately recognized as the original from which the Leningrad drawing was copied. The position of the body and the appendages and the angle under which the animal is drawn are exactly the same in the two illustrations. The Theatrum painting, however, is more detailed and is clearly a finished painting while the Leningrad watercolour is only a sketch. The oil painting also shows the specimens to be cooked, having a rather uniform brick red colour. Both shrimps in the Theatrum

oil painting are ovigerous females; the right one lies on its back and is seen in oblique ventral view. The following ink inscriptions are found on the page with the oil painting: "Potipema. in L.P. 1 p. 319. Marg. in H.B., p. 187". "Marg. in H.B." stands for Marcgraf (1648) in H[istoria Naturalis] B[rasiliae]. "L.P.1" = Libri Principis 1; this refers to Handbook 2; as explained by Whitehead & Boeseman (1989, 1989a: 40) the bound Handbooks 1 and 2 were rebound after 1829 and then the volume numbers were interchanged. The specimen in this Handbook figure differs rather strongly from the above mentioned figures of *Macrobrachium carcinus*, so that I am not sure that it is the same species. It will be dealt with separately here as *Macrobrachium* spec. (next species). Apart from the ink inscriptions with this Theatrum figure, there is an inscription in pencil immediately above the upper right hand corner of the oil painting saying "Palaemon n.spec." in Wilhem de Haan's handwriting (see pp 10, 11 on De Haan's visit to Berlin in 1826). This painting has been twice reproduced in colour, namely by Whitehead & Duparc, 1979 and by Whitehead & Boeseman, 1989, 1989a.

Marcgraf's description of Potipema is rather short and unillustrated, therefore it has usually been ignored by later zoologists. However, Moreira (1901: 78) correctly identified Marcgraf's Potipema (incorrectly written Potima by him) with the present species, which as that time was best known under the name *Palaemon jamaicensis* (Herbst). Marcgraf's description fits the present species, but his account of its characteristic colouration removes any doubt about the identity of his Potipema. As shown by Holthuis (1952: 114), Marcgraf's colour description of the species was the first ever published, the next came after 3 centuries, when Hedgpeth in 1947 described live specimens from Texas.

*Macrobrachium carcinus* is probably the species referred to in the legend of a sketch by Frans Post showing the anchorage near Recife. This sketch is reproduced by Kellein & Frei (1990, on p. 13 and, somewhat enlarged, on the back endpaper of the book). The legend mentions "garnaten groot 6 duijm van seer goede smaeck" (= shrimps, six inches, = 15 cm, long and of a very good taste). The shrimps were found by the crews of the ships, who were sent out to fetch fresh water from a stream that emptied into a pool about a half hour's walk from the sea. As *Macrobrachium acanthurus* only rarely attains a size of 16 cm, while *M. carcinus* can reach a length of 23 cm, it is more likely that the latter rather than the former species was meant.

*Macrobrachium carcinus* is a freshwater shrimp found on the Atlantic slope of America from Florida (U.S.A.) to Santa Catarina (southern Brazil), and in the West Indies. Its large size and good taste make it of economic importance.

## **Macrobrachium** spec.
(figs. 22, 23, 33)

Present in sources 4 and 9.

References: (a) unpublished: Potîpêma Handbook, 2: 319, fig.;

(b) published: - Schaeffer, 1968: 13, fig. [13]; - Boeseman, 1979: 174, fig. 211; - Krotoff, 1984: 38, col. fig. [10]; *Macrobrachium carcinus* Whitehead & Boeseman, 1989, 1989a: 128, 229 (230 in 1989a), 303, col. pl. 70.

The figure in Handbook 2, p. 319 shows a *Macrobrachium* in slightly oblique dorsal view; it is not coloured (fig. 33). The excellent drawing is very detailed and accurate, and could well pass for a modern scientific illustration; all appendages, including the antennae and antennulae with their peduncles are accurately shown as well as all the legs. It is possible that the species, although certainly a *Macrobrachium*, is not *M. carcinus*. Like in *M. carcinus* the second pereiopods are equal, covered with short spinules and have the carpus distinctly shorter than the merus. However, the fingers of these large chelipeds are only about half as long as the palm, instead of being just slightly shorter than the palm. The quality of the figure is such that it seems unlikely that the artist has made an error here. The only inscriptions with this figure are "Potîpêma" and "So gross als das Leben" (= natural size). It is an intriguing figure, and it might be interesting to find out whether similar specimens still occur in the area. Although this figure has no counterpart in the Leningrad collection or in the Theatrum, it is shown in the gobelin "Le chasseur Indien" of the series "Les Anciennes Indes" (figs. 22, 23; also in Schaeffer, 1968b: 13, fig. [13]; Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 38, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 303, col. pl. 70). Here the shrimp forms the upper figure in the "crustacean triangle" in front of the hunter. The specimen is shown in dorsal view with the two large chelae stretched forward. Its shape and position is so exactly like that in the Handbook figure, that there can be not the slightest doubt that the two are of the same origin. In the gobelin "Le chasseur Indien" of the series "Les Nouvelles Indes" the figure of the *Macrobrachium* is entirely omitted. On none of the other gobelins any *Macrobrachium* was noticed by me.

### **Palaemon pandaliformis** (Stimpson, 1871)
(fig. 7)

Present in sources 1, 4 and 5.

References: (a) unpublished: Potiatinga Leningrad drawings, (B): 145, fig., 152 (no figure); Potiatinga Theatrum, 1: 329, fig.;

(b) published: Poti Atinga Marcgraf, 1648: 188 (no figure); Potiatinga Sachs, 1665: 90; Poti Atinga Marcgraf, 1942: 188; *Penaeus? brasiliensis* Sawaya, 1942: lxiii (note 479); *Penaeus* Lemos de Castro, 1962: 42; *Palaemon pandaliformis* Whitehead & Boeseman, 1989, 1989a: 227, 250, col. pl. 19 fig. d.

The Leningrad figure (on p. 145) (fig. 7) is a rather rough sketch of a slender transparent shrimp with a long upturned denticulated rostrum; it does not show enlarged second chelipeds. This figure has been published in colour by Whitehead & Boeseman, 1989, 1989a. As with the two other species figured on this plate (*Macrobrachium carcinus* and *M. acanthurus*), the artist has given an excellent general impression of the animal without going into minute details. The shape of the rostrum, the transparency of the animal and the fact that the second pereiopods are not strongly enlarged, clearly show the species to be *Palaemon pandaliformis*. The long upturned denticulated rostrum is characteristic for that species. The fact that in *P. pandaliformis* the second pereiopods are slender and hardly longer or more robust

than the other legs, is the cause that the artist made all the legs of about the same size and strength; this is the more understandable as in the other species shown on this plate the second pereiopods are particularly strong. The figure carries the inscription "p. 329 b. Potiatinga". The indication p. 329b clearly is a reference to Theatrum vol. 1, where on p. 329 two shrimps are figured, namely (a) Potiguacu (= *Macrobrachium acanthurus*, see p. above), and (b) Potiatinga, which is the present species. The oil painting of Potiatinga in the Theatrum is so similar to the Leningrad sketch, that there can be no doubt that the latter is either a preliminary sketch for the former or is a rough copy of it. The oil painting is much more detailed and accurate; so, it does show the very slender slightly enlarged second pereiopods, which in the Leningrad sketch were either omitted or indicated by a single rough line. The oil painting fully confirms that the species indicated by Marcgraf (1648) as Poti Atinga is actually *Palaemon pandaliformis*. The ink inscriptions with the oil painting are the following "Potiatinga. Marg: in H,B. p. 188 s.Ic." (= Potiatinga, Marcgraf, Historia Naturalis Brasiliae, p. 188, without figure (sine icone)). In W. de Haan's handwriting there is a pencil inscription above the oil painting saying "Peneus"; this evidently is a preliminary identification made by De Haan during his 1826 visit to Berlin (see pp. 10, 11).

On p. 152 of the B. series of the Leningrad drawings, the name Potiatinga is found without a figure or other indication. It is possible that the artist intended to place a figure of the present species there, but later changed his mind, possibly because not enough space was available as the page already carries the figures of *Panulirus echinatus* and *Atya scabra*. In Griebe's "Naturalien-Buch" (source 6, p. 12) the name Potiatinga is used with a painting of *Panulirus echinatus*, probably the original painting after which the Leningrad sketch of p. 152 was made.

The native name "Poti Atinga" (or Potiatinga, or Potitinga) for the species led Fritz Müller (1880: 153; 1892: 181) to propose the name *Leander Potitinga* for it; this name, being younger than *Leander pandaliformis* Stimpson, 1871, disappears in the synonymy of the latter.

As pointed out under *Macrobrachium acanthurus*, Sawaya (1942) and Lemos de Castro (1962), because of the short and insufficient description provided by Marcgraf, and the absence of a figure, could not identify "Poti Atinga", and suggested that the species might belong to the family Penaeidae (as did De Haan). Here too the rediscovery of a figure of the species makes its identification possible.

*Palaemon pandaliformis* is a species from fresh and brackish water in the West Indies and from the Atlantic coast of central and South America (from Guatemala to Brazil).

Suborder Palinura Latreille, 1802
Palinuridae Latreille, 1802
**Panulirus echinatus** S.I. Smith, 1869
(figs. 6, 9, 10, 20, 24, 32b, 34)

Present in sources 1, 2, 4, 5, 6 and 9A, C.
References: (a) unpublished: Potiqqya Leningrad drawings, (A): 21 (no figure); Poticucuma Leningrad

drawings, (B): 144, fig.; Potiquiquiya Leningrad drawings, (B):152, fig.; Potiquiquiya Handbook, 1: 384, fig.; Potiquiquiya Theatrum, 1: 313, 315 (no figs.); Poticucuma Theatrum, 1: 319, fig.;

(b) published: Potiquiquiya Marcgraf, 1648: 185, 186, fig.; Potiquiquiya Jonstonus, 1650: 34, pl. 9 fig. 13 (Potiquiya); Potiquiquiya Jonstonus, 1657: 27, pl. 9 fig. 13 (Potiquiya); Potiquiquía Piso, 1658: 77, fig.; Potiquiquiya Jonston, 1660: 26, pl. 9 fig. 13 (Potiquiya); Potiquiquiya Jonstonus, 1665: 27, pl. 9 fig. 13 (Potiquiya); Potiquiquya Sachs, 1665: 89, pl. 1 fig. (3); Potiquiquiya Ruysch, 1718: 27, pl. 9 fig. 13 (Potiquiya); Potiquiquiya Jonstonus, 1767: 34, pl. 9 fig. 13 (Potiquiya); *Cancer Homarus* Linnaeus, 1767: 1053; *Cancer Homarus* Gmelin, 1790: 2988; *Cancer (Astacus) homarus* Herbst, 1793: 84, 85; *Palinurus Homarus* Fabricius, 1798: 400; *Palinurus laevicauda* Latreille, 1817a: 295; *Palinurus laevicauda* H. Milne Edwards, 1837: 301; Potiquiquiya Marcgraf, 1942: 185, 186, fig.; *Panulirus* Sawaya, 1942: lxiii (note 470); Potiquiquíya Piso, 1957: 187, fig.; - Jarry, 1959: 62, 64, fig. [1], [7]; - Anon., 1968: 83, fig. 78; *Panulirus* Lemos de Castro, 1962: 41, pl. 3 fig. 20; *Panulirus echinatus* Holthuis, Edwards & Lubbock, 1980: 32, 36; - Joppien, 1979: 360, fig. 164; - Krotoff, 1984: 32, 33, col. figs. [4], [5]; - Albertin, 1985: 307, fig. 8; *Panulirus echinatus* Vianna, 1986: 10, figs. 1, 2; *Panulirus echinatus* Vianna, 1987: 308, fig. 1; *Panulirus echinatus* Whitehead & Boeseman, 1989, 1989a: 54, 227, 263, pl. 32 fig. b.

The Leningrad watercolour sketch (fig. 34) of p. 144 shows clearly a *Panulirus* in oblique dorso-lateral view, facing left. The general impression of this forceful figure is that it is a good natural and accurate representation of the animal. But when carefully examined, many inaccuracies in details are found. So the antennular peduncles are far too long; the abdomen is figured with 8 instead of with 6 somites, etc. The colour of the abdomen is shown rather uniformly brownish, with some dark stipples in the dorsal shaded part. No distinct grooves are indicated on the somites, only an indication of one is visible on the fifth somite (counted from before backwards). This at first made me inclined to consider this specimen to belong to *Panulirus laevicauda* (Latreille, 1817), a common Brazilian species. However, the completed oil painting based on the same specimen, found in Theatrum 1: 319, shows, as pointed out by Vianna (1986: 10, 11, fig. 2; 1987: 308), that the species actually is *Panulirus echinatus*. In the oil painting (fig. 10) the abdomen is shown with numerous pale dots as in *P. echinatus* and unlike in *P. leavicauda* where the white dots are limited to the pleura and a very thin row along the posterior margin of the somite. The seeming absence of grooves probably is due to the fact that the artist got confused and took some grooves to be the posterior margin of the somite, which also would explain the error of having too many abdominal somites. The striped colour pattern of the legs agrees fully with that of *P. echinatus*, although this character also is found in *P. laevicauda*. With the drawing of p. 144 is the annotation "I.P.Tom.1. p. 319. Poticucuma", which is a reference to the just mentioned Theatrum (Icones Postii) vol. 1, p. 319, the figure on which will be discussed below.

On p. 21 of series A of the Leningrad drawings is the indication "*384* Potiqqya vier spann lang", but no figure is given. The reference is to Handbook 1, p. 384, where the present species is figured (see below). Potiqqya is either a misspelling for Potiquiquiya, or an abbreviation.

The species is mentioned for a third time in the Leningrad drawings, namely in ser. B, p. 152. Here the species is figured (fig. 6), but the figure is quite different from that on p. 144. It is an excellent water colour painting. The animal is shown in oblique dorsolateral view, facing right; it evidently is cooked as the colour is rather

uniformly brownish red, be it that the entire abdomen shows regularly distributed pale spots, while also the frontal horns and some of the spines on the carapace have pale lines or spots. The colour pattern of the legs is not clearly visible but could very well be striped. The abdominal somites show the transverse grooves very clearly and there cannot be the least doubt that the specimen is *Panulirus echinatus*. With the figure is the inscription "Potiquiquiya Hv 85.p.77"; this reference is to Piso's (1658) H[istoria] u [triusque Indiae] (actually: "De Indiae utriusque re naturali et medica") fig. 85 (Piso did not number his figures but that of the spiny lobster is the 85th) p. 77. This Leningrad figure is, however, completely different from that published by Marcgraf (1648) and Piso (1658) and seems to have no counter part in the Handbooks or Theatrum, being the only Leningrad Crustacean figure without such a counter part. However, an oil painting showing an extremely close resemblance to it is found in the unpublished "Naturalien-Buch" of Jacob Wilhelm Griebe (source 6, see p. 12). This book has been discussed by Joppien (1979: 333), Whitehead (1979: 461), and by Whitehead & Boeseman (1989, 1989a: 53-55). Whitehead (1979) mentioned the presence of an oil painting of a lobster in Griebe's book; this painting was also discussed by Whitehead & Boeseman (1989, 1989a: 54, 227, 263, pl. 32 fig. b) who published a black and white reproduction of it. The painting was marked "Potiatinga". As pointed out before, it is possible that Griebe's painting is one of the original paintings from Theatrum vol. 1, which at present is missing from that volume. Judging by the photograph, Griebe's painting is very accurate and detailed and leaves not the slightest doubt at the identity of the species. It is very likely that the Leningrad sketch is copied from this painting, which is the best of the three paintings in the collections seen. Above the animal in Griebe's painting the name Potiatinga is written, which in other sources is used for *Palaemon pandaliformis* (see there, pp. 29, 30). In this connection it is interesting to note that on p. 152 of ser. B of the Leningrad drawings, containing the copy of Griebe's painting, apart from the usual name for the present species, Potiquiquiya, also the name Potiatinga is given but without a figure to go with it.

The painting (fig. 9) on p. 384 of Handbook vol. 1, to which reference is made on p. 21 of ser. A of the Leningrad drawings, is an excellent water colour, showing the lobster in dorsal view. Like all Crustacea shown in the Handbooks, the drawing is quite detailed, arranged symmetrically and probably is made by an artistically talented scientist, rather than by an professional artist. Most likely it is by the hand of Marcgraf himself. The animal is dark purple with paler spots on the abdomen, and many of its spines are of pale colour. The legs are longitudinally streaked with yellowish and the telson and uropodal endopod are margined with a pale rim. The abdominal somites show very distinct transverse grooves, fringed with posteriorly directed hairs. There cannot be the least doubt that the species is *Panulirus echinatus*. It is quite clear that the wood-cut of Potiquiquiya published by Marcgraf and Piso (fig. 32b) is made after this painting, the shape and the position of the appendages is quite the same. The wood-cut, however, is quite crude and does not show the details which make the identification of the species possible. Therefore the identity of Marcgraf's species remained an enigma until the present paintings were rediscovered by carcinologists. This Handbook painting, apart from the page number 384, is

accompanied by the following inscriptions in ink: (1) on top of the page is the name "Potiquiquiya", (2) below the figure is written "vier Span lang". The German term Span, which is spelled exactly the same in English and Dutch, indicates the distance between the tips of the thumb and the little finger when these are extended, and amounts to about 20 cm; the total length of 80 cm evidently includes the antennae. In addition to these two ink inscriptions there is the pencil identification "*Palinurus penicillatus* Oliv." by W. de Haan, written in 1826 during his visit to Berlin (see pp. 10, 11). *Panulirus penicillatus* (Olivier, 1791) is an Indo-Pacific species, that does not occur in Brazil. The painting has been reproduced in black and white by Vianna (1986: 10, fig. 1; 1987: 309, fig. 1).

In the index to Theatrum vol. 1 "Potiquiquiya" is indicated for pp. 313, 315, and 335. On pp. 313 an 315 no paintings are found and it is possible that one of these finally ended up in Griebe's "Naturalien-Buch"; Potiquiquiya on p. 335 shows *Parribacus* (see pp. 35, 36). Theatrum 1, p. 319, however, does show an excellent painting (fig. 10) of a lobster, which clearly is the original from which the Leningrad sketch of ser. B p. 144 is made, as discussed above. It shows the animal in exactly the same position as in the Leningrad sketch; it clearly is the finished painting from which the sketch is copied. The body is dark purplish brown with lighter areas on the posterior half of the carapace. The antennal peduncles are pale yellowish brown with two broad dark purple bands. The frontal horns are pale brownish spotted with purple; several of the carapace spines are of a pale colour while the entire abdomen is spotted with pale dots. The pleopods are very dark, almost black with a white central spot and a fringe of whitish hairs. The legs are streaked longitudinally with wide purple and narrow yellowish stripes. With the painting is the ink inscription "Poticucuma", as in the Leningrad drawing. Furthermore there is De Haan's identification "*Palinurus penicillatus* Oliv." in pencil. A black and white reproduction of this painting has been published by Albertin (1985: 307, fig. 8) and Vianna (1986: 11, fig. 2).

The three paintings discussed above evidently are made by more than one artist. The Handbook painting may be made by Marcgraf, the two Theatrum paintings (if we accept Griebe's painting as one of the missing ones from the Theatrum) could be made by Eckhout. There is a possibility that all three are based on the same specimen; it is certain that all three depict *Panulirus echinatus*.

As said before, Marcgraf's woodcut (fig. 32b) is too crude to make the identification of the species possible, while also his description does not help. Piso (1658) used the same woodcut an did not add any information to help in the recognition of the species. The coloured copy of Marcgraf's book shows the body of the lobster uniformly brown, only the eyes an the soft part of the tailfan are pale blue; the blue distal half of the uropodal exo- an endopod and the telson are bordered by a narrow brown rim; this colour is clearly based on phantasy and not on observations of the living animal.

Linnaeus and several later authors identified "Potiquiquiya" with *Cancer homarus*, which during a long time was a catch-all for many species of spiny lobster; the name *Panulirus homarus* at present is used for an Indo-West Pacific species. Latreille (1803: 193) remarked under *Palinurus quadricornis* Fabricius, 1798 (= *Palinurus*

*elephas* (Fabricius, 1787), an eastern Atlantic species incorrectly reported by Fabricius from American waters): "C'est probablement cette espèce que Pison donne sous le nom de *Potiquiquiya*, p. 77". Latreille (1817a), when describing the new species *Palinurus laevicauda*, which at present is known as *Panulirus laevicauda* and which is a common species in Brazil, remarked that it "paroît être celle que Pison nomme *potiquiquya*". H. Milne Edwards (1837: 301) considered *P. laevicauda* a doubtful species, and remarked that Latreille had assigned to that species "la Langouste figurée d'une manière extrêmement grossière par Pison, sous le nom de Potiquiquiya (Hist. nat. Brasil.)". De Haan's identification of the paintings in Handbook 1: 384 and Theatrum 1: 319 with "*Palinurus penicillatus* Oliv." also is incorrect: *Panulirus penicillatus* (Olivier, 1791) is an Indo-Pacific species quite different from *P. echinatus*. Since the publication of H. Milne Edwards'(1834-1840) "Histoire Naturelle des Crustacés" most authors ignored Marcgraf's and Piso's Potiquiquiya, evidently considering it unidentifiable. Sawaya (1942) and Lemos de Castro (1962) in their accounts of Marcgraf's Crustacea, both identified the species as belonging to the genus *Panulirus* without being able to indicate the specific identity, the only reasonable conclusion that could be arrived at with the information then available. Marcgraf's figure was also discussed in the paper by Holthuis, Edwards & Lubbock (1980: 36). At that time I had seen the Leningrad drawings and, basing myself exclusively on them, I had come to the conclusion that Marcgraf's material might consist of two species: *Panulirus echinatus* (Leningrad drawing on p. 144) and *P. laevicauda* (Leningrad drawing on p. 152). Vianna (1986: 10, fig. 2; 1987: 308) who had examined a colour photograph of the figure of Theatrum 1: 319, of which the Leningrad drawing of p. 152 is a rough copy, came to the correct conclusion that the Theatrum painting, and thus also the Leningrad copy, represents *Panulirus echinatus* and not *P. laevicauda*. After having seen the Theatrum painting I fully concur with Vianna's opinion. Marcgraf's Potiquiquiya is thus exclusively based on *Panulirus echinatus*, which thus is the first of the western Atlantic species of the genus to be described and the last to receive an available name.

The spiny lobster Potiquiquiya also is represented in the gobelins made in France (see source 9, pp. 12-15), namely in the two entitled "Le chasseur Indien" and "Le cheval rayé". On the gobelin "Le chasseur Indien" of the series "Les Nouvelles Indes" (fig. 24; also in Jarry, 1959: 62, fig. [1]; Joppien, 1979: 362, fig. 165; Krotoff, 1984: 39, col. fig. [11]) a figure of a lobster is shown on the spot where in the same gobelin of the series "Les Anciennes Indes" (figs. 22, 23) (Schaeffer, 1968a: 13, fig. [13]; Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 38, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 303, col. pl. (70) a *Calappa ocellata* is figured, viz., next to *Lysiosquilla scabricauda* on the side turned away from the hunter (see the text on *Calappa* p. 41, source 9C, below). The lobster is not very well figured, especially the frontal part is indistinct: only one supra-orbital horn is visible and the structure of the antennae and anterior legs is rather peculiar. If the species is a palinurid, then certainly *Panulirus echinatus* is meant, as the abdominal segments show grooves, and the legs are striped. However, a definite identification of the species is not possible, nor can it be linked with certainty to any of the three figures discussed above.

A good figure of *Panulirus echinatus* can be seen in the gobelin "Le cheval rayé" of both the series "Les Anciennes Indes" (Krotoff, 1984: 32, col. fig. [4]; and a

photograph of the gobelin in Malta (fig. 20); in the photograph of the "trimmed" gobelin in the Mobilier National, Paris, not enough of the "crustacean triangle" is visible to show the lobster), and the series "Les Nouvelles Indes" (Jarry, 1959: 64, fig. [7]; Anon., 1968: 83, fig. 78; Krotoff, 1984: 33, col. fig. [5] as well as in Desportes' cartoon for this gobelin (Joppien, 1979: 360, fig. 164). In the gobelin of the series "Les Anciennes Indes", the lobster is shown in the middle or outer basal part of the "crustacean triangle" and in that of "Les Nouvelles Indes" it is found in the inner basal angle (the angle closest to the zebra). Its colour is rather homogeneous deep dark red. This figure shows most resemblance to the Leningrad figure of p. 152, especially as far as the colour, the position of the antennae, antennulae and legs, and the oblique lateral view of the body is concerned; it is most likely that they are made after the same drawing.

*Panulirus echinatus* is known from the extreme north eastern part of the mainland of Brazil (viz., the states of Pernambuco, Rio Grande do Norte and Ceará), and from the central Atlantic Islands: Ilha de Trindade, St. Helena, Ascension, Atol das Rocas, Fernando de Noronha, St. Paul's Rocks, the Cape Verde Islands and the Canary Islands. The type locality of the species is Recife, Pernambuco State; it is interesting that Marcgraf's specimens came from that same locality.

## Scyllaridae Latreille, 1825
## **Parribacus antarcticus** (Lund, 1793)
## (figs. 11, 22-24, 35a, 36)

Present in sources 1, 4, 5 and 9C.

References: (a) unpublished: Potiquiquiya Leningrad drawings, (A): 17 (no figure); Çiriayeima and Potiquiquyixe Leningrad drawings, (B): 146, 2 figs.; Potiquiquiya Handbook, 1: 316, fig.; Çiríayeima, Potiquiquiya and Potiquiquyixe Theatrum 1: 335, 2 figs.;

(b) published: Potiquiquyixe Marcgraf, 1648: 186, fig.; Potiquiquiijixe Jonstonus, 1650: pl. 9 fig. 14; Potiquiqunijxe Jonstonus, 1657: pl. 9 fig. 14; Potiquiqunijxe Jonston, 1660: pl. 9 fig. 14; Potiquiqunijxe Jonstonus, 1665: pl. 9 fig. 14; Potiquyixe Sachs, 1665: 93, pl. 3 fig. (3); Potiquiqunijxe Ruysch, 1718: pl. 9 fig. 14; *Cancer Arctus* Linnaeus, 1758: 633; Potiquiquiijixe Jonstonus, 1767: pl. 9 fig. 14; *Cancer Arctus* Linnaeus, 1767: 1053; *Cancer Arctus* Gmelin, 1790: 2993; *Cancer (Astacus) arctus* Herbst, 1793: 80; *Scyllarus Antarcticus* Lund, 1793: 22; *Scyllarus antarcticus* Fabricius, 1798: 399; Potiquiquyixe Marcgraf, 1942: 186, fig.; Scyllaridae Sawaya, 1942: lxiii (note 471); *Parribacus antarcticus* Holthuis, 1946: 102; - Jarry, 1959: 62, fig. [1]; *Parribacus antarcticus* Lemos de Castro, 1962: 41, 44, pl. 3 figs. 22, 23; - Schaeffer, 1968b: 13, fig. [13]; - Schaeffer, 1968a: 5, col. fig. c; - Boeseman, 1979: 174, fig. 211; - Krotoff, 1984: 38, 39, col. figs. [10, 11]; *Parribacus antarcticus* Holthuis, 1985: 73; *Parribacus antarcticus* Whitehead & Boeseman, 1989, 1989a: 128, 229 (230 in 1989a), 303, col. pl. 70.

The Leningrad drawings (B): 146, show two figures (fig. 11) of the shovel-nose lobster *Parribacus antarcticus* (Lund). The figures give an excellent general impression of the species, which can be easily recognized from them, even though many details are neglected. Artistically the water colours are of a high quality. A coloured reproduction of them has been published by Schaeffer (1968a). The largest of the two specimens is shown in oblique lateral view, facing left and with the abdomen extended.

The colour is rather uniformly reddish brown with the row of median tubercles of a somewhat brighter red. As said before the artist did not give much attention to details: the antennulae are not shown, the lines between the antennal segments are not or poorly indicated, while the abdominal somites are not very accurately shown either.

The smaller of the two figures is in about the same position as the larger and also has the abdomen extended, and likewise faces left. The abdomen here is more accurately figured than in the larger drawing, but the front end of the body gives even fewer details. The most striking difference between the two figures is the colour and colour pattern: the smaller specimen is shown very pale yellowish brown, conspicuously marbled with dark brown.

Both figures have a counterpart in Theatrum 1, namely on p. 335, where the two are shown as separate oil paintings on the same page. The upper of the two oil paintings shows the larger specimen. Its colour here is rather uniformly brownish red with the median abdominal carinae paler. It is more detailed than the Leningrad figure and is quite professionally painted, but about as inaccurate in details. On the figure itself the name "Çiríayeîma" is painted near the lower edge (but upside down); the number 60 can be discerned in the lower right hand corner of the painting. Above the painting the following inscription (in ink) is written on the page: "Çiriayeima. Potiquiquiya in L.Pr. 2 p. 316. Potiquiquyixe Marg: in H.B. p. 186" (in 3 lines). L.Pr. 2 stands for Libri Principis 2, meaning Handbook 1 (see p. 9, source 4); Marg: in H.B. = Marcgraf in H[istoria Naturalis] B[rasiliae]. A pencil inscription in W. de Haan's handwriting (see introduction pp. 10, 11) is visible on the right side of the painting; it says "*Scyllarus antarcticus* Fabr."; above the right hand corner of the painting De Haan wrote "*Scyllarus*".

The lower figure in Theatrum 1: 335 is the counterpart of the smaller Leningrad figure of p. 146. Like the upper oil painting it is more detailed, more refined, and more professionally, but not more accurately, painted than the Leningrad sketches. The two figures are very similar in shape and show the same marbled colour pattern. In the lower right hand corner of the Theatrum painting the number 61 can be seen. Over the upper right hand corner De Haan's identification "*Scyllarus*" is written in pencil.

None of the four figures discussed above formed the basis for Marcgraf's (1648) woodcut (fig. 35a), as their shape and position (e.g. the extended abdomen and the position of the legs) is quite different. It is possible, however, that Marcgraf's figure was made after the unmarbled specimen, but then certainly by a different artist, perhaps by Marcgraf himself. The original of Marcgraf's wood-cut (or a very accurate copy), namely is found on p. 316 of Handbook 1. This figure (fig. 36) agrees almost point for point with Marcgraf's wood-cut, but is more detailed and refined as well as scientifically more accurate. Like Marcgraf's wood-cut, it shows the animal in dorsal view with the distal part of the abdomen tucked under. No colour is applied in this painting. In the handcoloured copy of Marcgraf's (1648) book seen by me, the specimen has an orange pink colour with scattered darker and paler spots, with a darker median line over the carapace, and with dark red legs. Its colour resembles most that of the larger of the Leningrad drawings. The figure of Handbook 1: 316

carries several inscriptions in ink, viz., "Potiquiquiya" " Ein Krebs so gross als dass Leben. Ist schwartz ehe er gesotten wird" (= Potiquiquiya. A lobster, natural size. Is black before being cooked). In pencil there is W. de Haan's identification "*Scyllarus antarcticus* F.". There is no counterpart to this figure in the Leningrad sketches; but on p. 17 of ser. A, a space is left open for it, judging by the inscription: "316 Potiquiquiya ein Krebs so gross als das Leben ist, schwartz ehe er gesotten wird". The number 316 evidently refers to p. 316 of the Handbook, while the name and the remark about the colour is exactly the same as in the Handbook, only the comma should be in front rather than behind the word "ist".

All three specimens figured in these collections belong to the very characteristic genus *Parribacus*, which in the (western) Atlantic is represented by a single species, *P. antarcticus*, in which both plain and marbled specimens are found.

Linnaeus (1758), who assigned all scyllarid lobsters to a single species, *Cancer arctus*, in the synonymy of that species also referred to Marcgraf's (1648) figure. The first author, who recognized the present species as distinct was Lund (1793); he gave it the name *Scyllarus antarcticus*, and in the original description referred to Marcgraf's (1648) account of it. His identification was accepted by most subsequent authors (for a complete synonymy of the species, see Holthuis, 1985: 73). Sawaya (1942) recognized the species as a Scyllarid but made no definite identification on the specific level. Lemos de Castro (1962) indicated its correct identity.

In the gobelins based on paintings of Brazilian animals made by A. Eckhout and F. Post (for a full discussion of these gobelins see pp. 12-15, source 9 ) the present species is shown only on that entitled "Le chasseur Indien". That gobelin of the series "Les Anciennes Indes" (figs. 22, 23; also in Schaeffer, 1968: 13, fig. [13]; Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 38, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 128, 303, col. pl. 70) shows three figures of *Parribacus antarcticus*, all three in the lower part of the "Crustacea triangle" (fig. 23) figured in front of the hunter. Two of these are side by side on the water's edge below the lower lizard and close to the hunter; the one closest to the hunter is indicated here as specimen *a*, the other as specimen *b*. The third specimen (specimen *c*) is visible just above the tail of the lizard, close to the margin of the gobelin. Specimen *a* is very similar to Marcgraf's figure, especially in the shape and ornamentation of the abdomen, the position of the legs, etc. There is little doubt in my mind that they are of the same origin. Specimen *b* resembles the larger of the two Leningrad figures of p. 146 (e.g., in the uniform dark colour, the position of the legs, etc.), so that it is likely that these two are derived from a common drawing or painting. Similarly specimen *c* and the smaller Leningrad figure of p. 146 resemble each other in many respects, e.g., in the marbled colour pattern of the body; here too we may accept a common origin. In the gobelin "Le chasseur Indien" of the series "Les Nouvelles Indes" (fig. 24) (Jarry, 1959: 62, fig. [1]; Krotoff, 1984: 39, col. fig. [11]) only specimen *a* and *b* are shown, they are placed in the same position as in the other gobelin. Specimen *c*, however, is entirely omitted.

*Parribacus antarcticus* (Lund) is a marine species of shallow water; it has a peculiar distribution, being found in the western Atlantic (Florida to N.E. Brazil, and the West Indies), and in the Indo-West Pacific region (E. and S.E. Africa to Japan and Polynesia).

Suborder Anomura MacLeay, 1838
Diogenidae Ortmann, 1892
**Petrochirus diogenes** (Linnaeus, 1758)
(fig. 35b)

Present in source 1.

References: (b) published: Paranacare Marcgraf, 1648: 188, fig.; Paranacare Jonstonus, 1650: 35, pl. 9 fig. 15; Paranacare Jonstonus, 1657: 27, pl. 9 fig. 15; Paranakare Jonston, 1660: 27, pl. 9 fig. 15 (Paranacare); Paranacare Jonstonus, 1665: 27, pl. 9 fig. 15; Paranacare Sachs, 1665: 90; Paranacare Ruysch, 1718: 27, pl. 9 fig. 15; Paranacare Jonstonus, 1767: 35, pl. 9 fig. 15; Paranacare Marcgraf, 1942: 188, fig.; Paguridae Sawaya, 1942: lxiii (note 478); *Petrochirus* Lemos de Castro, 1962: 42.

Marcgraf's (1648) figure (fig. 35b) shows a hermit crab with the chelae equal or subequal in size, and with long slender cylindrical eyestalks. The description provides no important morphological information that would make the recognition of the species possible. Only the measurements and the colour description provide clues. The total length of the animal is given as 3 inches (= 7.5 cm), the length of the abdomen is said to be 1.5 inches (= 3.75 cm), the second and third pereiopods are 3 inches long, and the shell that the specimen inhabits 4 inches (10 cm). The colour of the dorsal surface of the body is said to be dark chestnut, with some dark lines on the abdomen. The ventral surface of the body as well as the bases of the legs are bluish. The specimen was found at the coast near the Paraiba River. In the area there are only two species of hermit crabs that can inhabit shells of 10 cm long; those are *Petrochirus diogenes* (L.) and *Coenobita clypeatus* (Herbst, 1798). The shape of the long, slender cylindrical eyes, as well as the almost equal chelipeds, exclude the possibility that the species is a *Coenobita*, while also the colour of *Coenobita clypeatus* is not chestnut brown and the bright colours of its large cheliped would certainly not have escaped the attention of Marcgraf. All these characters, however, do fit *Petrochirus* quite well. Provenzano (1959: 380) gave as the carapace length of a female of *Petrochirus diogenes* 37 mm, which is almost exactly the size of Marcgraf's specimen (total length 75 mm, minus abdomen length of 37.5 mm). Although it is likely that Marcgraf saw more than one species of hermit crab, the specimen described and figured by him may confidently be assigned to *Petrochirus diogenes*, an identification already suggested by Lemos de Castro (1962).

In none of the paintings or tapestries discussed above I have been able to find any hermit crab figure, so that no additional confirmation of the identity of Marcgraf's specimen can be obtained from these sources.

Both in the early and the later scientific Pagurid literature Marcgraf's description seems to be almost completely ignored, possibly because both description and figure provided so little information. So far as I can find, Sawaya (1942) was the first to discuss Marcgraf's animal and he did not venture further than identifying it to family. Lemos de Castro (1962) correctly suggested it to be the present species.

*Petrochirus diogenes* lives in shallow coastal waters of the Western Atlantic. Its range extends from North Carolina (U.S.A.) and the Bahama Islands to Brazil, and includes all of the West Indies. In older literature it often is cited as *Petrochirus bahamensis* (Herbst, 1791).

## Suborder Brachyura Linnaeus, 1758
## Calappidae De Haan, 1833
## **Calappa ocellata** Holthuis, 1958
## (figs.2, 19, 20, 22-26, 37, 38, 39a)

Present in sources 1, 2, 3, 4, 5, 8 and 9A, B, C, E.

References: (a) unpublished: Guaja et Guaja pinima Leningrad drawings, (B): 147, fig.; Guaiâapara Handbook, 1: 326, fig.; Guaja Theatrum, 1: 339, fig.; Guaja pinima Theatrum, 1: 341, fig.;

(b) published: Guaia Apara Marcgraf, 1648: 182, fig.; Guaia Apara Jonstonus, 1650: 32, pl. 9 fig. 1; Guaja Apara Jonstonus, 1657: 25, pl. 9 fig. 1 (Guaia A.); Guaia-Apará Piso, 1658: 75, fig.; Guaja Apara Jonston, 1660: 24, pl. 9 fig. 1 (Guaia A.); Guaja Apara Jonstonus, 1665: 25, pl. 9 fig. 1 (Guaia A.); Guaia Apara Sachs, 1665: 112, pl. 5 fig. (1); Guaja Apara Ruysch, 1718: 25, pl. 9 fig. 1 (Guaia A.); Guaia Apara Jonstonus, 1767: 32, pl. 9 fig. 1; *Cancer granulatus* Herbst, 1785: 200; *Calappa marmorata* H. Milne Edwards, 1837: 104; *Calappa flammea* Moreira, 1901: 96; - Thomsen, 1938: 115, fig. 56; Guaja Apara Marcgraf, 1942: 182, fig.; *Calappa flammea* Sawaya, 1942: lxi (note 453); - Anon., 1953: 54, fig. 35; Guáia-Apara Piso, 1957: 183, fig.; *Calappa ocellata* Holthuis, 1958: 158; - Jarry, 1959: 62, 64, 66, figs. [1, 3, 7, 14]; - Van Gelder, 1960: 14, fig. 9; *Calappa ocellata* Lemos de Castro, 1962: 38, pl. 1 figs. 1, 2; Crangejo and Caranguejo Wagener, 1964: 71, 190 (Crangejo), 300 (Caranguejo), fig. 26; Caranguejo Pinto, 1964: 71, 243, 350, fig. 26; - Anon., 1968: 79, 80, 83, 84, figs. 78, 80; - Schaeffer, 1968b: 12, 13, figs. [11, 13]; - Jarry, 1976: 65, 67, figs. 3, 5; *Calappa ocellata* Holthuis, 1979: 181; - Boeseman, 1979: 174, 178, figs. 211, 220; - Hoetink, 1979: 211, fig. 276; - Joppien, 1979: 360, fig. 164; - Krotoff, 1984: 3, 32, 33, 38, 39, 42, 43, col. figs. [1, 4, 5, 10, 11, 14, 15]; *Calappa ocellata* Whitehead & Boeseman, 1989, 1989a: 103, 124, 128, 131, 146, 229, 230, 297, 300, 303, 305, 310, pl. 64 fig. a, col. pls. 67, 70, 72, 77 fig. b.

P. 147 of ser. B of the Leningrad drawings (fig. 37) shows two crabs, the right one evidently is *Calappa ocellata* (the left figure shows *Carpilius corallinus*, see p. 51). The animal is shown in oblique dorsal view, it faces right. The chelipeds show it to be unmistakably a *Calappa*, and the colour pattern makes the identity with *C. ocellata* very likely. As most drawings of the Leningrad collection, the figure gives an excellent general impression of the species without getting into much detail. The figure is executed in a monochrome reddish brown. It is accompanied by the following inscription: "Guaja et Guaipinima i/e minor Guaja, q.e. al.spec." and the page number "p. 339". The annotation is difficult to decipher and I am far from certain that the words "i/e" (id est) and "q.e. al. spec." (=? quod est alia [or altera] species" are correctly interpreted. This figure is different from Marcgraf's wood-cut, (fig. 38a) but has an exact counterpart in the oil painting of Theatrum 1, p. 339 which shows the animal in the same position, but there it has a more olivaceous colour, with whitish spots and light areas, and a colour pattern of dark brownish red or red. The Theatrum painting has in the lower right hand corner the number "63" painted in, and in the upper central part of the painting is the word "Guaiâ". On p. 339, above the painting itself, the name "Guaja" is written in ink, while along the right hand margin of the painting in W. de Haan's handwriting the identification "Calappa marmorata F." is written in pencil, placed there by De Haan during his 1826 visit to Berlin (see pp. 10, 11).

A second oil painting of this species is found in Theatrum 1, namely on p. 341. This painting also shows a specimen with the chelae extended; judging by the shape

and colour pattern it is a specimen different from that of p. 339. It is shown more from the front than the other specimen, which is viewed more from the side. The general coloration of the two specimens is quite similar. This second oil painting has in the lower right hand corner the number "64". On p. 341, above the painting is the inscription "Guaja pinima" and below it "Guaja-miri. Marg: in HB. p. 183", both in ink. De Haan's identification "*Calappa marmorata* F.", written in pencil is found next to the right hand margin of the painting. The name Guaja pinima is nowhere mentioned by Marcgraf (1648) (of course there is Aratu Pinima, but that is quite a different species). The reference to Marcgraf (H B stands for H[istoria naturalis] B[rasiliae]) under Guaja-miri is not clear. What Marcgraf (1648: 183) figured and described as Guaja Miri is not a *Calappa*, but judging by the figure, a species of *Panopeus* (see p. 55).

As remarked above, the figure of this species published by Marcgraf (1648) and Piso (1658) (fig. 38a) has little resemblance to the Leningrad figure of p. 147; neither has it with either of the two oil paintings in Theatrum 1. However, it finds it counter part in the figure on p. 326 of Handbook 1. This figure (fig. 39a) shows the animal exactly in the same position as in Marcgraf's wood-cut. But instead of the awkwardness of the wood-cut it shows very nicely the shape and colour pattern of *Calappa ocellata*; the figure is not coloured. It is drawn with scientific precision rather than with artistic elan, and it would not be too far fetched to think of Marcgraf himself as the artist of it. Anyhow, there can be no doubt about the identity of Marcgraf's species with *Calappa ocellata*. The Handbook page, apart from the number 326, shows the following inscriptions: at the top of the page in ink "Guaiâ apára", and below the figure (likewise in ink) "So gross als das leben auch grosser" (= natural size, also larger); and again in De Haan's handwriting in pencil "*Calappa marmorata*".

In three of the gobelins of the series "Les Anciennes Indes" and "Les Nouvelles Indes" (source 9, see pp. 12-15) *Calappa* is shown. It also features in the Desportes sketch (fig. 2) made for the gobelins. These four sources (nos. 9A, C, D and E) are dealt with below in this order.

9A. In the gobelin "Le cheval rayé" of the series "Les Anciennes Indes" (fig. 20; also in Krotoff, 1984: 32, col. fig. [4]; Whitehead & Boeseman, 1989, 1989a: 300, col. pl. 67; photographs of this gobelin in the Mobilier National, Paris and the Grandmasters' Palace, Malta) no less than 4 figures of *Calappa* may be seen in the "crustacean triangle", all near the inner margin of the triangle: one *Calappa* (no. 1) is placed in the inner lower angle of the triangle next to the lowest of the *Cardisoma*, two (no. 2, the lower; no. 3, the higher) are in the middle of the triangle above the frontal half of *Lysiosquilla*, and the fourth (no. 4) is placed still higher, just above the upper snake and next to the upper spiny lobster. Specimen no. 1 is clearly similar to the Leningrad figure of p. 147; specimen no. 2 as well as no. 4 might be based on the figure in Handbook 1: 326; specimen no. 3 is based on the figure in Theatrum 1: 341. The right hand margin of this gobelin in the Mobilier National, shown on pl. 67 of Whitehead & Boeseman's book is strongly trimmed and only a single *Calappa* (no. 1) is clearly visible. In the same gobelin of the series "Les Nouvelles Indes"(Jarry, 1959: 64, fig. [7]; Anon., 1968: 83, fig. 78; Krotoff, 1984: 33, col. fig. [5]) only the three upper *Calappa*'s (nos. 2, 3, and 4) are present; they are similar to those of the gobelin of the

other series, but no. 2 is placed somewhat higher than no. 3.

9C. In the gobelin "Le chasseur Indien" of "Les Anciennes Indes" (figs. 22, 23; also in Schaeffer, 1968b: 13, fig. [13]; Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 38, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 128, 303, col. pl. 70), 3 *Calappa* can be distinguished in the "crustacean triangle" (fig. 23): (a) the upper lies next to the anterior part of *Lysiosquilla* and one of the claws of the stomatopod lies over it; this figure is very similar to figure no. 4 of "Le cheval rayé; (b) the next highest *Calappa* lies near the *Lysiosquilla* at the level of its free thoracic somites on the side away from the hunter, it is clearly similar to the Leningrad figure of p. 147 and thus to fig. no. 1 of "Le cheval rayé"; (c) the third specimen is similar to specimen (b), it is placed just above the lower lizard and next to the telson of the *Lysiosquilla* (on the side closest to the hunter); only a rather small part of this specimen is visible and therefore its identity with specimen (b) cannot be made fully certain. In the gobelin "Le chasseur Indien" of "Les Nouvelles Indes" (fig. 24; also in Jarry, 1959: 62, fig. [1]; Krotoff, 1984: 39, col. fig. [11]) only two *Calappa* are present, namely nos. a and c of the series "Les Anciennes Indes", specimen no. b being replaced by a lobster.

9D. In the gobelin "Le roy porté" of the series "Les Anciennes Indes" (fig. 25; also in Schaeffer, 1968b: 12, fig. [11]; Jarry, 1976: 65, fig. 3; Krotoff, 1984: 42, col. fig. [14]; Whitehead & Boeseman, 1989, 1989a: 305, col. pl. 72) and its counterpart "La négresse portée" in "Les Nouvelles Indes" (fig. 26; also in Anon., 1953: 54, fig. 35; Jarry, 1959: 64, fig. [3]; Van Gelder, 1960: 10, fig. 5; Anon., 1968: 80, 84, fig. 80; Hoetink, 1979: 211, fig. 276; Krotoff, 1984: 43, col. fig. [15]) the arrangement of fishes and Crustacea on the foreground is practically identical. In both two *Calappa ocellata* are shown in exactly the same place. The one between a turtle (*Testudo geometrica*) and a striped frogfish (*Ogcocephalus*) is very similar to the one shown on p. 147 of the Leningrad drawings. The other specimen, which is placed just above the head of a sailfish (*Istiophorus platypterus*) is clearly based on the one-clawed *Calappa* of the Desportes sketch (see next paragraph).

9E. The Desportes sketch (fig. 2). The figures of *Calappa* in the Desportes sketch (Jarry, 1959: 66, fig. [14]; 1976: 67, fig. 5; Van Gelder, 1960: 14, fig. 9; Boeseman, 1979: 178, fig. 220; Krotoff, 1984: 3, col. fig. [1]; Whitehead & Boeseman, 1989, 1989a: 146, 310, col. pl. 77 fig. b) number two. The first is the one but highest figure in the left vertical row. The second is in the extreme upper right hand corner of the sketch. The first is very similar to the Leningrad drawing of p. 147; its colour is pinkish with lighter and darker parts and a rather carelessly applied pattern of ocellations on the carapace. The second specimen is only partly shown: the extreme left part of the carapace and all the left legs are cut off by the margin of the paper. The right cheliped shows very well, but of the left only a vague pencil outline of the chela is discernable. The coloration of this specimen is far more natural and precise than that of the first specimen. The carapace is very pale straw colour (being still paler near the posterior margin), with a dark purple pattern of ocellate lines and with the two very characteristic dark purple spots near the posterior margin. The claw of the animal is porcelain-like white with brown fingers and a few dark purple markings on the carpus; the pereiopods are greyish. This figure is entirely different from both Theatrum oil paintings of the species. It shows more resemblance to the watercolour of

Handbook, 1: 326, and probably was made after the same specimen, but small differences show that the two figures are not copies of each other.

The figure of this species in the coloured edition of Marcgraf's (1648) book shows the carapace dark purplish brown with an irregular pattern of yellow lines and circles, except for an area along the posterior margin which is uncoloured, with only the shaded parts of a purplish colour. The chelae are pale greenish with the fingers and palmar crest pink; in the right chela the carpus (and merus?) shows some dark stripes. The walking legs are pink.

Also Wagener (1964: fig. 26) (source no. 3, see pp. 8, 9) shows a picture of a *Calappa* in his Thierbuch (fig. 38b). This painting, like almost all of Wagener's Crustacea illustrations, is excellent and very life-like. The figure shows the animal in front view, exact in details, with an excellent perspective. All the teeth and tubercles are painstakingly indicated. Wagener's figure is entirely different from any of the other *Calappa* figures discussed here, although it could have been made after the same specimen as that shown on the Leningrad figure of p. 147. Wagener's text (1964: 190) does not give much of interest: "Diese werden auch wohl Crangejo genannt, aber sie halten sich im Wasser unter den Steinblöcken auf und schmecken delikat. Ich habe sie vielmals selbst mit der Angelrute zweimal grösser gefangen". The habitat is probably not correctly given here: all *Calappa* species are inhabitants of sandy bottoms in which they can dig themselves in with great speed.

In the oil painting "Indonesian (?) soldiers, also Africans, at dockside" of Schloss Schwedt (fig. 19) (source no. 8, see p. 12) a *Calappa* is shown which very much resembles the figure by Wagener and might be copied from it, as already suggested by Whitehead & Boeseman (1989, 1989a: 103). The fact that the black and white photograph published by Thomsen (1938: 115, fig. 65) and by Whitehead & Boeseman (1989, 1989a: 297, pl. 64a) is the only documentation left of this painting makes it difficult to be completely positive in this respect. It is interesting, however, that the painting shows several of Wagener's Crustacea.

Marcgraf's and Piso's accounts of the species, although clearly recognisable as those of a species of *Calappa*, where completely ignored by Linnaeus. So far as I know Herbst (1785) was the first to mention the figures published by Marcgraf and Piso in the synonymy of a species, viz., of *Cancer granulatus* L. *Calappa granulata* (L.) is a species found in the Mediterranean and the eastern Atlantic and is not represented in American waters. Herbst, although recognizing several species of *Calappa*, confused more than one under the name *C. granulata*. Latreille (1803: 393) under *Calappa marmorata* remarked: "on doit regarder comme voisine de cette espèce le crustacé guaia-apara de Pison". Later H. Milne Edwards (1837) with some doubt identified Marcgraf's animal as *Calappa marmorata* (Fabr.) sensu Latreille, 1803, as did De Haan in 1826 when he examined the Handbook and Theatrum figures. It was pointed out later that the species that H. Milne Edwards (1837) (and before him Latreille, 1803) indicated with the name *Calappa marmorata* should more correctly be named *Calappa flammea* (Herbst, 1794) (see Holthuis, 1958: 157, for a discussion of this question). Although H. Milne Edwards (1837) was not certain of his identification of Marcgraf's animal, it was usually accepted as correct. So Moreira (1901) placed "Guaia Apara" in the synonymy of *Calappa flammea*. For some unknown reason, however, most

authors ignored Marcgraf's and Piso's accounts of "Guaia Apara", even Rathbun (1937) in her handbook of the American oxystome crabs did not refer to Marcgraf, neither under *Calappa flammea*, nor under any of the other species of the genus. Sawaya (1942), when trying to identify Marcgraf's crabs, arrived at the logical conclusion that the species is *Calappa flammea*. In 1958, when studying the western Atlantic species of *Calappa*, I found that several species had been confused under the name *Calappa flammea*, and I came to the conclusion that one of the common species inhabiting the West Indies and Brazil is different from the true *Calappa flammea*, and I described it as a new species *Calappa ocellata*. It is to this latter species that Marcgraf's animal belongs as is clearly shown by his figure. Lemos de Castro (1962) accepted this identification.

*Calappa ocellata* is known from the Western Atlantic from North Carolina (U.S.A.) and Bermuda to Pernambuco, Brazil. It lives in shallow waters on a sandy bottom.

## Leucosiidae Samouelle, 1819
## **Persephona mediterranea** (Herbst, 1794)
## (figs. 2, 20, 22-24, 39b, 40a)

Present in sources 1, 4 and 9A, C, E.

References: (a) unpublished: Aratûpéba Handbook, 1: 328, fig.;

(b) published: Guaia, alia species Marcgraf, 1648: 182, fig.; Guaia alia species Jonstonus, 1650: 32, pl. 9 fig. 2; Guaja alia species Jonstonus, 1657: 25, pl. 9 fig. 2 (Guaia a.s.); andere gedaante van de Guaja Jonston, 1660: 25, pl. 9 fig. 2 (Guaia alia species); Guaja alia species Jonstonus, 1665: 25, pl. 9 fig. 2 (Guaia a.s.); Guaja alia species Ruysch, 1718: 25, pl. 9 fig. 2 (Guaia a.s.); Guaia alia species Jonstonus, 1767: 32, pl. 9 fig. 2; Guaja alia species Herbst, 1783: 108; *Cancer mediterraneus* Herbst, 1794: 150, pl. 37 fig. 2; *Guaia punctata* H. Milne Edwards, 1837: 127; *Persephona punctata* Moreira, 1901: 95; *Persephona punctata punctata* Rathbun, 1937: 152; Guaia, alia species Marcgraf, 1942: 182, fig.; *Persephona p. punctata* Sawaya, 1942: lxi (note 454); *Persephona aquilonaris* Guinot, 1959: 433; *Persephona p. punctata* Lemos de Castro, 1962: 38, pl. 1 figs. 3, 4; - Jarry, 1959: 62, 64, 66, figs. [1, 7, 14]; - Van Gelder, 1960: 14, fig. 9; - Anon., 1968: 83, fig. 78; - Schaeffer, 1968b: 13, fig. [13]; - Jarry, 1976: 67, fig. 5; - Boeseman, 1979: 174, 178, figs. 211, 220; - Joppien, 1979: 360, 362, figs. 164, 165; - Krotoff, 1984: 3, 32, 33, 38, 39, col. figs. [1, 4, 5, 10, 11]; *Persephona mediterranea* Whitehead & Boeseman, 1989, 1989a: 128, 147, 229 (not on this page in 1989a), 230, 303, 310, col. pls. 70, 77 fig. b.

On p. 328 of Handbook 1 a specimen of *Persephona mediterranea* is figured under the name Aratûpéba (fig. 39b). It is an excellent scientifically correct illustration and might have been made by Marcgraf himself: the shape and characteristic coloration leave no doubt as to the identity of the species. Apart from the inscription Aratûpéba at the top of the page (in ink) there is an inscription (likewise in ink) below the figure: "so als das Leben" (= natural size). Finally there is a pencil inscription made by Wilhem de Haan during his 1826 visit to Berlin (see pp. 10, 11). This inscription says "*Leucosia Mauritii* DH"; evidently De Haan considered the species to be new and intended to name it for Prince Johan Maurits van Nassau. He never did publish it, so that the name, like *Gecarcinus Marcgravii* De Haan (see p. 57), remains a

manuscript name.

The present figure, which has no counterpart in the other collections of paintings, obviously is the original for the wood-cut published by Marcgraf (1648: 182) under the name Guaia alia species (fig. 40a), only the wood-cut is cruder and less detailed. It is interesting to note that Marcgraf (1648) in his book used the name "Aratu Peba" not for this species but for *Plagusia depressa*, and the same name is used for that species on p. 366 of Handbook 1.

Linnaeus (1758) did not refer to Marcgraf's picture of this species and neither did most subsequent authors, notwithstanding the figure was copied in the many editions of Jonstonus "Historiae naturalis...". Herbst (1783: 108) referred to Jonstonus' pl. 9 fig. 2 among the doubtful species, but did not mention Marcgraf. A few years later Herbst (1794) described and figured the species as new under the inappropriate name *Cancer mediterraneus*; the type specimen namely was incorrectly labelled as originating from the Mediterranean.

H. Milne Edwards (1837: 127) identified Marcgraf's species with some doubt with *Cancer punctatus* L., 1758 (= *Persephona punctata*). He even used the Brazilian vernacular name Guaia, under which Marcgraf cited it, as a new generic name for that species. *Guaia* H. Milne Edwards, 1837, however, falls as a junior synonym of *Persephona* Leach, 1817. Moreira (1901), Rathbun (1937), Sawaya (1942) and Lemos de Castro (1962) all assigned Marcgraf's "Guaia, alia species" to *Persephona punctata*, be it that Rathbun expressed some doubt. Rathbun (1937) in het monograph recognized two subspecies of *P. punctata*, namely the nominate form *P. p. punctata* and *P. punctata aquilonaris* Rathbun, 1933. She assigned Marcgraf's specimen to the nominate form evidently not realizing that it actually was *P. p. aquilonaris*; she was followed in this by Sawaya and Lemos de Castro. It was Guinot (1959) who showed that *Persephona punctata* and *P. aquilonaris* are distinct species; she also pointed out that *Cancer mediterraneus* Herbst, 1794, was an older name for *P. aquilonaris*, but did not use that name. Later authors, however, accepted *P. mediterranea* (Herbst) as the correct name of the species.

Although *Persephona mediterranea* is not shown in the Theatrum, it is found on the Desportes sketch (fig. 2) (see p. 14, source 9E) and in two of the gobelins (see pp. 13-14, sources 9A, C). In the Desportes sketch (reproduced in Jarry, 1959: 66, fig. [14]; Van Gelder, 1960: 14, fig. 9; Jarry, 1976: 67, fig. 5; Boeseman, 1979: 178, fig. 220; Krotoff, 1984: 3, col. fig. [1]; Whitehead & Boeseman, 1989, 1989a: 310, col. pl. 77b), the figure of *Persephona* is placed at the extreme right in the median horizontal row of crabs. The arrangement of the dark spots on the carapace is somewhat more similar to that in the figure of the Handbook than that published by Marcgraf; the position and proportions of the segments of the walking legs, however, is strongly different from that shown in either the Handbook drawing or the published wood-cut. The colour of the figure in the Desportes sketch shows some resemblance to that found in the coloured edition of Marcgraf's book. In both the carapace is pale yellowish (slightly more greenish in the Desportes sketch), with the spots dark brown. The colour of the shaded area along the margin of the carapace, as well as that of the meri of the walking legs is greyish green in the Desportes sketch, but in Marcgraf's figure it is dark blue. The distal part of the walking legs (carpus-dactylus) in both figures is yellowish and the chelipeds both are whitish stippled with red specks.

The first of the two gobelins in which *Persephona* can be seen is "Le cheval rayé". In the gobelin "Le cheval rayé" of the series "Les Anciennes Indes" (fig. 20; also in Krotoff, 1984: 32, col. fig. [4]; Whitehead & Boeseman, 1989, 1989a: 300, col. pl. 67), two specimens of the species are shown in the upper half of the "triangle of Crustacea". The upper specimen of *Persephona* is placed just below the upper *Carpilius corallinus*, which obscures a small part of it; the second specimen is found just below the flattened tail of a thin snake, part of which disappears under the just mentioned *Carpilius*. Both *Persephona* specimens are well exposed and resemble the figure in the Handbook. In the same gobelin in the series "Les Nouvelles Indes" both specimens of *Persephona* are visible in the same positions (Jarry, 1959: 64, fig. [7]; Anon., 1968: 83, fig. 78; Joppien, 1979: 360, fig. 164; Krotoff, 1984: 33, col. fig. [5]).

The second gobelin showing the species is "Le chasseur Indien". This gobelin of the series "Les Anciennes Indes" (figs. 22, 23; also in Schaeffer, 1968b: 13, fig. [13]; Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 38, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 303, col. pl. 70) shows a distinct figure of *Persephona* almost in the center of the triangle of Crustacea (fig. 23), it can be seen just above the back of the lower iguana, and next to the telson of *Lysiosquilla*, being partly covered by a *Carpilius*; the identity of the specimen is unmistakable. In the same gobelin of the series "Les Nouvelles Indes" (fig. 24; also in Jarry, 1959: 62, fig. [1]; Joppien, 1979: 362, fig. 165; Krotoff, 1984: 39, col. fig. [11]) the specimen is found in the same position.

*Persephona mediterranea* has a rather wide distribution in the Western Atlantic. Its range extends from New Jersey (U.S.A.) to Santa Catarina (southern Brazil) and includes the Gulf of Mexico and the Caribbean Sea.

Majidae Samouelle, 1819
**Mithrax hispidus** (Herbst, 1790)
(figs. 2, 12, 20, 22-26, 40b)

Present in sources 1, 2, 4, 5 and 9 A, C, D, E.

References: (a) unpublished: Guaja Leningrad drawings, (A): 18, fig.; Guaiâ Handbook, 1: 338, fig.; Guaja, Guyaguaçu Theatrum, 1: 343 (no fig.);

(b) published: Guaia alia species Marcgraf, 1648: 182, 183, fig.; Guaia alia species Jonstonus, 1650: 32, pl. 9 fig. 3; Guaja alia species Jonstonus, 1657: 25, pl. 9 fig. 3 (Guaia a.s.); Guáia-Guaçu Piso, 1658: 75, fig.; ander gedaante van de Guaja Jonston, 1660: 25, pl. 9 fig. 3 (Guaia alia species); Guaja alia species Jonstonus, 1665: 25, pl. 9 fig. 3 (Guaia a.s.); Guaja Brasilian. Sachs, 1665: pl. 6 fig. (1); Guaja alia species Ruysch, 1718: 25, pl. 9 fig. 3 (Guaia a.s.); Guaia alia species Jonstonus, 1767: 32, pl. 9 fig. 3; Spec. incert. no. 4 Herbst, 1785: 188; Guaja.Outra espécie Marcgraf, 1942: 182, 183, fig.; *Cancer* spec. Sawaya, 1942: lxii (note 455); - Anon., 1953: 54, fig. 35; Guáia-Guacú Piso, 1957: 182, fig.; - Jarry, 1959: 62, 64, 66, figs. [1, 3, 7, 14; - Van Gelder, 1960: 10, 14, figs. 5, 9; *Mithrax (Mithrax) hispidus* Lemos de Castro, 1962: 38, 44, pl. 1 figs. 5, 6; - Anon., 1968: 79, 80, 83, 84, figs. 78, 80; - Schaeffer, 1968: 12, 13, figs. [11, 13]; - Jarry, 1976: 65, 67, figs. 3, 5; - Boeseman, 1979: 178, fig. 220; - Hoetink, 1979: 211, fig. 276; *Persephona punctata*? Whitehead, 1979: col. plate opp. p. 432; - Krotoff, 1984: 3, 32, 33, 38, 39, 42, 43, col. figs. [1, 4, 5, 10, 11, 14, 15]; *Mithrax hispidus* Whitehead & Boeseman, 1989, 1989a: 124, 128, 131, 146, 229, 230, 300, 305, 310, col. pls. 67, 72, 77 fig. b.

The Leningrad drawing is a very faint pencil sketch giving hardly more than

the outline of the animal; even though it is unfinished, it shows accurate details. It bears the ink inscription: "338 Guaja wie das Leben" (= Guaja, life size). The number 338 refers to Handbook, 1: 338, where a beautiful finished water colour painting of the animal (fig. 12) is found; an excellent colour reproduction of it is also published by Whitehead, 1979. Evidently, the Leningrad drawing is an unfinished copy of the Handbook painting. The specimen figured in the Handbook has the carapace dark reddish brown with elongate pale areas along the posterior margin, small pale spots in the area of the cervical groove, a few larger spots near the H-shaped depression; the cardiac region shows four circular spots arranged in a quadrangle. All the legs are of a bright brownish red, the tips of the dactyli of the walking legs are black, preceded by a pale yellowish brown basal part. The chelae have the fingers of a darker brownish red with white spoon-shaped tips. The Handbook painting has the ink inscription"Wie das Leben" (= Life size). In pencil in W. de Haan's handwriting the name "Mithrax hispida L" is added (L obviously stands for Latreille and not for Linnaeus; Latreille, 1803a: 103, reported upon Herbst's species as *Maja hispida*).

Undoubtedly the same specimen is figured in the so-called Desportes sketch (fig. 2) (source 9 E, see p. 14). Here the species is figured as the second figure from the right in the upper row of crabs. It is extremely similar to the Handbook painting, only the chelae are slightly different and the arrangement of pale spots on the carapace likewise is different. There can be no doubt, however, that the same species and very likely the same specimen has served for all three figures. The Desportes sketch evidently is made after a living or freshly killed specimen, showing all the natural colours of the species. The Desportes sketch must therefore have been copied from an original sketch made (by Eckhout?) in Brazil.

Marcgraf's (1648) wood-cut (fig. 40b) is clearly based on the Handbook painting, as shown by its shape and the position of the legs; the colour of the figure in the coloured copy of Marcgraf's book consulted by me also is like the one in the Handbook. Some of the features shown by Marcgraf's wood-cut that do not fit *M. hispidus*, like the sharply pointed frontal teeth, most likely are errors of the blockmaker; in the other figures these features are correctly shown. De Haan and Lemos de Castro (1962) were entirely correct in their identification.

Linnaeus (1758 and later) completely ignored Marcgraf's account of the species. Herbst (1785: 188) placed Piso's figure of this species among the "nicht deütlich genug beschriebene Krabben". Also later authors generally gave little or no attention to Marcgraf's species. Sawaya (1942) with some hesitation identified it with *Cancer*. Lemos de Castro (1962) was the first zoologist to publish a definite (and correct) identification of Marcgraf's specimen. The new evidence that now has come to light proves him entirely correct.

The figure of *Mithrax hispidus* as shown in Desportes' sketch has been used in three of the gobelins, both in the "Les Anciennes Indes" and the "Les Nouvelles Indes" series (sources no. 9A, C, D). In "Le cheval rayé" of "Les Anciennes Indes" (fig. 20) the species is visible at the bottom of the "crustacean triangle", just below the lower specimen of *Cardisoma* (see p. 58) which partly covers the *Mithrax* with its legs. The specimen is quite distinct in the gobelin of the Académie de France in Rome (Krotoff, 1984: 32, col. fig. [4]) and in that of the Grandmaster's Palace in Malta

(fig. 20); in the (trimmed) gobelin of the Mobilier National, Paris (unpublished photograph) only half the crab is visible. In the same gobelin of the series "Les Nouvelles Indes" (Jarry, 1959: 64, fig. [7]; Anon., 1968: 79, 83, fig. 78; Krotoff, 1984: 33, col. fig. [5]) the figure of *Mithrax* is the lowest among the Crustacean figures and close to the lateral margin of the gobelin. Its shape and colour (shown in Krotoff's figures on pp. 32 and 33) make the identity unmistakable. Furthermore, the gobelin "Le cheval rayé" of both series "Les Anciennes Indes" (fig. 20) and "Les Nouvelles Indes" shows a very indistinct figure of a crab, evidently *Mithrax*, in the middle of the "crustacean triangle". It is partly obscured by the upper chela of a *Cardisoma* and partly by a snake (these are the middle of the three *Cardisoma* and the upper of the two snakes in the gobelin of the "Les Anciennes Indes"; in the gobelin of the series "Les Nouvelles Indes" only one *Cardisoma* and one snake are present). Krotoff's (1984: 32, 33) figures shows the characteristic red colour of this crab and prove its identity, although only one claw, a few legs and a small part of the carapace are visible. Much clearer, however, is the figure of *Mithrax* in the gobelins "Le roi porté" (fig. 25) ("Les Anciennes Indes") (Schaeffer, 1968b: 12, fig. [11]; Jarry, 1976: 65, fig. 3; Krotoff, 1984: 42, col. fig. [14]; Whitehead & Boeseman, 1989, 1989a: 305, col. pl. 72), and "La négresse portée" (fig. 26) ("Les Nouvelles Indes") (Anon., 1953: 54, fig. 35; Jarry, 1959: 64, fig. [3]; Van Gelder, 1960: 10, fig. 5; Anon., 1968: 80, 84, fig. 80; Hoetink, 1979: 211, fig. 276; Krotoff, 1984: 43, col. fig. [15]). In both it is similarly placed in the foreground to the right of centre, in front of a sailfish (*Istiophorus platypterus* (Shaw & Nodder)) and next to a tortoise (*Testudo geometrica* L.). The animal is fully and clearly shown, with much detail, making it clear that it is copied from a design like the one on Desportes' sketch; as was to be expected the figure in the series "Les Anciennes Indes" is better than that of the other series. *Mithrax* is also shown in the gobelin "Le chasseur Indien" of both series (figs. 22-24; also in Schaeffer, 1968: 13, fig. [13]; Jarry, 1959: 62, fig. [1]; Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 38, 39, col. figs. [10, 11]; Whitehead & Boeseman, 1989, 1989a: 303, col. pl. 70); the figure is of about the same quality as the one in "Le cheval rayé". In "Le chasseur Indien" it is also placed below *Cardisoma*, the large claw of the latter partly hiding the *Mithrax*. The parts that are visible (about the left half of the body) show that it is the same as the animal figured in Desportes' sketch.

Of all the figures of *Mithrax hispidus* discussed here that of the Handbook published in colour by Whitehead (1979) is the most important. For some unknown reason Whitehead identified that painting as "*Persephona punctata*?". The only *Persephona* in this entire collection is *P. mediterranea*, dealt with above on pp. 43-45. *P. mediterranea* was formerly generally known as *P. punctata* (L.), but is a species entirely different from *Mithrax*.

Theatrum vol. 1 shows on p. 343 the inscriptions Guaja and Guyaguaçu, but it carries no illustrations. It is possible that this page was reserved for a painting of the present species (Boeseman, pers. comm).

*Mithrax hispidus* is a marine species whose range extends from Bermuda, the Bahama Islands and Delaware Bay (U.S.A.) to southern Brazil and includes the West Indies.

## Portunidae Samouelle, 1815
## **Callinectes sapidus** Rathbun, 1896
## (fig. 13)

Present in sources 1, 2 and 5.

References: (a) unpublished: Çiriobi Leningrad drawings, (B): 149, fig.;

(b) published: Ciri Obi Marcgraf, 1648: 184, no fig.; Çirí-Obi Piso, 1658: 76, no fig.; Ciri Obi Sachs, 1665: 113; ? *Arenaeus cribrarius* Rathbun, 1930: 134; Ciri Obi Marcgraf, 1942: 184, no fig.; *Arenaeus cribrarius* Sawaya, 1942: lxii (note 460); Çirí-Obi Piso, 1957: 183, no fig.; *Arenaeus cribrarius* Lemos de Castro, 1962: 39.

The Leningrad drawing (fig. 13) is a water colour sketch, well depicting a portunine swimming crab, without going into much detail. The shape and colour of the body leave little doubt that a *Callinectes* is shown, and the fact that the front has only two broad teeth (instead of 4 smaller) leaves no doubt that *Callinectes sapidus* is intended, the only Portunine crab of the area showing this character. *Callinectes sapidus* is known from Brazil (although not as common there as, e.g., *C. danae* Smith); therefore there is no good reason not to accept the present identification as correct.

The annotations with the Leningrad figure are the following: First the native name "Ciriobi"; secondly "ad, No. 80. p. 76 enig. Species". "No. 80. p. 76" refers to Piso (1658), p. 76 and fig. 80, i.e. the 80th (unnumbered) figure of Piso's Liber III, which is his "Ciri". However, although Piso mentions Çirí-Obi here, the figure of Çirí shown on that page is of Çiri-Apoa (= *Cronius ruber*, see pp. 49-51, fig. 41a). The expression "enig [matica ?] Species", evidently refers to the fact that the identity of the species was uncertain. Below the figure is the note in pencil "deest apud nos", probably written by Horkel and indicating that he could not find a similar figure in the Handbooks and Theatri, as indeed is the case. In the index to Theatrum I the name Ciriobi is given as occurring on p. 353, but that page, apart from the inscriptions "Ciriobi" and "Ucu-una", is blank, showing no figures at all (Dr. M. Boeseman pers. comm.). No illustrations of this species are found in any of the other sources consulted here.

Marcgraf (1648: 184) described what he named "Ciri Obi Brasiliensibus" as follows: "ejusdem cum praecedenti [= Ciri Apoa, = *Cronius ruber*, see pp. 49-51] est figurae, solo colore ex parte differens: testa enim est obscure cinerei coloris, maculis olivaceis: crurum extremitas caerulea, remiges cinnabrii coloris. Brachiorum & forcipum interiora latera dilute, tenaculae forcipum insigniter caeruleae. Corpus inferius albicans cinnabrio mixtum". The colour and colour patterns of the various species of swimming crabs, and especially their variability in many instances, are still so poorly known that the information provided by Marcgraf is not too much of a help with the identification of his Ciri Obi. A comparison of Marcgraf's description with the figure of Ciriobi in the Leningrad drawings show them to match so well that they evidently are based on the same animal. The carapace in the Leningrad drawing is brownish grey ("obscure cinerei coloris") with some lighter areas ("maculis olivaceis"). The chelipeds are shown brownish grey with the inner surface of the chelae bluish grey ("tenaculae forcipum insigniter coerulea"). The last pair of the legs has the widened propodus and dactylus more reddish brown ("remipes

cinnabrii coloris"). It is possible that in the sketch the original colour is somewhat faded. There can be little doubt therefore that Marcgraf's Ciri Obi is *Callinectes sapidus*. Rathbun (1930: 134, 135) thought that Ciri Obi might possibly be *Arenaeus cribrarius* (Lamarck). She probably considered that Marcgraf's "maculis olivaceis" referred to the "multitude of small white or light yellow spots" found on the carapace of *Arenaeus*. But Marcgraf did not say how large and how many these spots were, and in *Callinectes* there often are two light olivaceous spots in the posterior part of the carapace, one each above the base of the fourth pereiopods. Sawaya (1942) and Lemos de Castro (1962) followed Rathbun in assigning Ciri Obi (with some doubt) to *Arenaeus cribrarius*. It is fortunate that the Leningrad drawing made it possible to definitely prove the identity of Marcgraf's species with *Callinectes sapidus*.

*Callinectes sapidus* Rathbun is the well known "Blue Crab" of the Atlantic coast of the United States, where it is of great economical importance. The range of the species extends from Massachusetts (U.S.A.) to Uruguay, but it has so far not yet been reported from northern Brazil.

### **Cronius ruber** (Lamarck, 1818)
(fig. 41a)

Present in sources no. 1, 2, 4 and 5.

References: (a) unpublished: Çiri Leningrad drawings, (A): 19, fig.; Ciri Handbook, 1: 352, fig.; Ciriapoa Theatrum, 1: 351, no fig.;

(b) published: Ciri Apoa Marcgraf, 1648: 183, fig.; Ciri Apoa Jonstonus, 1650: 33, pl. 9 fig. 8; Ciri Apoa Jonstonus, 1657: 26, pl. 9 fig. 8; Cirí-Apoá Piso, 1658: 76, fig. (Cirí on figure); Ciri Apoa Jonston, 1660: 25, pl. 9 fig. 8; Ciri Apoa Jonstonus, 1665: 26, pl. 9 fig. 8; Ciri Apoa Sachs, 1665: 113; Ciri Apoa Ruysch, 1718: 26, pl. 9 fig. 8; Ciri Apoa Jonstonus, 1767: 33, pl. 9 fig. 8; Eiri, Spec. incert. no. 5 Herbst, 1785: 188; *Lupea rubra* H. Milne Edwards, 1834: 454; *Cronius ruber* Moreira, 1901: 121; ? *Callinectes danae* Rathbun, 1930: 118; Ciri Apoa Marcgraf, 1942: 183, fig.; *Callinectes danae* Sawaya, 1942: lxii (note 458); Cirí-Apoá Piso, 1957: 184, fig.; *Callinectes danae* Lemos de Castro, 1962: 39, pl. 2 fig. 9.

The Leningrad drawing is a very faint pencil sketch, but shows so much resemblance to the wood-cut (fig. 41a) published by Marcgraf (1648) and Piso (1658), that they must have been made after the same picture. The inscription with the figure says "352. Ciri lebens gross sind auch wol grosser" (Ciri, natural size, are also found larger); the no. 352 refers to the page of the Handbook 1. I have not seen the handbook figure, but Dr. M. Boeseman, who did examine it described it (in litt.) as "Ciri. A dark brown crab, anterior transverse zone slightly lighter, pincer-bearing legs brown, but pincers whitish with roseate tips, other legs green to bluish, swimming legs with yellow hairs along the margins". In the coloured edition of Marcgraf's (1648) book the carapace is dark brown with the epibranchial and gastric regions outlined by a narrow pale band; the lateral and frontal areas slightly paler than the rest. Pale blueish spots are present in the cardiac region. The chelipeds are brown, with the exception of the fingers and the dorsal part of the palm, which are white. The following legs have the basal part (coxa to merus, sometimes to carpus)

white and the distal part, dactylus and propodus (sometimes carpus) blue; the flattened dactylus and propodus of the last leg have white spots in the blue, and this leg is fringed with yellow setae.

Marcgraf's wood-cut (fig. 41a) and the Leningrad pencil sketch show a swimming crab with nine large teeth on the anterolateral margin, but without a strong lateral spine as found in *Callinectes*. That the absence of a long lateral spine is not caused by an error of the artist is shown by the description of Marcgraf's, which mentions that the sides show a sharp angle ("& in quolibet latere in acutum desinit angulum"). This and the general shape of the carapace, which is oval rather than elongate transverse, makes that H. Milne Edwards' identification of the species with *Cronius ruber* is more likely than that by Rathbun with *Callinectes danae*. Marcgraf stated the carapace to be medium sized ("mediocris magnitudinis"), while a full grown *Callinectes* would hardly be described that way. Another indication might be that the native name for *Cronius ruber* cited by Moreira (1901: 57) "Siri-goyá" is closer to "Ciri-apoa" than the name "Siro-mirim" that Moreira (1901: 55) cited for *Callinectes danae*.

Marcgraf in his description of the carapace drew special attention to a heart-shaped figure on it ("Totius testae color fuscus seu nigricans, in qua diverso fusco cordis figura, aliaeque depictae"). Now the anterior gastric ridges in *Cronius ruber* are "bi-arcuate" (Rathbun, 1930: 139), in *Callinectes* species, they form a single curved line with the concave part directed forwards. The anterior gastric ridge of *Cronius* has a striking resemblance to the anterior part of the heart-shaped figure in Marcgraf's wood-cut. The bizarre figure shown on the carapace of Marcgraf's animal probably is caused by part of the dorsal pubescence of the carapace being worn off at places, as happens very regularly in *Cronius ruber*, and as is well shown in Rathbun's (1930: pl. 62) illustration.

There can be little doubt, therefore, that H. Milne Edwards (1834) was correct in identifying Marcgraf's animal with *Cronius ruber*.

The fact that *Callinectes* was known to Marcgraf is shown by its being figured on p. 149 of the Leningrad collection (see pp. 48, 49).

Linnaeus (1758) ignored Marcgraf's figure. Herbst (1758) ranged the species of Marcgraf and Piso among the "nicht deütlich genug beschriebene Krabben". Latreille (1803a: 20) made the remark: "Le crustacé, figuré par Pison sous le nom de *ciri*, pag. 76, est un portune qui semble être voisin du portune sanguinolent ou de pélagique" [= *Portunus sanguinolentus* (Herbst, 1783) or *P. pelagicus* (L., 1758)]. The first author that I know of to definitely identify "Ciri Apoa" was H. Milne Edwards (1834), who gave a reference to Marcgraf in the synonymy of *Lupea rubra* (Lamarck), a species now best known as *Cronius ruber* (Lamarck). Also Moreira (1901) adopted this identification. Rathbun (1930), however, placed a reference to Marcgraf's "Ciri Apoa", be it with a question mark, in the synonymy of *Callinectes danae* Smith, 1869. She remarked in a footnote: "As *Callinectes danae* is perhaps the commonest swimming crab in Brazil, it is likely that Marcgraf's species is identical with it, in spite of his grotesque figure". Sawaya (1942) and Lemos de Castro (1962) tended to agree with Rathbun's identification.

Seba (1759: pl. 18 fig. 9) figured a species which he identified with "Cancer

Ciri Apoa, seu Aratu Pinima, Brasiliensis", which certainly does not belong to the present species, and which Rathbun (1930: 23) placed in the synonymy of *Ovalipes ocellatus guadulpensis* (Saussure) [= *Ovalipes floridanus* Hay & Shore, 1918]. Rathbun, misled by Seba's locality indication "Brasiliensis", made an error here, as the specimen figured by Seba is nothing else but the Atlantic European swimming crab *Liocarcinus holsatus* (Fabricius).

*Cronius ruber* is found on both sides of the Atlantic (on the West African coast from the Cape Verde Islands to Angola, and on the American side from South Carolina (U.S.A.) to southern Brazil), and in the East Pacific (Mexico to Peru). It is a marine species that inhabits shallow water.

Xanthidae MacLeay, 1838

**Carpilius corallinus** (Herbst, 1783)

(figs. 1, 2, 13, 14, 19, 20, 22-26, 37)

Present in sources 1, 4, 5, 8 and 9.

References: (a) unpublished: Guajá Leningrad drawings, B: 147, fig.; Guajume Leningrad drawings, B: 149, fig.; - Theatrum, 1: fig. on title page, center, below; Guaja Theatrum, 1: 337, fig.; Guajume Theatrum, 1: 357, fig.;

(b) published: ? Uca Guacu Marcgraf, 1648: 185, no fig.; ? Uca Guacu Sachs, 1665: 107; - Gudger, 1912: 270, fig. 5; - Thomsen, 1938: 115, fig. 65; ? Uca Guacu Marcgraf, 1942: 185, no fig.; ? Uca guaçú Sawaya, 1942: lxii (note 465); - Anon., 1953: 54, fig. 35; - Jarry, 1959: 62, 64, 66, figs. [1, 3, 7, 14]; - Van Gelder, 1960: 14, fig.; - Anon., 1968: 79, 80, 83, 84, figs. 78, 80; - Schaeffer, 1968b: 12, 13, fig. [11, 13]; - Jarry, 1976: 65, 67, figs. 3, 5; - Schaeffer, 1976: 15, fig. 1; - Boeseman, 1979: 174, 178, figs. 211, 220; - Hoetink, 1979: 211, fig. 276; - Joppien, 1979: 360, fig. 164; - Anon., 1984: 145, fig.; - Krotoff, 1984: 3, 32, 33, 38, 39, 42, 43, col. figs. [1, 4, 5, 10, 11, 14, 15]; - Albertin, 1985: 291, fig. 3; *Carpilius corallinus* Whitehead & Boeseman, 1989: 103 ("Crab below beak of bottlenosed dolphin" and "Caranguejo (abaixo de 'bico' do roaz)", 124, 128, 131 (*C. covallinus* in 1989, correct in 1989a), 147, 229, 230, 297, 300, 303, 310, pl. 64a, col. pls. 67, 70, 72, 77b.

The Leningrad watercolour on p. 147 (fig. 37) is in monochrome dark brownish red. The painting is well executed and clearly shows *Carpilius corallinus* (next to *Calappa*). Like so many of the Crustacean figures on pp. 143 to 152 of the Leningrad collection the present watercolour is a forceful representation of the species, giving a vivid impression of the shape and texture of the animal and of its colour, without going into minute details. The species is shown in oblique dorso-anterior view, with the shiny eyes very vividly outstanding. This Leningrad figure has two inscriptions: first the native name "Guaja"and secondly "I.P.Tom 1 p. 337", which is a reference to the Theatrum ("Icones Postii") vol. 1 p. 337, where indeed the same figure, but more detailed and in oil can be found. The Leningrad figure evidently is copied from that in the Theatrum as even the position of the legs is exactly the same in the 2 figures. The Theatrum painting is a finished professional product and is of a high quality, although it does not give many more details than the Leningrad sketch. The colour in the oil painting is much darker than in the Leningrad sketch, with a dark olive overtone. It is most likely that the painting has been made after a living or freshly dead animal. The Theatrum painting bears the number "62" in the lower right hand

corner. On the page above the painting is the ink inscription "Guaja", no other inscriptions were found.

The same figure is also found on the title page of vol. 1 of the Theatrum (fig. 1; also in Gudger, 1912: 270, fig. 5; Schaeffer, 1976: 15, fig. 1; Albertin, 1985: 291, fig. 3), where it forms the central bottom figure of the wreath of animals draped around the title. Even though it is used here as an ornament, the figure unmistakably is that of p. 337.

An extremely poor copy of the same figure can be found in the so-called Desportes sketch (source 9E, see p. 14); this sketch (fig. 2) has also been published by Jarry (1959: 66, fig. [14]; 1976: 67, fig. 5), Van Gelder (1960: 14, fig. 9), Boeseman (1979: 178, fig. 220), Krotoff (1984: 3, coloured fig. [1]) Whitehead & Boeseman (1989, 1989a: 147, 310, col. pl. 77b). In this Desportes sketch, the animal is figured in the central part of the lower portion just left of the turtle, it is the crab nearest to the lower margin. In contrast to the other paintings in the Desportes sketch, that of *Carpilius* is very poor and possibly unfinished, and it is mostly the general shape, and especially the position of the legs (as well as the beady eyes) that make its identification with the Leningrad sketch of p. 147 and the oil painting of Theatrum I p. 337 possible; the colour of the crab in Desportes' sketch is pinkish with a kind of squamiform markings on the carapace.

*Carpilius corallinus* is also shown (next to *Callinectes*) on p. 149 of the Leningrad collection (fig. 13). This second figure shows a still more massive animal in oblique fronto-dorsal view and, although the left lateral margin of the carapace is quite unnatural, the figure can be identified without the least uncertainty as that of *Carpilius corallinus*. The artist characterized this smooth, heavy and robust species very well. This figure also has a counterpart in Theatrum vol. 1, namely on p. 357, which shows a breath-taking picture of two large specimens of *Carpilius corallinus* placed back to back (fig. 14). The two crabs fill the whole painting and are most impressive; the massive body and heavy claws are masterfully figured. The colour is dark brownish red on a background of pale yellowish brown with the fingers of the chelipeds black. The painting must have been made after living or at least fresh animals. There is no difficulty in their specific identification. This figure has been published (in black and white) by Anon. (1984: 145). The figure on p. 149 of the Leningrad collection (fig. 13) is clearly made after the foremost of the two crabs of Theatrum I p. 357, namely the one which looks toward the observer. The peculiar left side of the carapace in the Leningrad figure is due to the fact that the artist who copied this figure from that of the Theatrum misunderstood the perspective; the Theatrum animal is a perfectly natural one.

The Theatrum 1: 357 painting has the number "60" in the lower right hand corner. On the page itself are the inscriptions "Guajume" (at the top of the page) and "Ucanaguacu. Marg: in H.B. p. 184". The last inscription is a reference to Marcgraf (1648), H.B. stands for H[istoria naturalis] B[rasiliae]. However, Marcgraf does not refer to Ucanaguacu on this or any other page of the work. On p. 184 he mentioned Uca una (= *Ucides cordatus* (L.)) and on p. 185 Uca guacu. The latter species cannot be identified from Marcgraf's very short description: "Uca Guacu Brasiliensibus, figura & conformatione sua plane convenit cum antecedente [= Uca una], excepta magnitu-

dine & colore, hic enim longe est major". It is not impossible, however, that *Carpilius* indeed is meant.

It is remarkable that the species of which such excellent illustrations were made during Marcgraf's stay in Brazil, is not reported in his 1648 book, unless his very poorly described Uca Guacu, indeed is this species. *Carpilius* and *Ucides* both have robust smooth, convex bodies, and *Carpilius* is larger than *Ucides*, with a different colour (brownish red rather than olivaceous). These indications, however, are too vague to make a certain identification of Uca guacu possible. Sawaya (1942: lxii) took both Uca guacu and Cunuru to be *Ocypode*, probably because the descriptions of both in Marcgraf's book are printed next to a figure of *Ocypode quadrata*; it is clear, however, that the figure does not belong to either Cunuru or Uca guacú but is a misplaced illustration of Aguara uca (see p. 69 under *Ocypode*). Lemos de Castro (1962: 40) did not agree with Sawaya, and, evidently basing himself on Marcgraf's description, thought that Uca guacú of Marcgraf might have been based on a specimen of *Ucides cordatus* that was somewhat larger than and differently coloured from the specimen described by Marcgraf as Uca una.

A figure that might be this species is found in the oil painting "Indonesian(?) soldiers, also Africans, at dockside" from the Schloss Schwedt collection (source 8) (fig. 19). This painting is discussed here on p. 12 and has been dealt with more extensively by Thomsen (1938: 116-118, fig. 65) and by Whitehead & Boeseman (1989, 1989a: 102-104, pl. 64a). The black and white photograph of this painting is the only remaining documentation, as after World War II the castle and its paintings were destroyed by fire. Below the beak of the bottlenosed dolphin shown in the lower half of the painting is a crab, the identity of which is uncertain. It is a large robust specimen, which, among the species discussed in the present paper shows most resemblance to *Carpilius corallinus*, but as already mentioned by Whitehead & Boeseman (1989, 1989a), it has no counterpart in any of the collections discussed here. It might be one of the specimens figured in the Theatrum, but then shown under a different angle. The presence of a figure of a Xiphosuran in the same painting shows that the crab does not necessarily have to be from Brazil, as Xiphosura have never been found there. Although the photograph makes a certain identification impossible, I would opt for "*Carpilius corallinus* (?)".

*Carpilius* is shown also on several of the gobelins of the series "Les Anciennes Indes" and "Les Nouvelles Indes" (source 9, see pp. 12-14 above, for information on these gobelins). In the gobelin "Le cheval rayé" of the series "Les Anciennes Indes" (fig. 20) is a figure of *Carpilius* which strongly resembles that of the Leningrad figure of p. 147, but more so that of the Desportes sketch (fig. 2); it is shown at the inner corner of the "crustacean triangle" in front of the zebra in the lower part of the gobelin; the *Carpilius* is placed at the tail end of *Lysiosquilla* just above the lowest of the three *Cardisoma guanhumi*; the body of the *Cardisoma* obscures a small part of the *Carpilius*. This figure of *Carpilius* is not shown in "Le cheval rayé" of the "Nouvelles Indes". However, the gobelin "Le cheval rayé" of both series (Jarry, 1959: 64, fig. [7]; Anon., 1968; 79, 83, fig. 78; Krotoff, 1984: 32, 33, col. figs. [4, 5]; Whitehead & Boeseman, 1989, 1989a: 124, col. pl. 67), and also Desportes' cartoon of this gobelin (Joppien, 1979: 360, fig. 164) do show in the upper half of the "crustacean triangle" a *Carpilius*

which can be recognized as the one from the Leningrad figure of p. 149. In the gobelin of "Les Anciennes Indes" (fig. 20) this *Carpilius* is placed near the top of the triangle, next to and slightly lower than a *Cardisoma*; in that of "Les Nouvelles Indes" it is placed near the foot of a large graminaceous plant and just above a specimen of *Persephona mediterranea*. In the gobelin "Le roi porté" of the series "Les Anciennes Indes" (fig. 25; also in Schaeffer, 1968b: 12, fig. [11]; Jarry, 1976: 65, fig. 3; Krotoff, 1984: 42, col. fig. [14]; Whitehead & Boeseman, 1989, 1989a: 131, 229 (230 in 1989a), 305, col. pl. 72) a figure of *Carpilius*, similar to that of p. 147 of the Leningrad collection, is seen looking out from under the tail of a striped frogfish (*Ogcocephalus*). In the corresponding gobelin "La négresse portée" of the series "Les Nouvelles Indes" (fig. 26; also in Anon., 1953: 54, fig. 35; Jarry, 1959: 64, fig. [3]; Anon., 1968: 80, 84, fig. 80; Hoetink, 1979: 211, fig. 276; Krotoff, 1984: 43, col. fig. [15]), a similar figure is shown in the same place, but it is less distinct. In the gobelin "Le chasseur indien", both that of "Les Anciennes Indes" (figs. 22, 23; also in Schaeffer, 1968b: 13, fig. [13]; Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 38, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 128, 229 (230 in 1989a), 303, pl. 70) and "Les Nouvelles Indes" (fig. 24); (also in Jarry, 1959: 62, fig. [1]; Krotoff, 1984: 39, col. fig. [11]), the figure of *Carpilius* of the Leningrad drawing on p. 147 is shown in the "crustacean triangle" in front of the hunter; it is placed above the lower lizard next to the telson of *Lysiosquilla* and partly covers *Persephona*; the front and chelipeds of *Carpilius* are hidden from view by the body of the lizard.

The range of *Carpilius corallinus* extends from the Bahama Islands and the West Indies to north-eastern Brazil.

### ? **Eurypanopeus** spec.
(fig. 29)

Present in sources ?4 and 5.
References: (a) unpublished: Leningrad drawings, (B): 43, fig.; ? Theatrum, 1: 15 (not seen).

The main theme of the figures on p. 43 of the Leningrad drawings is formed by Reriapiya, *Megabalanus tintinnabulum* (L.) (see pp. 18, 19 , fig. 29)). On the plate also two fishes are figured, identified by Boeseman et al. (1990) as *Ophioblennius atlanticus* (Valenciennes, 1836) and ? *Blennius pilicornis* Cuvier, 1829. Apart from all this, a single crab is figured above the left group of Balanids. The crab is sketched in a dark brown colour, showing a transversely oval carapace, and on the right side of this a distinct claw with palm and carpus somewhat swollen and three rather slender walking legs; of the legs of the left side of the body only three short stubs are visible. The figure gives too few details to make a reliable identification of the animal possible. It could be a species of the Xanthid genus *Eurypanopeus*, judging by the general shape of the specimen and by the fact that species of that genus commonly are found among oysters, balanids, sponges, etc.

It is possible that the figure on p. 15 of Theatrum 1, which also shows the Balanidae, gives a better picture of the crab. I have, however, not seen the Theatrum figure.

**Panopeus lacustris** Desbonne, 1867
(fig. 41b)

Present in source 1.

References: (b) published: Guaia Miri Marcgraf, 1648: 183, fig.; Guaia Miri Jonstonus, 1650: 33, pl. 9 fig. 4; Guaja Miri Jonstonus, 1657: 25, pl. 9 fig. 4 (Guaia M.); Guaja miri Jonston, 1660: 25, pl. 9 fig. 4 (Guaia M.); Guaja Miri Jonstonus, 1665: 25, pl. 9 fig. 4 (Guaia M.); Guaia Miri Sachs, 1665: 114, pl. 5 fig. (3) (Guaja M.); Guaja Miri Ruysch, 1718: 25, pl. 9 fig. 4 (Guaia M.); Guaia Miri Jonstonus, 1767: 33, pl. 9 fig. 4; Spec. incert. no. 9 Herbst, 1758: 188; Guaia Miri Marcgraf, 1942: 183, fig.; *Panopeus* Sawaya, 1942: lxii (note 456); *Panopeus* Lemos de Castro, 1962: 38, pl. 1 fig. 8.

Marcgraf gave a short description and a figure (fig. 41b) of his Guaia Miri. "Guaia Miri Brasiliensibus, cancerculus in salsis fluviis degens, numquam excedit pruni magnitudinem; testa illius est ellyptica, anteriore parte in multos angulos desinente: ocelli parvi, breves: brachia duo, dextrum paulo minus sinistro: crura octo, quatuor internodiis constantia, & brevibus pilis hirta: color testae ferrugineus: brachiorum & crurum obscure violaceo-purpureus. Pili crurum pallidi; inferius forcipum latus albicat". In the coloured edition the figure has the carapace pale greenish with darker irregular lines; the legs are of the same colour with brownish patches here and there. Like most of the other wood-cuts showing Crustacea, this figure is rather coarsely executed and gives few details. The general shape, however, shows the species to be most likely a *Panopeus*, a conclusion already arrived at by Sawaya (1942) and Lemos de Castro (1962). The size of the animal (not larger than a plum) and its habitat (in brackish rivers) make, that among the species of *Panopeus* it most likely belongs to *Panopeus lacustris* Desbonne, as recently characterized by A.B. Williams (1983: 868-872, fig. 4) in his revision of the *Panopeus herbstii* group. Williams (1983: 871) even reported material of this species from Recife.

Marcgraf's Guaia Miri was completely ignored by Linnaeus and most post-Linnean authors. Herbst (1785: 188) cited Guaia Miri among the "nicht deütlich genug beschriebene Krabben", but referred to Jonstonus'(1650: pl. 9 fig. 4) copy of Marcgraf's figure, possibly because Marcgraf's book was not available to him. The only authors that I know of to have tried to identify Marcgraf's species are Sawaya (1942) and Lemos de Castro (1962) mentioned already.

The species has not been figured by any of the other sources discussed in this paper (pp. 7-15).

*Panopeus lacustris* is known from Bermuda, Florida, the Caribbean Sea and Brazil south to Rio de Janeiro. It has been introduced into Hawaii.

Gecarcinidae MacLeay, 1838
**Cardisoma guanhumi** Latreille, 1828
(figs. 2, 15-27, 41c)

Present in sources 1, 2, 3, 4, 5, 7, 8 and 9A, B, C, D, E.

References: (a) unpublished: Guanhumi Leningrad drawings, A: 17, fig.; Guajume Leningrad drawings, B: 148, fig.; Guanhumi Handbook, 1: 320, fig. (not seen); Guajume Theatrum, 1: 355, fig.; Guanhumy Theatrum, 1: 359 (no fig., only name);

(b) published: Guanhumi Marcgraf, 1648: 185, fig.; Guanhumi Jonstonus, 1650: 34, pl. 9 fig. 10; Guanhumi Jonstonus, 1657: 26, pl. 9 fig. 10; Guanhúmi Piso, 1658: 77, fig.; Guanhumi Jonston, 1660: 26, pl. 9 fig. 10; Guanhumi Jonstonus, 1665: 26, pl. 9 fig. 10; Guanhumi Sachs, 1665: 119; Guanhumi Ruysch, 1718: 26, pl. 9 fig. 10; Guanhumi Jonstonus, 1767: 34, pl. 9 fig. 10; *Cancer ruricola* Herbst, 1783: 119, 120; *Ocypode ruricola* Latreille, 1803a: 35; *Cardisoma guanhumi* Latreille, 1828a: 685; *Cardisoma guanhumi* Moreira, 1901: 110; *Cardisoma guanhumi* Rathbun, 1918: 341; - Soloviev, 1934: 224, fig. 6; - Thomsen, 1938: 9, 115, figs. 5, 65; Guanhumi Marcgraf, 1942: 185, fig.; *Cardisoma guanhumi* Sawaya, 1942: lxii (note 466); - Anon., 1953: 48, 54, figs. 26, 34, 35; Guanhúmi Piso, 1957: 186, fig.; - Jarry, 1959: 62, 64, 66, figs. [1, 3, 5, 7, 14]; - Van Gelder, 1960: 14, fig. 9; *Cardisoma guanhumi* Lemos de Castro, 1962: 40, pl. 3 figs. 18, 19; Crangejo Wagener, 1964: 189, 299 (Caranguejo), fig. 25; Caranguejo Pinto, 1964: 242, 349, fig. 25; Crangejo Spohr, 1967: 32, 33, fig. 25; - Anon., 1968: 72, 81, 83, 84, figs. 65, 76, 78, 80; - Schaeffer, 1968b: 8, 12, 13, figs. [2, 11, 13] - Schaeffer, 1973: 194, fig.; - Jarry, 1976: 65, 67, figs. 3, 5; - Van den Boogaart, 1979: 133, col. fig. 131; - Van den Boogaart, 1979a: 525, fig. 203; - Boeseman, 1979: 174, 178, figs. 211, 220; - Hoetink, 1979: 211, fig. 276; - Joppien, 1979: 360, 362, figs. 164, 165; - Valladares & Mello Filho, 1981: 66, 67, 109, 111, 118, col. figs. (on pp. 66, 67, 118);- Honour, 1982: 40, 42, col. fig. 32; - Krotoff, 1984: 3, 32, 33, 38 - 44, col. figs. [1, 4, 5, 10-15]; - Whitehead, 1985: 132, 138, 140, fig. 5; *Cardisoma guanhumi* Whitehead & Boeseman, 1989, 1989a: 49, 69, 102, 124, 128, 129, 131, 137, 146, 226 (not in 1989a), 227, 228, 229, 230, 249, 254, 271, 297, 300, 303, 304, 305, 310, col. pls. 18b, 23a, 40, 67, 70, 71, 72, 77b, uncol. pl. 64a.

On p. 17 of the Leningrad drawings there is a very faint pencil sketch (fig. 27; reproduced in colour by Whitehead & Boeseman, 1989, 1989a: 249, col. pl. 18b) of this species. There cannot be any doubt that this figure served as the basis for the wood-cut published by Marcgraf (1648, 1942) and Piso (1658, 1957) (fig. 41c), or at least is based on the same drawing. Although neither the present figure nor the wood-cut are very detailed, it is clear that Latreille (1828a), Moreira (1901), Rathbun (1918), Sawaya (1942), Lemos de Castro (1962) and other authors were correct in identifying Marcgraf's species with *Cardisoma guanhumi* Latreille, 1828; Latreille even adopted Marcgraf's Brazilian vernacular name "Guanhumi" as the specific name for his new species. The wide front, the strongly different chelipeds as well as the size (carapace as large as an orange, "magnitudine Auriaci mali"; Marcgraf, 1648: 185), make any other conclusion unlikely. The annotation with this Leningrad figure reads as follows: "320 Guanhumi so gross alss ein ordinari krab roht" (= 320 Guanhumi of the size of a common crab red). The number 320 refers to the figure in the Handbook. The rest of the handwriting seems to indicate that the species is red, at least if the word "roht" is a lapsus for "roth" and if the not very easily decipherable gothic script is correctly transliterated. This colour indication is incorrect, as the species in life is of a whitish or bluish grey colour and certainly not red; this is also indicated by the native name "caranguejo terrestre branco" (Sawaya, 1942). In the coloured edition of Marcgraf's (1648) work the colour is more correctly shown as pale bluish grey.

The figure on p. 320 of vol. 1 of the Handbook (that I did not see) evidently is similar to the figure of p. 17 of the Leningrad drawings and Marcgraf's wood-cut.

It is interesting that Linnaeus ignored Marcgraf's species, and that the first author who tried to identify it (Herbst, 1783: 119) only referred to Piso's account of the species. Herbst identified it with *Cancer ruricola* Linnaeus, in which he was followed at first by several authors, until Latreille (1828a) placed the species in his new

genus *Cardisoma* and referred to it as follows: "2°. Comme variété à serres d'inéquales grandeurs, le *Cancer guanhumi* de Marcgrave". This very meagre description, however, is sufficient to make *Cancer guanhumi* Latreille, 1828 an available name for the species, and being the oldest such name, it is the valid one. Latreille (1828a) placed the species *Cancer ruricola* L. in a separate genus *Gecarcinus* Leach, 1814, and at the present the names *Cardisoma guanhumi* and *Gecarcinus ruricola* are still the generally accepted names for the two species.

The Leningrad figure of p. 17 and thus that of Handbook 1: 314, being the one reproduced by Marcgraf, is the only one of the figures of *Cardisoma guanhumi* made in Brazil by the staff of Johan Maurits van Nassau, that is mentioned in scientific carcinological literature, even though it is not the best one. The other figures will be dealt with below.

*Cardisoma guanhumi* is also figured on p. 148 of the Leningrad collection (fig. 15). The figure given there is entirely different from either that of p. 17 or from Marcgraf's wood-cut, and excellently depicts the species. It is drawn in bold lines and artistically is of a higher quality than the figure on p. 17. The colour is that typical of the species, being bluish grey, with a slight purplish tinge in the middle of the carapace. The shapes of the front and the legs give the right impression, also the dark velvet pubescence at either side of the oral cavity is well shown. The specimen could be the same as that shown on p. 17, but then certainly figured by a different artist. The figure of p. 148 has been reproduced by Soloviev (1934: fig. 6) and by Schaeffer (1973: 194). This figure in all probability was the preliminary sketch for (or a rough copy of) the oil painting of the Theatrum 1: 355, referred to in the references given above. The oil painting, of which a coloured photograph was placed at my disposal by Mrs. P.J. Albertin, shows the same animal, in the same posture as the Leningrad figure of p. 148. It is a beautiful, almost photographic representation of a dead *Cardisoma guanhumi* laying flat on the substrate with the legs extended sideways. This painting is pasted on a page of the Theatrum (no. 355), with several inscriptions above and below. In the upper part there is in ink the word Guajume, clearly a variant of Guanhumi. The pencil inscription *"Gecarcinus"* is visible just above the right hand corner of the painting. Below the painting it says, in ink, "Cunaru. Piso in H u I.p 76 Marg: in HB.p.184" (= Cunaru (recte Cunuru). Piso in Historia utriusque Indiae, p. 76. Marcgraf in Historia Brasiliae, p. 184 (recte 185)). However, the name Cunuru was given by Piso (1658: 76) and Marcgraf (1648: 185) to *Ucides cordatus* (see p. 72). Most interesting is a pencil inscription below the lower right hand corner of the painting saying: "Gecarcinus Marcgravii dH". This inscription is unmistakably in the handwriting of W. de Haan, who from 1823 to 1846 was curator of invertebrates of the Rijksmuseum van Natuurlijke Historie at Leiden. De Haan wrote this inscription evidently when in the summer of 1826 he visited Berlin (see pp. 10, 11). Although De Haan gave the name *Gecarcinus Marcgravii* two years before the publication of Latreille's name *Cancer guanhumi*, the fact that he did not get this name published makes Latreille's 1828 name the valid one.

Either or both of the figures of *Cardisoma guanhumi* shown on pp. 17 and 148 of the Leningrad drawings are used in three of the gobelins of source 9 discussed in the present paper on pp. 12-14, while the figure of p. 148 is also shown in the Desportes

sketch (fig. 2) (source 9E, see p. 14).

In the gobelin "Le cheval rayé" of the series "Les Anciennes Indes" (fig. 20; figured in colour by Krotoff (1984: 32, col. fig. [4], and by Whitehead & Boeseman (1989, 1989a: 300, col. pl. 67) a number of Crustacea, arranged roughly in a triangle, is placed in the lower corner of the gobelin towards which the zebra jumps (this is the lower left hand corner in the gobelin of the Académie de France in Rome (Krotoff, 1984: 32), but the lower right hand corner in the gobelins in the Mobilier National (Whitehead & Boeseman, 1989, 1989a: 300, pl. 67) and in the Grandmaster's Palace in Malta, the former being the mirror image of the last two). In the triangle of Crustacea there are 3 specimens of *Cardisoma*, the first is at the top of the triangle next to a specimen of *Carpilius corallinus*, the second is placed slightly above the center of the triangle and is run over by a small lizard, the third is at the extreme lower angle of the triangle nearest to the zebra. The first is clearly based on the same figure as the Leningrad figure of p. 17, the other two, and especially the third are much more like the Leningrad figure on p. 148. In the Rome gobelin shown by Krotoff (1984: 32) all three crabs are distinctly visible. The gobelin of the Mobilier National is heavily trimmed, both in the upper part (the red macaw is beheaded), and in the right part (in front of the zebra): the frame passes over the middle of the third crab and most of the "crustacean triangle", inclusive of the two other *Cardisoma*, is lost. The Malta gobelin shows most of the "crustacean triangle", except for the *Cardisoma* at the top which is covered by the frame. In the gobelin "Le cheval rayé" of "Les Nouvelles Indes" (figured by Jarry, 1959: 64; Anon., 1968: 83, fig. 78; Joppien, 1979: 360, fig. 164; Krotoff: 33, in col.) the "crustacean triangle" is shown in the lower left hand corner, behind the zebra; in it the Crustacea are arranged somewhat differently from those in the series "Les Anciennes Indes". Of the three *Cardisoma* only the central one is shown in "Les Nouvelles Indes", the others are left out altogether. This is clearly shown in the gobelin of the Archbishop's Palace in Prague (Jarry, 1959: 64) and in a gobelin in the Mobilier National (Anon., 1968: fig. 78; Krotoff, 1984: 33, col. fig. [5]), a second gobelin in the Mobilier National (of which M. Coural sent me a photograph and a close-up) shows exactly the same situation. These three gobelins are practically identical, except that the third gobelin forms the right half of an enormous piece of tapestry, the left half of which is formed by the gobelin "Le chameau"; the two are woven together as one unit, the "crustacean triangle" being placed in about the middle of the bottom part. The cartoon for the gobelin "Le cheval rayé" of "Les Nouvelles Indes", reproduced by Joppien (1979: 360, fig. 164) shows exactly the same arrangement as on the gobelins, only in mirror image. The crab in these gobelins of "Les Nouvelles Indes" shows two large chelae, while in those of "Les Anciennes Indes" only one enlarged claw was, correctly, figured. In this respect thus the gobelins of "Les Nouvelles Indes" are less accurate than those of "Les Anciennes Indes", even though in the so-called "Desportes sketch" the species is figured correctly.

In the gobelin "Le roi porté" (Les Anciennes Indes (fig. 25; also in Schaeffer, 1968a: 12, fig. [11]; Jarry, 1976: 65, fig. 3; Krotoff, 1984: 42, col. fig. [14]; Whitehead & Boeseman, 1989, 1989a: 305, col. pl. 72), the same figure of *Cardisoma* from Leningrad p. 148 can be discovered in the lower right half of the scene, be it that only a small part (the left half of the carapace and part of the left legs) is visible, the rest being

hidden by two fishes (a striped frogfish, *Ogcocephalus*, and a longitudinally striped species). In the corresponding gobelin "La négresse portée" in the series "Les Nouvelles Indes" the same specimen is shown in the same place (fig. 26; also in Anon., 1953: 54, fig. 35; Jarry, 1959: 64, fig. [3]; Hoetink, 1979: 211, fig. 276; Krotoff, 1984: 43, col. fig. [15].

Finally the same figure of the Leningrad collection p. 148 is used in a third gobelin, viz., "Le chasseur indien" of "Les Anciennes Indes" (figs. 22, 23; also in Schaeffer, 1968b: 13, fig. [13], under "O Pescador"; Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 38, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 303, col. pl. 70), where it is one of the bottom figures in a triangular arrangement of Crustacea in front of the indian hunter (fig. 23); the side of the crab close to the frame is partly hidden by an iguana and by a turtle, the entire other half, including the large chela being clearly visible. In the corresponding gobelin of the series "Les Nouvelles Indes" (fig. 24; also in Jarry, 1959: 62, fig. [1]; Joppien, 1979: 362, fig. 165; Krotoff, 1984: 39, col. fig. [11]) the crab is in exactly the same position.

In the Desportes sketch (see p. 14; fig. 2) the species is shown as the upper left of the Crustacea. The figure clearly is of the same origin as that of Leningrad collection p. 148: the position of the body and of the legs is very similar and the colour is also grey, be it that it is darker than in the figure of Leningrad p. 148, but still very natural.

A third figure of the present species (fig. 16) made in the same period in Brazil is the one by Wagener (1964: fig. 25), also reproduced by Spohr (1976), and in colour by Whitehead & Boeseman (1989, 1989a: 254, col. pl. 23a). This figure is the best of the three. It shows the animal in front view in an aggressive posture. It is excellent both artistically and scientifically, being very detailed and accurate. The figure resembles strongly those of two *Cardisoma guanhumi* shown in the lower left hand corner of a painting by A. Eckhout in "Schloss Schwedt" on the Oder River (source 8, p. 12; fig. 19) reproduced by Thomsen (1938: 115, fig. 65) and by Whitehead & Boeseman (1989, 1989a: 297, pl. 64a); the two crabs here show the same aggressive posture as in Wagener's figure although the chelae are less highly elevated. It is interesting that Wagener, who was not a scientist and is considered a mediocre amateur artist, provided a better sketch of the species than Eckhout, to whom the sketch of the Leningrad figure on p. 148 is usually ascribed, or than Marcgraf, who has been thought to be responsible for the figure of the Leningrad collection, p. 17. Eckhout's final product, the oil painting in Theatrum 1 of course is technically superior to the various sketches.

It is not unlikely that all three figures are made after the same specimen, the proportions being about the same. The main difference is that the Leningrad figure of p. 148 shows only three walking legs on the right side of the animal; either the animal had lost a leg, or the artist was somewhat careless.

A fourth figure of this species is shown in the gobelin "Combat des Animaux" both in that of the series "Les Anciennes Indes" (fig. 21; also in Anon., 1953: 54, fig. 34; Anon., 1968: 81, fig. 76; Krotoff, 1984: 40, col. fig. [12], Whitehead & Boeseman, 1989, 1989a: 304, col. pl. 71), and in "Les Nouvelles Indes" (see Jarry, 1959: 64, fig. [5]; Krotoff, 1984: 41, col. fig. [13]), and of both of which I received a photograph from

the Mobilier National. In the gobelin of "Les Anciennes Indes" two crabs are shown (in the left foreground in the photograph seen by me and in those published by Anon., 1953, Krotoff, 1984 and Whitehead & Boeseman, 1989, 1989a; but in the right foreground in the figure published by Anon., 1968, which is the mirror image of the other four). Both crabs are seen from above and obliquely from behind. They are probably both based on the same drawing as the position of the body and the (visible) legs is the same in both; however, they are different from any of the three discussed above. The figure closest to the middle of the gobelin is shown in full, with the two chelae of different size. The second figure, closer to the margin of the gobelin evidently represents a crab disappearing into its burrow, the larger part of the carapace still being visible as well as all left legs, including the small chela. In the same gobelin of the series "Les Nouvelles Indes", the crabs are present in about the same position, be it that they are figured less naturally: in the complete crab the large chela is figured too short and in an awkward position, while the other crab in this gobelin is not shown burrowing, but the entire carapace is visible, the large chela and one of the pereiopods on the left side are missing, two other left pereiopods are shown as short stubs only, while on this left side only the last pereiopod is complete. That these crabs originate from Albert Eckhout is clear. In Eckhout's painting of the Tupinamba-man (figs. 17, 18; also in Thomsen, 1938: 9, fig. 5; Anon., 1953: 48, fig. 26; Anon., 1968: 72, fig. 65; Schaeffer, 1968: 8, fig. [2]; Van den Boogaart, 1979: 133, col. fig. 131; Van den Boogaart, 1979a: 525, fig. 203; Valladeres & Mello Filho, 1981: 66, 67, 109, 111, 118, figs. on pp. 66, 67 (both in colour), 118 (incorrectly named *Ulcides cordatus* on p. 118); Honour, 1982: 42, col. fig. 32; Whitehead, 1985: 132, 138, 140, fig. on p. 132; Whitehead & Boeseman, 1989, 1989a: 271, col. pl. 40), two crabs, practically identical to those of "Le combat des animaux" of "Les Anciennes Indes" series, are shown. In the lower left hand corner of the painting the complete crab can be seen, with the chelae and pereiopods exactly in the same position as those in the gobelin. In the extreme lower part of the painting, somewhat to the right of the middle, Eckhout showed a crab disappearing in its burrow; this animal matches exactly the burrowing crab of the gobelin. Especially interesting is the coloured detail figure on p. 66 of the book by Valladares & Mello Filho, where the left hand crab of the painting is shown enlarged and in beautiful detail (reproduced in the present paper as fig. 18); on p. 118 these authors identified the crab as "*Ulcides cordatus*", an incorrect spelling of an incorrect identification, the species certainly is not *Ucides cordatus* (L.), but definitely *Cardisoma guanhumi*. An interesting variant of this completely visible crab can be observed in the tapestry "Le combat des animaux" of "Les Anciennes Indes" kept in the Palais des Chevaliers in Malta, as well as in the one kept in the Louvre in Paris (the latter figured in colour by Krotoff, 1984: 40, fig. [12] and Whitehead & Boeseman, 1989, 1989a: 304, pl. 71) and that in São Paulo (Anon., 1968: 79, fig. 76). In those three tapestries, namely the crab is shown with two long articulated antenna-like appendages sticking out from under the posterior margin of the carapace; these appendages are not shown in any of the other gobelins (whether "Anciennes Indes" or "Nouvelles Indes") of which I have seen reproductions, neither are they present in Eckhout's painting. These appendages do not exist in nature and must be due to an artistic freedom taken by the artist or weaver responsible for the Malta and Louvre

tapestries. In the Louvre gobelin, moreover, both crabs show two dark eye-like spots some distance before the posterior margin of the carapace; this with the "antennae" gives the impression of an animal facing backward. In the Malta gobelin these distinct eye spots are not shown.

Wagener (1964: 189) described the habitat of the species quite well, and comments on its usage as food. Spohr (1967) gave an English version of Wagener's remarks.

*Cardisoma guanhumi* is a conspicuous and well known land crab. Its great size (carapace length up to 90 mm) and its enormous chelipeds make it a quite impressive animal. Also the fact that it is terrestrial, catches the imagination of observers. Its size and excellent taste make that it is eaten in most part of its range.

The species is known from Bermuda and southern Florida to southern Brazil, including the West Indies. Although it is terrestrial, it always is found in coastal areas.

## Grapsidae MacLeay, 1838
## **Goniopsis cruentata** (Latreille, 1803)
## (figs. 2, 22-24, 42a)

Present in sources no. 1, 2, 3, 4, 5, 9A, C.

References: (a) unpublished: Aratu Leningrad drawings, (A): 19, fig.; Aratû Handbook, 1: 348, fig.; Aratu, Aratu-pinima Theatrum, 1: 347, no fig.;

(b) published: Aracu Piso, 1648: 47; Aratu Marcgraf, 1648: 185 (not the fig.); Aratu et Aratu Pinima Jonstonus, 1650: 34 (not pl. 9 fig. 11); Aratu & Aratu Pinima Jonstonus, 1657: 26 (not pl. 9 fig. 11); Aratú Piso, 1658: 285, 299, 300 (not the figure; part of the description on p. 299 incorrect); Aratu, en Aratu Pinima Jonston, 1660: 26 (not pl. 9 fig. 11); Aratu & Aratu Pinima Jonstonus, 1665: 26 (not pl. 9 fig. 11); Aratu, Aratu Pinima Sachs, 1665: 119; Aratu & Aratu Pinima Ruysch, 1718: 26 (not pl. 9 fig. 11); Aratu et Aratu Pinima Jonstonus, 1767: 34 (not pl. 9 fig. 11). *Grapsus cruentatus* Latreille, 1825: 148; Aratu Marcgraf, 1942: 185 (not the figure); Aracu Piso, 1948: 54; Aratú Piso, 1957: 592, 623. - Jarry, 1959: 62, 64, 66, figs. [1, 7, 14]; - Van Gelder, 1960: 14, fig. 9; *Goniopsis cruentata* Lemos de Castro, 1962: 40, pl. 1 fig. 7; Crangejo Wagener, 1964: 71, 190, 300 (Caranguejo), fig. 27(b); *Goniopsis cruentata* Pinto, 1964: 71, 244, 350, fig. 27(b); - Anon., 1968: 83, fig. 78; - Schaeffer, 1968b: 13, fig. [13]; - Jarry, 1976: 67, fig. 5; - Boeseman, 1979: 174, 178, figs. 211, 220; - Krotoff, 1984: 3, 32, 33, 38, 39, col. figs. [1, 4, 5, 10, 11]; *Goniopsis cruentata* Whitehead & Boeseman, 1989, 1989a: 103, 128, 147, 229, 230, 297, 303, 310, pl. 64a, col. pls. 70, 77b.

The Leningrad drawing is a faint pencil sketch of a grapsid crab. A comparison of this figure with the wood-cut(fig. 42b) of "Aratu" published by Marcgraf (1648: 185) and Piso (1658: 300), shows that the present figure is entirely different from the published ones and represents a totally different species, even though both are grapsids and have some characters in common. The Leningrad figure is accompanied by the inscription "348 Aratu so gross als das Leben" (348 [a reference to p. 348 of Handbook 1], Aratu, natural size). In the Leningrad figure the carapace is as long as wide and less strongly narrowed posteriorly than in Marcgraf's wood-cut. The meri of the last pair of walking legs in the Leningrad figure are shown very wide (the relations length/width being about 4/3), while the chelae are much heavier and more

robust than in Marcgraf's figure, and have the fingers higher and less sharply pointed.

There cannot be any doubt that Marcgraf's and Piso's woodcuts (which are identical) (fig. 42b) represent the species known as *Aratus pisonii* (H. Milne Edwards, 1837), a species named originally *Sesarma Pisonii* by H. Milne Edwards (1837: 76, pl. 19 figs. 4, 5) and based partly on Marcgraf's and Piso's accounts of it. The vernacular name "Aratu" was later used by H. Milne Edwards (1853: 187) to form a new generic name, *Aratus*, for the species. There has never been any doubt that Marcgraf's and Piso's wood-cut of "Aratu" represent *Aratus pisonii*, a very characteristic crab, which inhabits mangroves and is found mostly out of the water on the mangrove roots and branches (see pp. 64, 65).

Lemos de Castro (1962: 40) was the first point out that Marcgraf's description of "Aratu" and "Aratu pinima" does not fit *Aratus pisonii*, but that it more likely is based on *Goniopsis cruentata*, and that the true *Aratus pisonii* is the crab described by Marcgraf (1648: 187) as "Carara Pinima", without illustration. Sawaya (1942: lxiii, note 476, under Guarará pinima) also had concluded that that species was *Aratus*. Pinto (1964: 244, 350) likewise cited Aratu as the vernacular name of *Goniopsis cruentata*.

The present Leningrad figure is, as said before, very faint and indistinct, but it could well represent *Goniopsis cruentata*. This surmise is confirmed by the coloured Desportes sketch (fig. 2) (see p. 14, source 9E) published by Jarry (1959: 66, fig. [14]; 1976: 67, fig. 5), Van Gelder (1960: 14, fig. 9), Boeseman (1979: 178, fig. 220), Krotoff (1984: 3, col. fig. [1]), and Whitehead & Boeseman (1989, 1989a: 310, col. pl. 77b). The central figure of the second row of crabs in this sketch is an animal, which, judging by it coloration, cannot be anything but *Goniopsis cruentata*, and the outline fits the present sketch perfectly. The coloured figures of this Desportes sketch, show a beautifully and accurately executed colour drawing of *Goniopsis cruentata*, which can only have been made after a living specimen. The carapace is dark olive to practically black with conspicuous white spots laterally. The eyes have bright red stalks and black corneae. The chelae are yellowish with small red spots dorsally, the rest of the cheliped and the other pereiopods are brilliant red with small white spots especially on the meri. The figure of Aratu in Handbook, 1, p. 348 (not seen by me), shows a very similar coloration (M. Boeseman, in litt.).

There can therefore be no doubt that the Leningrad figure of "Aratu" and also Marcgraf's "Aratu" and "Aratu pinima" are *Goniopsis cruentata*, and that Marcgraf's figure on p. 185 is misplaced and should have illustrated "Carara pinima" on p. 187.

Piso (1648: 47), when dealing with antidotes for the poison of the fish Guambajacu (= *Diodon* spec.), mentioned that to this end a kind of crab is used. He described this crab as follows: "Quos inter non ita magni reperiuntur, multiplici ac variegato colore, caeruleo, albo, rubro, violaceo, chelis aequalibus armati, quorum crura pilis nigricantibus sunt vestita. Hos Aracu appellant Brasiliani". This species, crushed in wine can be used as an emetic and an antidote to the fish poison. The description of the bright colour of the species shows that *Goniopsis* and not *Aratus* is meant; no figure is given here by Piso. Ten years later Piso (1658: 299, 300, fig.) changed his above description as follows: "Quos inter non ita magni reperiuntur, quadratae figurae, in arborum truncis latitantes, ut Ostreis & Mytilis insidientur. Qui

multiplici ac variegato colore, albo, rubro, violaceo, chelis aequalibus armati, crura pilis nigricantibus habent vestita. Hos Aratú appellant Brasiliani". Now a figure of *Aratus pisonii* is added. Piso corrected here the native name from Aracu to Aratú, left out the mention of blue colour, described the carapace as quadrangular, and added the remark that the species hides among the trunks of trees and is found among oysters and mussels. As *Aratus* is well known to climb around on the branches of mangroves, it seems possible that Piso was as confused by the presence of the wrong picture with Marcgraf's description of Aratu, as were many later authors. There can be little doubt that Aratu of both Piso and Marcgraf actually was *Goniopsis*. Piso (1658: 285) also mentions Aratu as an antidote against spider poison.

Wagener (1964: fig. 27, lower figure) gave an excellent drawing of *Goniopsis cruentata* (fig. 42a), showing the characteristic colour pattern very well. The figure is entirely different, especially as far as the position of the legs is concerned, from the one in the Desportes sketch (see above), even though they show the same species (possibly even the same specimen). Wagener noted of this species: "Diese Art Krebse hält sich an hässlichen sumpfigen Orten auf und haben einen üblen Geruch, gleichwohl werden sie auch von Negros und Brasilianen gefressen".

In one of the oil paintings, supposedly painted by Eckhout, that before World War II decorated the walls of Schloss Schwedt a.d. Oder, Germany, several species of Crustacea are shown (fig. 19). As Schloss Schwedt and all its treasures were destroyed by fire in 1945, the only documentation of this painting is a black and white photograph published by Thomsen (1938: 115, fig. 65), and also reproduced by Whitehead & Boeseman (1989, 1989a: 297, pl. 64a). Whitehead & Boeseman (1989, 1989a: 102-104) discussed the animals shown on this painting (their no. "5. Indonesian (?) soldiers, also Africans, at dockside"). The figure of *Goniopsis* is situated practically on the bottom line of the painting to the right of the Xiphosuran and between it and a grouper (*Epinephelus guttatus*). It resembles Wagener's figure more than Desportes' sketch: the chelae are turned outward like in Wagener's figure, in Desportes figure they are turned inward. Also the rest of the painting, as far as can be seen from the photograph, checks well with Wagener's *Goniopsis*.

In two of the gobelins mentioned before (pp. 12-14; source 9) *Goniopsis cruentata* is shown. Firstly, in "Le cheval rayé" ("Les Anciennes Indes") (fig. 20) the species is situated in about the middle of the "crustacean triangle", above the carapace of the *Lysiosquilla* and immediately below a *Persephona mediterranea*; between the *Goniopsis* and the *Lysiosquilla* is a *Calappa* and the lower of the two small snakes; to the outside of *Goniopsis* (towards the lateral frame) is a specimen of *Plagusia*, which partly covers the *Goniopsis* with its legs. The specimen is clearly shown in the Rome (Krotoff, 1984: 32, fig. [4] and Malta gobelins (fig. 20) but it lacks in the "trimmed" gobelin of the Mobilier National (unpubl. photograph.; Whitehead & Boeseman, 1989, 1989a: 300, col. pl. 67), in which only a fraction of the "crustacean triangle" is shown. In "Le cheval rayé" of "Les Nouvelles Indes" the specimen of *Goniopsis* has a quite different position, being placed near the top of the "crustacean triangle", slightly below the *Plagusia*, which is the highest placed crab. This specimen is very clearly shown in the two gobelins of the Mobilier National (Anon., 1968: 83, fig. 78; Krotoff, 1984: 33, col. fig. [5]; and on an unpublished photograph of the twin gobelin with "Le chameau"),

the one in Prague (Jarry, 1959: 64, fig. [7]), as well as in the cartoon published by Joppien (1979: 360, fig. 164).

Secondly, on the gobelin "Le chasseur indien", both in the series "Les Anciennes Indes" (figs. 22, 23; also in Schaeffer, 1968: 13, fig. (13); Boeseman, 1979: 174, fig. 211; Krotoff, 1984: 39, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 303, col. pl. 70) and "Les Nouvelles Indes" (fig. 24; also in Jarry, 1959: 62, fig. [1]; Krotoff, 1984: 39, col. fig. [11]) *Goniopsis* is shown, be it that it is quite hidden and obscured by other Crustacea; it is best recognized by the very pale chelae on the otherwise dark chelipeds. The specimen is situated at the side of the large *Lysiosquilla* that is turned away from the hunter, and at the level of the third to fifth abdominal somites of the stomatopod; the crab is even partly covered by the stomatopod. The legs of one side of the specimen of *Persephona mediterranea*, shown on the same gobelin, lie over the *Goniopsis* specimen, while one claw of the latter is partly obscured by legs of *Calappa* (in "Les Anciennes Indes" series; in "Les Nouvelles Indes"series the *Calappa* is replaced by a lobster, which leaves *Goniopsis* free). The shape and the colour pattern of this *Goniopsis* strongly resemble those shown in the Desportes sketch.

Latreille (1825: 148) was unacquainted with *Aratus pisonii*, a species that was to be established 12 years later. Therefore it is not surprising that he identified "Aratu, Aratu pinima Marcgr. Bras. pag. 185" with *Goniopsis cruentata*. It is interesting to see that Latreille here did not refer to Marcgraf's figure. Possibly he thought the figure poor or doubtful and the description of more importance. H. Milne Edwards (1837: 76, pl. 19 figs. 4, 5) recognized Marcgraf's figure of Aratu as that of a new species that he was describing, and which he gave the name *Sesarma pisonii*. It is clear that in his opinion the figure was correct and Marcgraf's description so poor that it could be ignored. H. Milne Edwards was followed by later authors until Lemos de Castro (1962) showed the true situation.

## **Aratus pisonii** (H. Milne Edwards, 1837)
(fig. 42b)

Present in sources nos. 1, 2.

References: (b) published: Aratu & Aratu pinima Marcgraf, 1648: 185, fig. (not the description); Carara Pinima Marcgraf, 1648: 187; Aratu et Aratu Pinima Jonstonus, 1650: pl. 9 fig. 11 (not the description); Aratu et Aratu Pinima Jonstonus, 1657: pl. 9 fig. 11 (not the description); Aratú Piso, 1658: 299 (p.p.), fig. (not the other text); Aratu et Aratu Pinima Jonston, 1660: pl. 9 fig. 11 (not the description); Aratu et Aratu Pinima Jonstonus, 1665: pl. 9 fig. 11 (not the description); Aratu Sachs, 1665: pl. 5 fig. (4); Carara pinima Sachs, 1665: 116; Aratu et Aratu Pinima Ruysch, 1718: pl. 9 fig. 11 (not the description); Aratu et Aratu Pinima Jonstonus, 1767: pl. 9 fig. 11 (not the description); Aratu & aratu pinima Herbst, 1783: 118 (only references to the figures); *Sesarma Pisonii* H. Milne Edwards, 1837: 76, pl. 19 fig. 4, 5; *Aratus Pisoni* H. Milne Edwards, 1853: 187; *Aratus pisoni* Moreira, 1901: 105; *Aratus pisonii* Rathbun, 1918: 323, pl. 96; Aratu e Aratu pinima Marcgraf, 1942: 185, fig. (not the description); Carara Pinima Marcgraf, 1942: 187; *Aratus pisoni* Sawaya, 1942: lxiii (notes 467 and 476); Aratú (p.p.?) Piso, 1957: 623; *Aratus pisonii* Lemos de Castro, 1962: 41 (notes 467 and 476), pl. 4 figs. 28, 29.

Marcgraf (1648: 185) and Piso (1658: 300) published the same figure of this species (fig. 42b). In none of the other sources consulted an illustration of this crab was found. The origin of the (very good) figure therefore is not known; it even may have been added later by J. de Laet, the editor of Marcgraf's text. This might explain why (1) the figure does not appear in Piso's 1648 contribution dealing with Aratu, but is found in his 1658 edition, (2) the figure has been incorrectly placed in Marcgraf's text; it is namely found near the text of "Aratu, Aratu pinima" (= *Goniopsis cruentata*) instead of near that of "Carara pinima" (= *Aratus pisonii*). The confusion resulting from the incorrect placement of this figure has already been discussed under the previous species, *Goniopsis cruentata* (p. 61). So the generic name *Aratus* for the present genus is derived from the vernacular name Aratu used by Marcgraf to indicate *Goniopsis cruentata*. It was Lemos de Castro (1962) who first discovered the discrepancy between the description and figure of Aratu and who explained that although the figure clearly shows *Aratus pisonii*, the description must have been based on *Goniopsis cruentata*. The new data that have now become available show the complete correctness of his views.

*Aratus pisonii* is a characteristic species of the mangroves and is very frequently seen on the branches and roots of the mangroves out of the water, hiding behind these branches when danger approaches. The elongate triangular carapace, which narrows posteriorly, the dark colour of the upper surface and the small red chelipeds, which show small bundles of short black hairs, make the species very easily recognizable. In the coloured edition of Marcgraf's (1648) work the species is shown as a brown crab with all the legs bright red, and also a red colour on the tips of the frontal lobes.

*Aratus pisonii* inhabits both the Atlantic coast (from Florida (U.S.A.) and the Bahama Islands to São Paulo, Brazil) and the Pacific coast of America (from Mexico to Peru and perhaps Chile).

### **Sesarma angustipes** Dana, 1852
(fig. 42c)

Present in source no. 1.

References: (b) published: Carara Una Marcgraf, 1648: 184, fig.; Carara Una Jonstonus, 1650: 33, pl. 9 fig. 5; Carara Una Jonstonus, 1657: 25, pl. 9 fig. 5; Karara Una Jonston, 1660: 25, pl. 9 fig. 5 (Carara Una); Carara Una Jonstonus, 1665: 25, pl. 9 fig. 5; Carara una Sachs, 1665: 117; Carara Una Ruysch, 1718: 25, pl. 9 fig. 5; Carara Una Jonstonus, 1767: 33, pl. 9 fig. 5; Carara una Herbst, 1783: 118; Carara Una Marcgraf, 1942: 184, fig.; Carará una Sawaya, 1942: lxii (note 462); *Sesarma angustipes* Lemos de Castro, 1962: 39, pl. 2 figs. 12, 13.

The species described and figured by Marcgraf (1648) (fig. 42c) as Carara Una, is not discussed or figured in any of the other sources (nos. 2-9, on pp.7-14) consulted.

Most later authors ignored the species. Jonstonus (1650: 33, pl. 9 fig. 5; and many later editions) copied both Marcgraf's description and figure, but added nothing new. Herbst (1783: 118) cited Carara una as from Jonstonus, listed the species as pos-

sibly belonging to his section D "Krabben mit plattem fast viereckigtem Schilde", but did not further discuss it. Sawaya (1942: lxii) could not identify Marcgraf's species, other than that it might be a female specimen of *Uca*. Lemos de Castro (1962: 39) recognized Marcgraf's species as a *Sesarma* and thought it most likely that it belongs to *Sesarma angustipes* Dana, as Marcgraf's account came closer to that species than to the three other species of the subgenus *Holometopus* reported from Brazil: *S. rectum* Randall, *S. miersi* Rathbun and *S. ricordi* H. Milne Edwards. Abele (1972: 167-169), who studied the status of the various species of the complex that includes *S. angustipes*, *S. ricordi* and *S. miersi*, came to the conclusion that *S. angustipes* "is the only species of the group which is known to occur in Brazil"; Brazilian records of the other two species are evidently based on misidentified specimens of *S. angustipes*. Therefore Lemos de Castro's identification seems to be fully justified.

In the coloured edition of Marcgraf's (1648) book the figure of Carara Una shows a uniformly brownish crab.

*Sesarma angustipes* is a littoral species, and is known from Trinidad and from the Brazilian coast between the states of Paraiba and Santa Catarina.

**Plagusia depressa** (Fabricius, 1775)
(figs. 2, 22-24)

Present in sources 1, 4, 5, 9A, C, E.

References: (a) unpublished: Aratu peba Leningrad drawings, (A): 20, fig.; Aratu peba Handbook, 1: 366, fig.; Aratu peba Theatrum, 1: 349 (name only, no figure);

(b) published: Aratu Peba Marcgraf, 1648: 183; Aratu Peba Marcgraf, 1942: 183; *Ovalipes ocellatus guadulpensis* Sawaya, 1942: lxii (note 457); - Jarry, 1959: 62, 64, 66, figs. [1, 7, 14]; - Van Gelder, 1960: 14, fig. 9; *Ovalipes punctatus* Lemos de Castro, 1962: 38; - Anon., 1968: 79, 83, fig. 78; - Schaeffer, 1968b: 13, fig. [13]; - Jarry, 1976: 67, fig. 5; - Boeseman, 1979: 178, figs. 211, 220; - Joppien, 1979: 360, fig. 164; - Krotoff, 1984: 3, 32, 33, 38, 39, col. figs. [1, 4, 5, 10, 11]; *Plagusia depressa* Whitehead & Boeseman, 1989, 1989a: 128, 146 ("e. Not identified"; "e Não identificado"), 227 (not in 1989a), 228, 303, 310, col. pls. 70, 77b.

The Leningrad drawing is a very faint pencil-sketch which gives only few details, but the general outline of the animal is remarkably like that of *Plagusia*, while there are also indications of the peculiar characteristic front of *Plagusia*. The inscription with the figure says "366. Aratu peba, lebensgross u. etlich grosser" (= 366 (a reference to the page of Handbook 1, on which the animal is figured), Aratu peba, natural size, many specimens even larger).

My conviction that "Aratu peba" is *Plagusia depressa* was confirmed, when I found that a fully worked out figure of the present sketch is present in the Desportes sketch (fig. 2; source 9E, see above, p. 14). This sketch has also been reproduced by Jarry (1959: 66, fig. [14]; 1976: 67, fig. 5), Van Gelder (1960: 14, fig. 9), Boeseman (1979: 178, fig. 220), Krotoff (1984: 3, col. fig. [1] and Whitehead & Boeseman (1989, 1989a: 310, col. pl. 77b); *Plagusia* is in the center of the sketch in the left vertical row of crabs (third from the top). The shape of the carapace, the squamiform structure of its dorsum, the peculiarly incised front, the small chelipeds, etc., are quite characteristic.

The colour shown in this painting of *Plagusia* exactly matches that described by Marcgraf (1648) for Aratu peba. The carapace is of a variegated greenish grey with reddish, whitish and bluish tinges; behind the front is a red triangle that is directed posteriorly, the apex reaching about to the center of the carapace. At either side of the triangle there is a roundish red spot. Distinct white spots are visible on the lateral and posterior parts of the carapace. Marcgraf's description of the carapace says: "ex rubro, brunno, viridi, caeruleo, albo mire mixto colorata & punctulata, in cujus medio macula rubra, instar pyramidis fere & ad quodlibet latus globus ruber depictus". The legs are pale brown with darker brown lines ("crura & brachia flavescunt ex albo, multis striis brunnis variegata"). The eyes are shown black (not "caerulescunt") and the anterior margin of the front is yellowish. The fact that the colour of *Plagusia* is variable and that the above pattern is not characteristic for the species, makes it very likely that if the Desportes sketch was not made in Brazil after the actual living specimens described by Marcgraf, it must have been copied from such a painting. Dr. M. Boeseman informed me that the figure on p. 366 of Handbook I is extremely similar to that of the Desportes sketch, and clearly is the original figure.

Most authors did not try to identify Marcgraf's (1648) "Aratu Peba". The reason for this probably is that no figure was provided by Marcgraf, and that his description is such that it fits many species, the morphological characters given being very general, while the colour of the species, to which Marcgraf paid much attention, is very variable. Only with the help of the present Leningrad drawing and the Desportes sketch it proved possible to definitely identify "Aratu Peba". So far only Sawaya (1942) and Lemos de Castro (1962) endeavoured to guess at the identity of "Aratu peba". Both arrived at the incorrect conclusion that it possibly belongs to the genus *Ovalipes*, probably because Marcgraf described the body as circular ("corpore rotundo & figura pomi"). Sawaya doubtfully assigned the species to *Ovalipes ocellatus guadulpensis* (Saussure) [= *Ovalipes floridanus* Hay & Shore]. Lemos de Castro thought it more likely that the species is *Ovalipes punctatus* (De Haan). The present evidence shows that the species is no swimming crab but a grapsid and that the name "Aratu" is correctly used here by Marcgraf; Lemos de Castro (1962: 40), namely, stated "A designaça~o vulgar "aratu" é hoje empregada indiferentemente para várias espécies da família *Grapsidae*".

The figure of *Plagusia depressa* discussed above is shown also on some of the gobelins made after paintings of Brazilian animals; these gobelins are discussed by Jarry (1959, 1976) and are already referred to in the introduction of this paper (pp. 12-14). Among the crabs shown on the gobelin "Le cheval rayé" of the series "Les Anciennes Indes" (fig. 20) I could not find any that resembles *Plagusia*, but on the gobelin with the same name in the series "Les Nouvelles Indes" (Jarry, 1959: 64, fig. [7]; Anon., 1968: 79, 83, fig. 78; Krotoff, 1984: 33, col. fig. [5]) the upper of the crabs shown in the "crustacean triangle" behind the zebra clearly is *Plagusia*, having exactly the same general shape, posture, and colour (in Krotoff's figure) as the specimen shown in the Desportes sketch. In Desportes' cartoon for "Le cheval rayé" as published by Joppien (1979: 360, fig. 164) the specimen can be discerned with difficulty in the rather darkly printed figure. In the gobelin "Le chasseur indien", both in the one of the series "Les Anciennes Indes" (figs. 22, 23; also in Schaeffer, 1968b: 13, fig. [13]; Boeseman, 1979:

174, fig. 211; Krotoff, 1984: 38, col. fig. [10]; Whitehead & Boeseman, 1989, 1989a: 303, pl. 70) and in that of "Les Nouvelles Indes" (fig. 24; also in Jarry, 1959: 62, fig. [1]; Krotoff, 1984: 39, col. fig. [11]), *Plagusia* can be seen among the Crustacea in front of the hunter; it is found next to *Lysiosquilla scabricauda* at the side turned towards the hunter. Only the carapace and the legs of one side of the *Plagusia* are visible, the legs of the other side being hidden under the *Lysiosquilla*. Here too, there is no difficulty in recognizing the figure as similar in shape and colour to that of the Desportes sketch, even the red triangle on the carapace is present.

*Plagusia depressa* (Fabricius) is a marine species known from both sides of the Atlantic Ocean. On the American side its range extends from Bermuda and South Carolina (U.S.A.) to Brazil; in the eastern Atlantic it is found from Morocco to Angola.

## Ocypodidae Rafinesque, 1815
## **Ocypode quadrata** (Fabricius, 1787)
(fig. 42d)

Present in sources no. 1, 2

References: (b) published: Aguaru Uca Marcgraf, 1648: 184; Cunuru Marcgraf, 1648: 185, figure only (not the description); Cunuru Jonstonus, 1650: pl. 9 fig. 6 (not the description on p. 33); Cunuru Jonstonus, 1657: pl. 9 fig. 6 (not the description on p. 26); Cunurú Piso, 1658: 76, figure only (not the description); Kunuru Jonston, 1660: pl. 9 fig. 6 (Cunuru) (not the description on p. 25); Cunuru Jonstonus, 1665: pl. 9 fig. 6 (not the description on p. 26); Aguara uca Sachs, 1665: 118; Cunuru Ruysch, 1718: pl. 9 fig. 6 (not the description on p. 26); Cunuru Jonstonus, 1767: pl. 9 fig. 6 (not the description on p. 33); Aguaru Uca Marcgraf, 1942: 184; Cunuru Marcgraf, 1942: 185, figure only (not the description); *Ocypode albicans* ? Sawaya, 1942: lxii (notes 462 and 465); Cunurú Piso, 1957: 185, figure only (not the description); *Ocypode quadrata* Lemos de Castro, 1962: 39 (note 462), 40 (note 465), pl. 2 figs. 16, 17.

Although the present species has been described by Marcgraf (1648) and figured both by Marcgraf (1648) and Piso (1658) (fig. 42d), no painting of it has been noticed by me in either the Leningrad or the Cracow collections, nor in any of the other unpublished sources.

Under the name Aguaru Uca Marcgraf gave a description of a species of crab, which cannot be anything else but the present species, as confirmed by Sawaya (1942) and Lemos de Castro (1962). Shape, colour and habitat as described by Marcgraf are typically that of *Ocypode*. The description is not illustrated, but a figure of *Ocypode quadrata* is found on p. 185 of Marcgraf's book near the texts of Uca Guacu and Cunuru. Neither one nor the other is an *Ocypode*, so that it seems most likely that the figure has been misplaced by the editor, as this also was the case with the figure of *Aratus pisonii* (see p. 61, 62 above). Uca Guacu might be *Carpilius corallinus* (see p. 64, 65), and Cunuru most probably is the female of *Ucides cordatus* (p. 73). Under the name Cunuru, Piso (1658) copied the figure of Marcgraf's.

Linnaeus and most post-Linnean authors ignored both the description and the figure of *Ocypode* in Marcgraf's book. H. Milne Edwards (1837: 46) referred to "Uca

guacu ? Marcgrave, op. cit. p. 185" under *Ocypode rhombea*, a species which at present is usually considered identical with *O. quadrata*. H. Milne Edwards probably based his identification on the fact that Marcgraf's figure of *Ocypode quadrata* was placed by him near the description of "Uca guacu", and evidently was thought by Milne Edwards to be meant as an illustration of that species. Sawaya (1942: lxii, note 462) discussed Marcgraf's Aguará ucá rather extensively and came to the conclusion that it in all probability is *Ocypode albicans* (= *O. quadrata*). The same author (Sawaya, 1942: lxii, note 465) also brought Marcgraf's Uca guacú and Cunuru to *Ocypode*, evidently basing himself on the figure that was placed between Marcgraf's description of these two species. As shown above Marcgraf's figure indeed shows *Ocypode quadrata*, but the two descriptions most likely refer to *Carpilius corallinus* and the female of *Ucides cordatus*, respectively. Sawaya's statement that Bosc (1830, 1: 244) refers Uca guacú to the Ocypodidae is not quite correct: Bosc there (as well as in the first edition of his work: Bosc, 1802, 1: 190) deals only with the species of "*Ocypode*" that have one chela much larger than the other (i.e., those of the genus *Uca*) and says that Marcgraf "en a quatre de figurées". In the rest of the text on *Ocypode* (s.l.) Bosc mentions Marcgraf's book at 2 occasions only, namely under *Ocypoda heterochelos* (references to Maracoani and its figure), and under *Ocypode pugilator* (reference to Ciecie Ete and its figure). It is thus clear that Bosc under *Ocypode* only refers to species of *Uca* mentioned in Marcgraf's work, not to *Ocypode*. Lemos de Castro (1962: 39, note 462 and 40, note 465) makes the situation perfectly clear, showing that Marcgraf's Aguaru Uca is *Ocypode quadrata* and that the first figure on Marcgraf's p. 185 also belongs to that species, but that the descriptions of Uca guacu and Cunuru, between which the figure is placed, pertain to other species.

It is interesting that in the coloured edition of Marcgraf's (1648) book the colour of the figure of *Ocypode quadrata* is unlike that described by Marcgraf for Aguara Uca of which he said "Testae dorsalis color cinereus & circumcirca pallide flavo umbratus: reliquum corpus, crura & brachia pallide flava: forcipes albi coloris; pili crurum pallide flavi". The coloured figure, however, shows the body green with the median part of the carapace yellow, and all the legs, including the chelipeds, dark brown; there is also some brownish colour on the sternum. This coloration resembles strongly that given in Marcgraf's book to Uca Una. The colour was evidently applied by someone who thought the figure to be that of Cunuru, and Cunuru to be the female of Uca Una (see discussion of Cunuru on p.73).

*Ocypode quadrata* is a species of sandy beaches and inhabits the Atlantic coast of America between the state of Rhode Island (U.S.A.) and that of Santa Catarina (Brazil).

**Uca maracoani** (Latreille, 1803)
(fig. 42e)

Present in sources no. 1, 2.

References: (b) published: Maracoani Marcgraf, 1648: 184, fig.; Maracoani Jonstonus, 1650: 34, pl. 9 fig. 12; Maracoani Jonstonus, 1657: 26, pl. 9 fig. 12; Maracoani Piso, 1658: 76, 77, fig.; Marakoani Jonston, 1660: 26, pl. 9 fig. 12 (Maracoani); Maracoani Jonstonus, 1665: 26, pl. 9 fig. 12; Maracoani

Sachs, 1665: 117; Maracoani Ruysch, 1718: 26, pl. 9 fig. 12; Maracoani Jonstonus, 1767: 34, pl. 9 fig. 12; *Cancer vocans* Linnaeus, 1767: 1041; Maracoani Herbst, 1783: 121; *Cancer vocans* Gmelin, 1790: 2969; *Cancer vocans* Fabricius, 1798: 340; *Ocypode heterochelos* Bosc, 1802: 197; *Ocypode maracoani* Latreille, 1803a: 45, 46; *Gonoplax maracoani* Lamarck, 1818: 254; *Gelasimus maracoani* H. Milne Edwards, 1837: 51; *Uca maracoani* Moreira, 1901: 113; *Uca maracoani* Rathbun, 1918: 378; *Uca maracoani* De Oliveira, 1939: 123; Maracoani Marcgraf, 1942: 184, fig.; *Uca maracoani* Sawaya, 1942: lxii (note 461); Maracoani Piso, 1957: 185, 186, fig.; *Uca maracoani* Lemos de Castro, 1962: 39 (note 461); *Uca* (*Uca*) *maracoani* Crane, 1975: 143, 148.

Under the name Maracoani Marcgraf published a description and figure (fig. 42e) which show without the least doubt that his material belonged to the species that at present is generally known as *Uca maracoani* (Latreille, 1803). The shape of the chelae and that of the eyes are most characteristic. In the coloured edition of Marcgraf's book, the entire body of the crab is pale brown with the base of the dactylus and an area in the distal part of the large chela of a darker shade of brown.

Marcgraf's figure and description have been copied in the various editions of Jonston[us] (1650, 1657, 1660, 1665, 1767) and in Ruysch's (1718) work. Also Sachs (1665) mentioned the species but did not figure it.

Linnaeus (1758) ignored Marcgraf's species but in 1767 (:1041) he placed Maracoani in the synonymy of *Cancer vocans*, and was followed in this by Fabricius (1798). Bosc (1802) referred the species to *Ocypode heterochelos* Lamarck, 1801. Finally Latreille (1803) recognized the species as independent and described it as new under the name *Ocypode maracoani*. Since then the specific name *maracoani* became generally accepted for the species.

It is peculiar that in none of the sources 3 to 9 incl. (see pp. 8-14) this characteristic species has been described or figured.

*Uca maracoani* lives in the littoral zone "near low-tide levels on muddy substrates close to mangroves" (Crane, 1975: 146). Its range extends along the north and east coasts of South America from Venezuela to southern Brazil (Rio de Janeiro).

## **Uca thayeri** Rathbun, 1900
(fig. 42f)

Present in sources 1 and 2.

References: (b) published: Ciecie Ete Marcgraf, 1648: 185, fig.; ? Ciecie Panema Marcgraf, 1648: 185; Ciecie Ete Jonstonus, 1650: 33; Ciecie Panema Jonstonus, 1650: pl. 9 fig. 7; Ciecie Ete Jonstonus, 1657: 26; Ciecie Panema Jonstonus, 1657: pl. 9 fig. 7; Cicie Ete Jonston, 1660: 25; Ciecie Panema Jonston, 1660: pl. 9 fig. 7; Ciecie Ete Jonstonus, 1665: 26; Ciecie Panema Jonstonus, 1665: pl. 9 fig. 7; Ciecie Ete Sachs, 1665: 119; Ciecie Panema Sachs, 1665: 119; Ciecie Ete Ruysch, 1718: 26; Ciecie Panema Ruysch, 1718: pl. 9 fig. 7; Ciecie Ete Jonstonus, 1767: 33; Ciecie Panema Jonstonus, 1767: pl. 9 fig. 7; *Gelasimus vocans* H. Milne Edwards, 1837: 54; *Uca thayeri* Rathbun, 1918: 406; *Uca* De Oliveira, 1939: 118; Ciecie Ete Marcgraf, 1942: 185; ? Ciecie Panema Marcgraf, 1942: 185; *Uca pugilator* Sawaya, 1942: lxiii (note 468); Ciécié panema Sawaya, 1942: lxiii (note 469); *Uca* spec. Lemos de Castro, 1962: 40 (note 468), pl. 3 fig. 21; *Uca* spec. Lemos de Castro, 1962: 40 (note 469); *Uca* (*Borboruca*) *t. thayeri* Crane, 1975: 112, 114.

Marcgraf (1648: 185) under the name Ciecie Ete gave a short description and a good figure (fig. 42f) of the present species. The placement of the eyes and the shape of the large chela being quite characteristic. In the coloured edition of Marcgraf's work the species is shown as of a rather uniformly light brown with darker shading. The description of Ciecie Ete is followed by that of Ciecie Panema. This latter description consists of a single line "cancer praecedenti plane similis, excepto quod forcipis tenaculum inferius brevius est superiori". As the relative length of the fingers of the large chela is not a reliable character in *Uca* and as specimens of *U. thayeri* are known in which the fixed finger is shorter than the dactylus, there is no way to distinguish Ciecie Panema from *Uca thayeri*. As no additional information on Ciecie Panema is available it is impossible to identify the species with certainty; it might just be based on specimens of *U. thayeri* with short pollices. It seems best to synonymize the two forms, be it with some doubt.

Jonstonus (1650) took Marcgraf's figure of Ciecie Ete to be that of Ciecie Panema and reproduced it as his pl. 9 fig. 7 under the latter name, even though in his text he only used the name Ciecie Ete and did not refer to Ciecie Panema. This is also true for the later editions of his work (Jonston[us], 1657, 1660, 1665, 1767, and Ruysch, 1718). Sachs (1657: 119) listed the two species but gave no details.

Ciecie Ete and Ciecie Panema of Marcgraf's were ignored by Linnaeus and most post-linnean authors. H. Milne Edwards (1837: 54), however, placed Marcgraf's Ciecie Ete (as "Ciecie, etc.") in the synonymy of *Gelasimus vocans* (= *Uca vocans* (L., 1758), an Indo-West Pacific species). It was Rathbun (1900: 134) who first recognized the present species as distinct and described it as new. Later, Rathbun (1918: 406) recognized the identity of her *Uca thayeri* with Marcgraf's Ciecie Ete. De Oliveira (1937: 188) cited both Marcgraf's species (as ciê-ciê-etê and ciê-tiê-panema) under the generic name *Uca* without assigning either to a species. Sawaya (1942: lxiii) thought "Ciécié eté" to be *Uca pugilator* (Bosc) and identified "Ciécié panema" not beyond the genus *Uca*. Lemos de Castro (1962), although referring to Rathbun's identification of Ciecie Ete with *Uca thayeri* would not commit himself beyond assigning that species and Ciecie panema to the genus *Uca*. Crane (1975) in her fundamental monograph of the genus *Uca* followed Rathbun in identifying Ciecie Ete with the present species.

*Uca thayeri* is found in "deep mud on sloping banks of mangrove-bordered estuaries and streams, often partly shaded" (Crane, 1975: 113). The range of the species extends from N. Florida (U.S.A.) to São Paulo State (Brazil).

### **Ucides cordatus** (Linnaeus, 1763)
(figs. 43a,b)

Present in sources 1, 2 and 3.

References: (b) published: Uca Una Marcgraf, 1648: 184, fig.; Cunuru Marcgraf, 1648: 185, not the figure; Cunuru Jonstonus, 1650: 33 (not pl. 9 fig. 6); Uca Una Jonstonus, 1650: 33, pl. 9 fig. 9; Cunuru Jonstonus, 1657: 26 (not pl. 9 fig. 6); Uca Una Jonstonus, 1657: 26, pl. 9 fig. 9; Uca-úna Piso, 1658: 76, fig.; Cunuru Piso, 1658: 76, not the figure; Kunuru Jonston, 1660: 25 (not pl. 9 fig. 6); Uka Una Jonston, 1660: 26, pl. 9 fig. 9 (Uca Una); Cunuru Jonstonus, 1665: 26 (not pl. 9 fig. 6); Uca Una Jonstonus, 1665: 26, pl. 9 fig. 9; Cunuru Sachs, 1665: 107; Uca una Sachs, 1665: 107, pl. 5 fig. [2];

Cunuru Ruysch, 1718: 26 (not pl. 9 fig. 6); Uca Una Ruysch, 1718: 26, pl. 9 fig. 9; Cunuru Jonstonus, 1767: 33 (not pl. 9 fig. 6); Uca Una Jonstonus, 1767: 33, pl. 9 fig. 9; *Cancer cordatus* Linnaeus, 1763: 414; *Cancer Uca* Linnaeus, 1767: 1041; *Cancer Uca* Herbst, 1783: 128, 129; *Cancer Uca* Gmelin, 1790: 2967; *Ocypode cordata* Latreille, 1803a: 37; *Uca* Latreille, 1819: 96; *Uca una* Latreille, 1828a: 685; *Uca una* H. Milne Edwards, 1837: 22; *Uca una* Stebbing, 1893: 84; *Ucides cordatus* Rathbun, 1897: 154; *Oedipleura cordata* Ortmann, 1897: 336; *Oedipleura cordata* Moreira, 1901: 111; *Ucides cordatus* Rathbun, 1918: 347; Uca una Marcgraf, 1942: 184, fig.; Cunuru Marcgraf, 1942: 185, not the figure; *Ucides cordatus* Sawaya, 1942: lxii (note 464); *Ocypode* Sawaya, 1942: lxii (note 465); *Ucides cordatus* Lemos de Castro, 1962: 40 (note 464), pl. 2 figs. 14, 15; Cunuru Lemos de Castro, 1962: 40 (note 465b); Krebs Wagener, 1964: 71, 190, 300 (Caranguejo), fig. 27 (a); *Uca cordata* Pinto, 1964: 71, 243, 244, 350, fig. 27 (a).

Marcgraf's (1648) description and figure (fig. 43a) of Uca una are sufficient to identify the species with certainty, and there has hardly ever been any doubt about the taxonomic identity of Marcgraf's animals. The wood-cut is rather crude and schematized, but shows quite well the swollen branchial regions of the carapace, the slender eyes, the long and hairy legs, etc. The characteristic spinules on the inner surface of the chelipeds are not shown in the figure, but they are mentioned in the text: "Branchium.. interius multis tuberculis acuminatis praeditum".

So few problems as there were about the identity of Marcgraf's Uca una so many were there about its correct name; the nomenclatural mess was finally straightened out about 250 years after the species was first published. The oldest available name for the species is *Cancer cordatus* Linnaeus, 1763, based on Linnaeus' description of material from Surinam. A few years later, in the 12th edition of his Systema Naturae Linnaeus (1767) introduced the name *Cancer Uca* based exclusively on Marcgraf's description and figure of Uca una.

Latreille (1819: 96) introduced the generic name *Uca* for the genus containing *Cancer uca* L., notwithstanding the fact that he knew that this name had already been established by Leach (1814) for the genus of Fiddler crabs. Later, Latreille (1828a: 685) made matters even worse by using the name *Uca una* for *Cancer uca* L., perhaps basing himself on the (non-existent) priority of Uca una of Marcgraf. The fiddler crabs were given the generic name *Gelasimus* by Latreille (1817), who also here ignored the priority of *Uca* Leach, 1814. H. Milne Edwards (1837) in his fundamental Histoire naturelle des Crustacés, adopted Latreille's names, and so great was the authority of these two French zoologists that they were followed by the majority of authors. Even a "pious priority purist" like Stebbing (1893: 84) stated that the crab "*Uca una* (Linn.)... may be mentioned as a rare instance of one that has been allowed to possess the names by which it was figured and described centuries ago". Stebbing evidently did not realize that the generic and specific name used by him as well as the author's name were incorrect. It was Mary Jane Rathbun (1897: 154) who finally and definitely straightened matters out and made clear that the generic name *Uca* belongs to the Fiddler crabs. For the genus that Latreille had called *Uca* she proposed the new name *Ucides*, and also showed that the oldest available name for its type species is not *una* but *cordatus*; the correct name of the species thus being *Ucides cordatus* (Linnaeus, 1763). Ortmann (1897: 334-336) almost simultaneously with Rathbun arrived at the same conclusion. The new name *Oedipleura* that he proposed for *Cancer cordatus* was

published within a few months after *Ucides*, of which it thereby became a junior objective synonym.

The identity of the species described by Marcgraf as "Cunuru" has been the subject of different interpretations. Several authors thought it to be *Ocypode quadrata* (Fabr.); they obviously reached this conclusion as a figure of *Ocypode* was placed next to the text of Cunuru. However, it has become clear now that the figure was misplaced and should have been given on the previous page to illustrate Marcgraf's "Aguara Uca", which is *Ocypode quadrata*. A study of the description of "Cunuru" shows that Marcgraf himself thought this to be the female of his "Uca Una"; he stated that Cunuru is smaller than Uca una, with the chelae smaller and less unequal, and with the legs less hairy or hardly hairy at all. As these indeed are characters that distinguish female *Ucides* from the males, and as there are no indications to the contrary, it seems best to accept Marcgraf's statement and consider Uca una and Cunuru as the male and female of a single species, *Ucides cordatus* (L.). Sawaya (1942: lxii), basing himself on the misplaced figure, assigned Cunuru to the genus *Ocypode*. Lemos de Castro (1962), however, showed that the description by Marcgraf supported his assertion that Cunuru is the female of Uca una.

The coloured edition of Marcgraf's (1648) book shows Uca una as a crab with a pale olivaceous green body, brown legs and dark brownish orbits.

It is interesting to see that this large and conspicuous crab, like all the other Ocypodidae, is not found among the paintings by Eckhout so far as these are known to us. Apart from the figure published by Marcgraf and Piso, the only known figure of the species made during Johan Maurits' time in Brazil is that in Wagener's Thierbuch. Wagener's illustration, no. 27 upper figure (here fig. 43b), is not finished because as Wagener explained himself: "The crab of which I had started to make the present drawing, smelled so badly that I had to throw it away, and leave my drawing unfinished". Still the figure is such that the specimen easily can be recognized as *Ucides cordatus*, even the spinules on the chelae are well indicated. It pleads for Wagener's artistic talents that even an unfinished sketch like this is so accurate and life-like. Pinto (1964: 244, 350) identified it correctly as "*Uca cordata*", using the wrong generic name.

*Ucides cordatus* inhabits muddy coastal areas, making its burrows in the mud. Its range extends from southern Florida (U.S.A.) to Rio de Janeiro (Brazil) and includes the Caribbean area.

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**Figures 1-57**

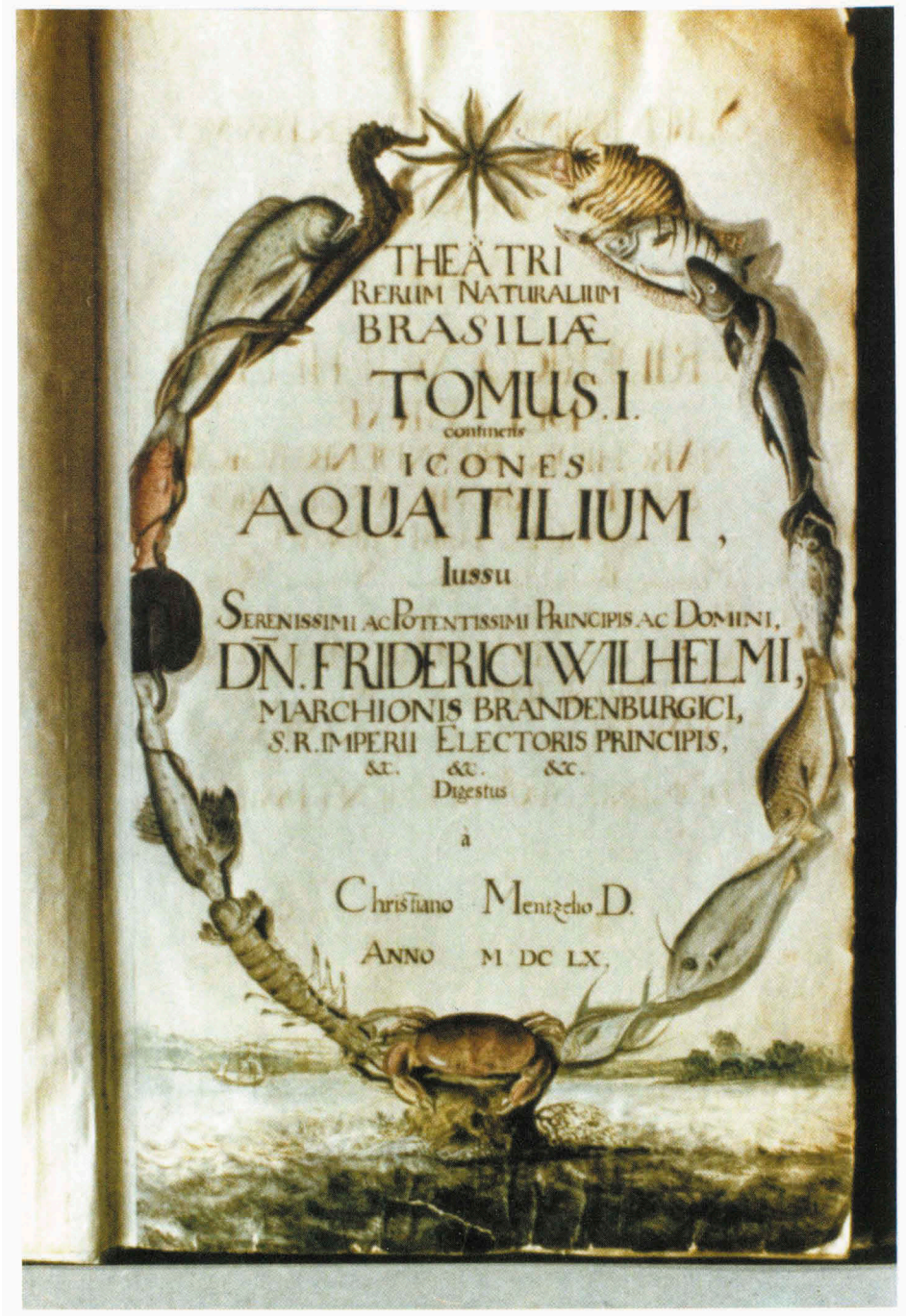


Fig. 1. Title page of Theatri Rerum Naturalium Brasiliae. Tomus I.

Fig. 2. F. Desportes' cartoon sketch of animals for the gobelins of "Les Nouvelles Indes", in Manufacture Nationale de Sèvres, France. (Courtesy Mme. T. Préaud).

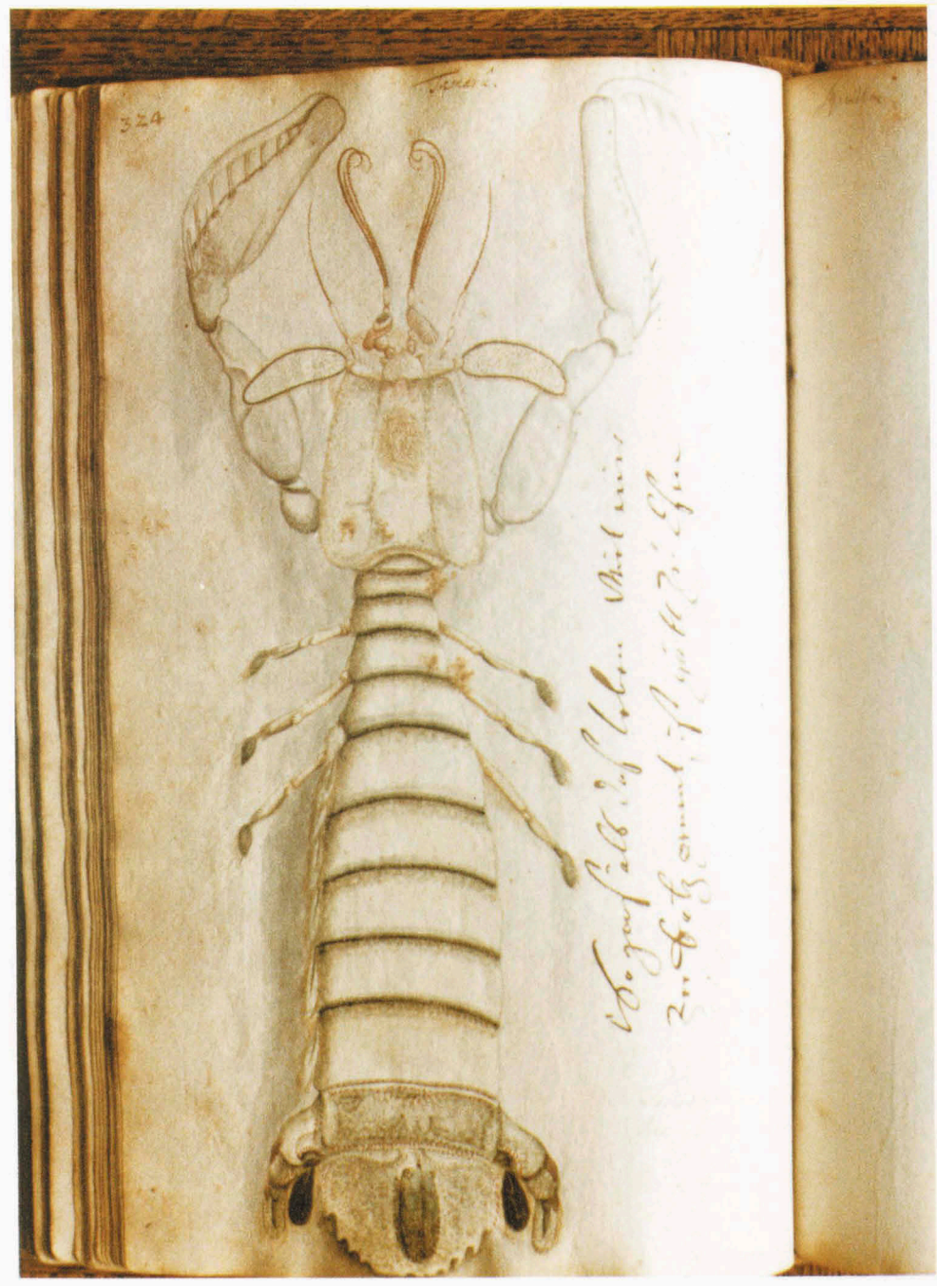


Fig. 3. *Lysiosquilla scabricauda* (Lamarck). Tamarû, in Handbook 1: 324.


Fig. 4. *Lysiosquilla scabricauda* (Lamarck). Tamaru, in Theatrum, 1: 311.


Fig. 5. *Squilla* spec. Tamalu asu in Wagener's "Thierbuch". After Whitehead & Boeseman, 1989: 252, col. pl. 21.


Fig. 6. Page 152 of ser. B of Leningrad drawings, showing Guaricurú (above; = *Atya scabra* (Leach)), and Potiatinga (below; = *Panulirus echinatus* S.I. Smith).

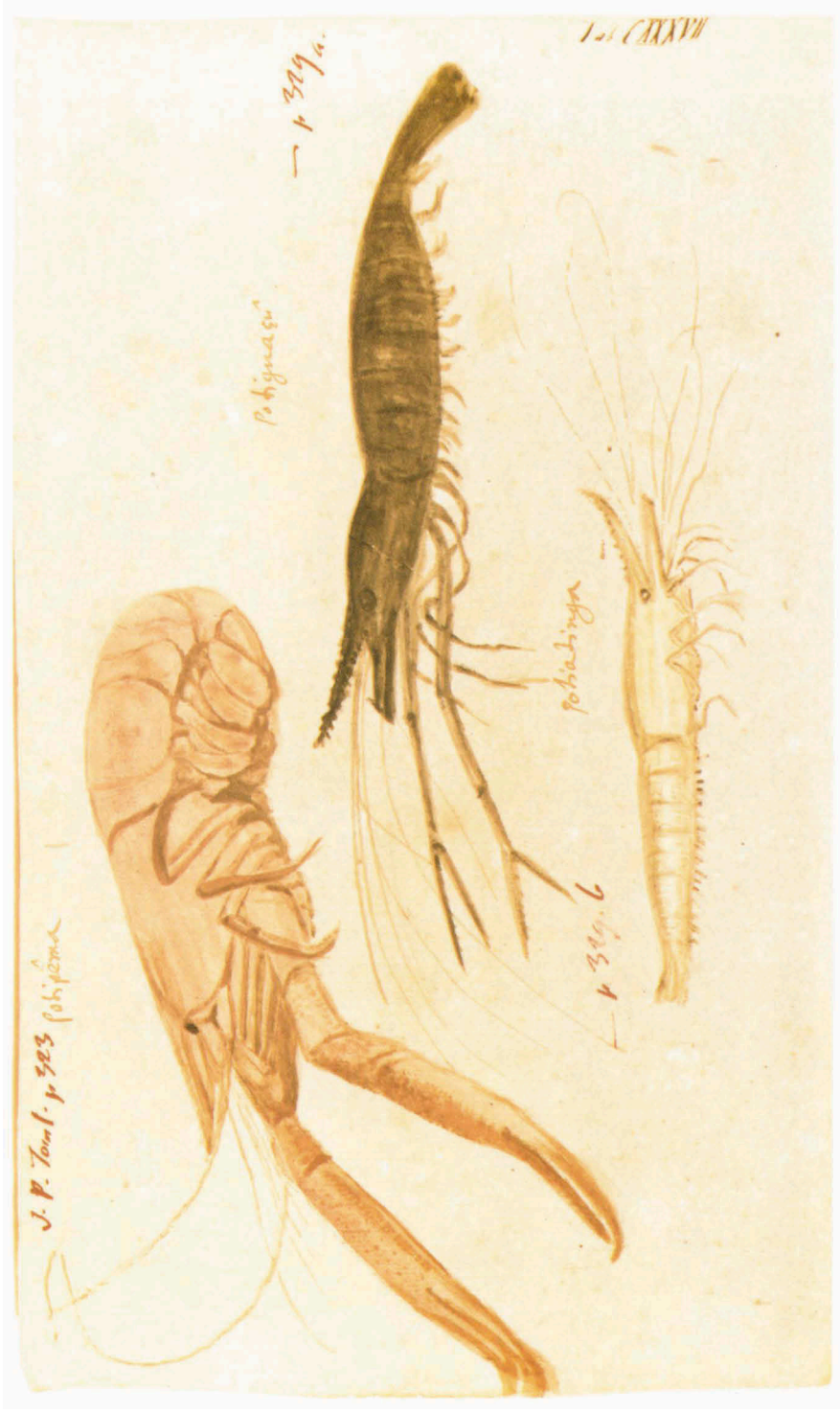

Fig. 7. Page 145 of ser. B of Leningrad drawings, showing Potipêma (above, left; = *Macrobrachium carcinus* (L.)), Potiguaçû (center, right; = *Macrobrachium acanthurus* (Wiegmann)), and Potiatinga (below, center; = *Palaemon pandaliformis* (Stimpson)).

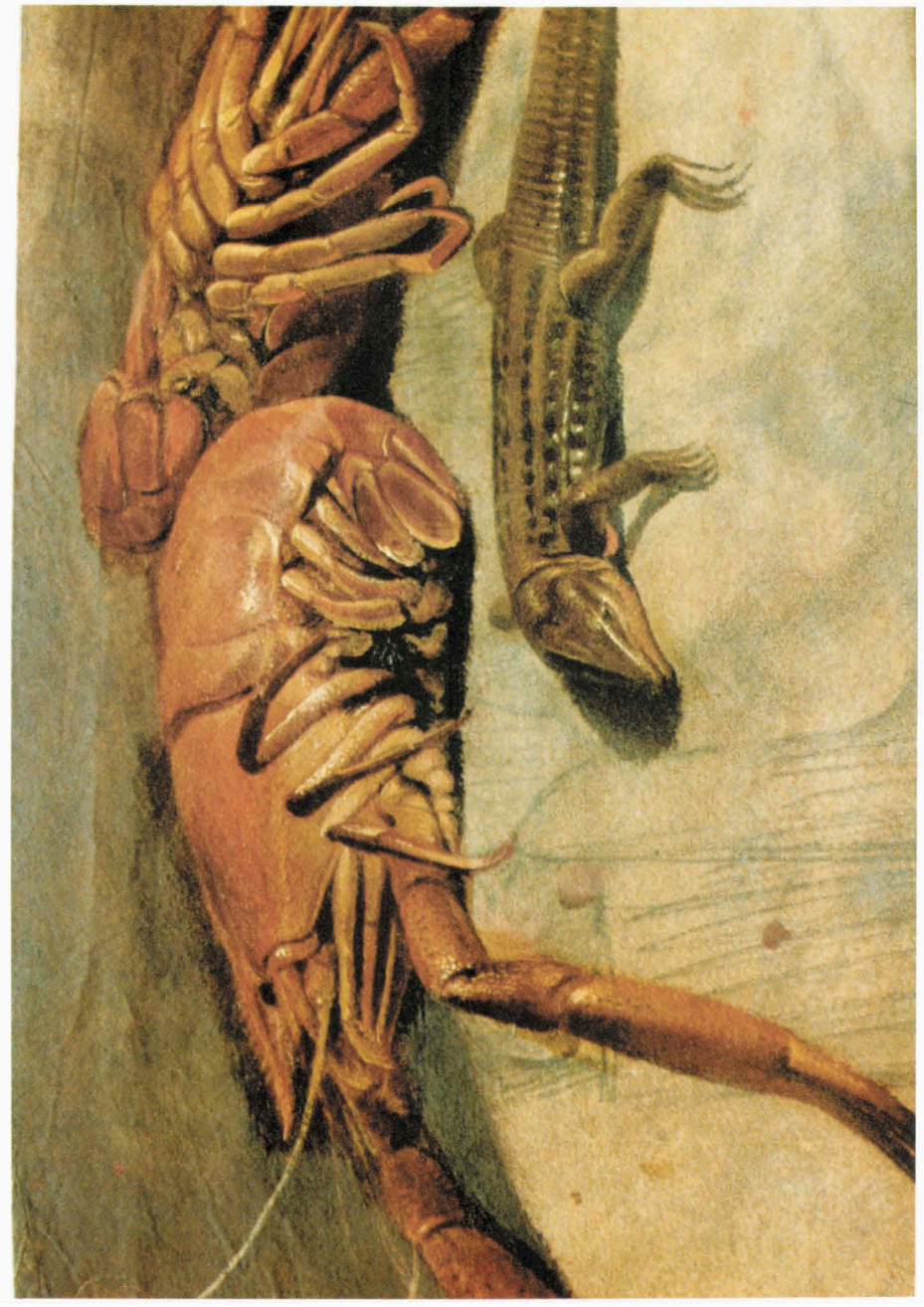

Fig. 8. *Macrobrachium carcinus* (L.). Two specimens (and a lizard) figured in Theatrum, 1: 323, under the name Potipema.

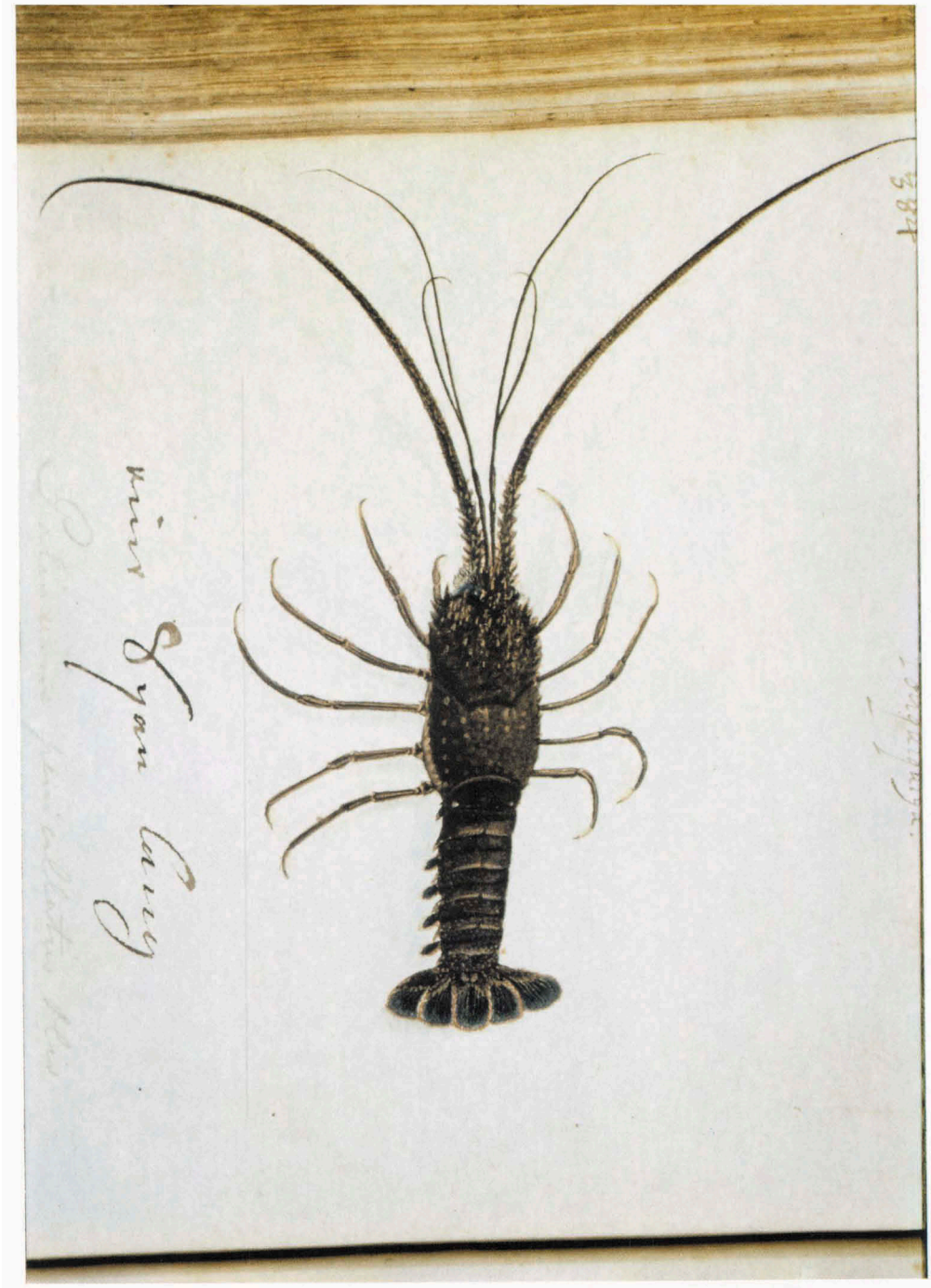

Fig. 9. *Panulirus echinatus* S.I. Smith. Potiquiquiya, in Handbook, 1: 384.

Fig. 10. *Panulirus echinatus* S.I. Smith. Potiquiquiya, in Theatrum, 1: 319.


Fig. 11. *Parribacus antarticus* (Lund). Ciriayeima and Potiquiquyixe, in Leningrad drawings, (B): 146.

Fig. 12. *Mithrax hispidus* (Herbst). Guaiâ, in Handbook, 1: 338.

Fig. 13. Page 149 of series B of Leningrad drawings showing Ciriobi (left; = *Callinectes sapidus* Rathbun), and Guajume (right; = *Carpilius corallinus* (Herbst)).


Fig. 14. *Carpilius corallinus* (Herbst). Guajume, in Theatrum 1: 357.

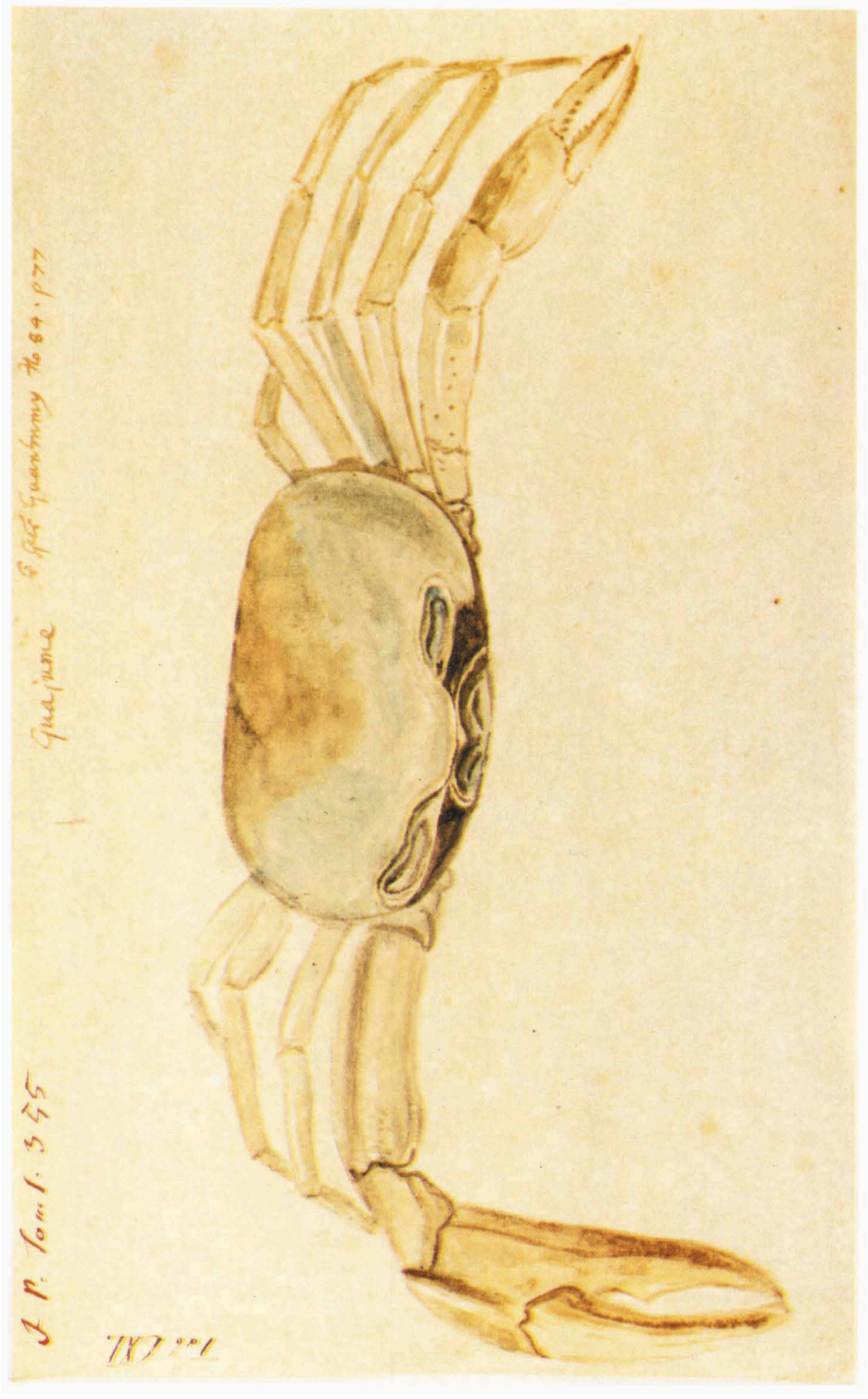


Fig. 15. *Cardisoma guanhumi* Latreille. Guajume, in Leningrad drawings, (B): 148.


Fig. 16. *Cardisoma guanhumi* Latreille. Cangrejo of Wagener. After Whitehead & Boeseman, 1989: 254, pl. 23a.

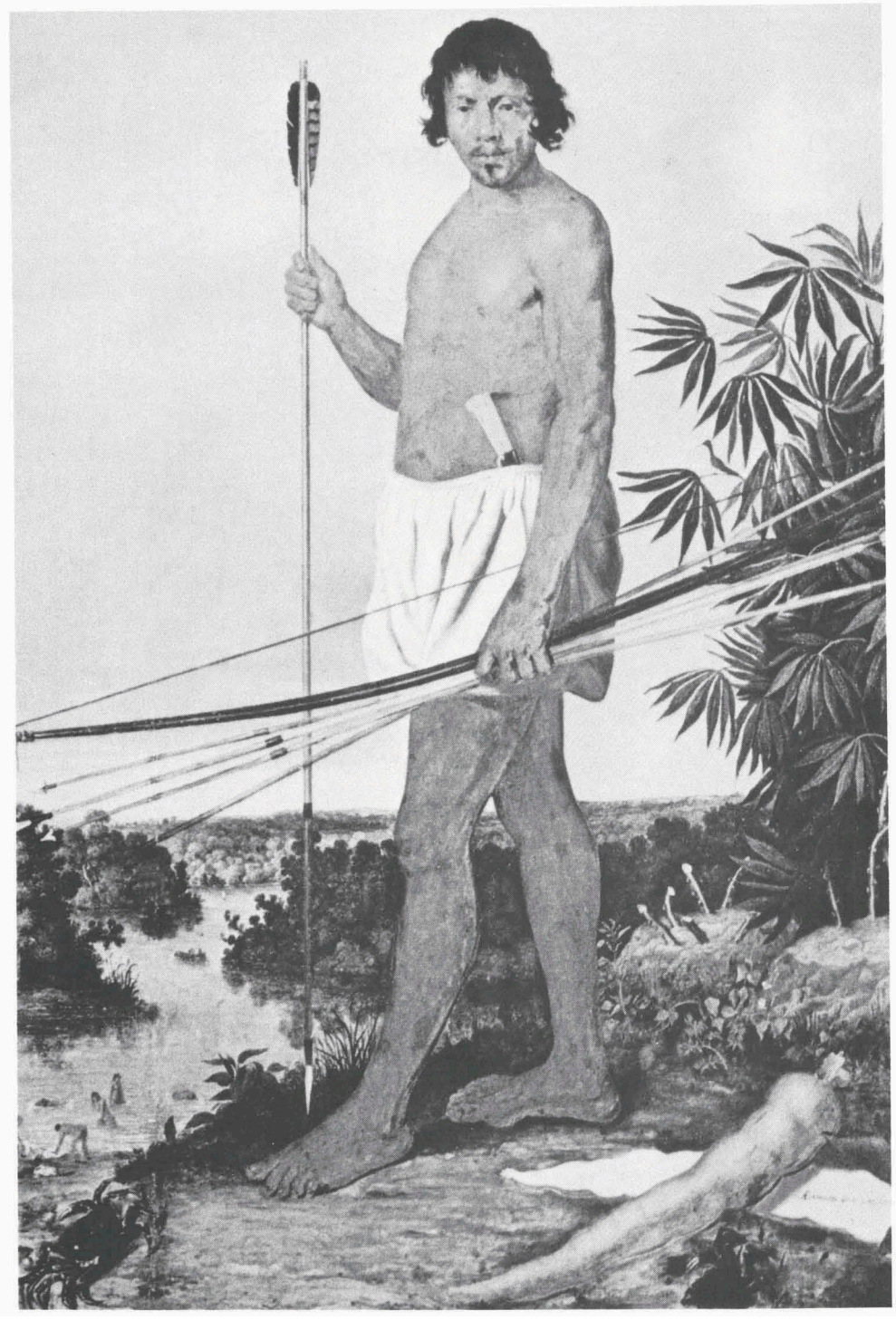

Fig. 17. Portrait of a Tupinamba man by Albert Eckhout. After Valladares & de Mello Filho, 1981: 67.

Fig. 18. Detail of the previous figure showing the crab in the lower left hand corner of the painting. After Valladares & de Mello Filho, 1901: 66.

Fig. 19. Schwedt painting (by Albert Eckhout) of "Indonesian (?) soldiers, also Africans, at dockside". After Thomsen 1938: 115, fig. 65.

Fig. 20. Gobelin "Le cheval rayé" of the series "Les Anciennes Indes" in the Grandmaster's Palace in Malta.
(Courtesy Mr Francis S. Mallia).

Fig. 21. Gobelin "Le combat des animaux" of the series "Les Anciennes Indes", in Mobilier National, Paris. (Courtesy M. Jean Coural).

Fig. 22. Gobelin "Le chasseur indien" of the series "Les Anciennes Indes", in Mobilier National, Paris. (Courtesy M. Jean Coural).

Fig. 23. Detail from the gobelin "Le chasseur indien" of the series "Les Anciennes Indes" in Mobilier National, Paris (gobelin different from that of fig. 7). (Courtesy M. Jean Coural).

Fig. 24. Gobelin "Le chasseur indien" of the series "Les Nouvelles Indes", in Mobilier National, Paris. (Courtesy M. Jean Coural).

Fig. 25. Gobelin "Le roi porté" of the series "Les Anciennes Indes", in Mobilier National, Paris. (Courtesy M. Jean Coural).


Fig. 26. Detail of the gobelin "La négresse portée" of the series "Les Nouvelles Indes", in Mobilier National, Paris. (Courtesy M. Jean Coural).


Fig. 27. Page 17 of series A of the Leningrad drawings, showing Reriapiya (above; = *Lepas hillii* (Leach) and *Conchoderma virgatum* (Spengler)), and in pencil, Guanhumi (below; = *Cardisoma guanhumi* Latreille).

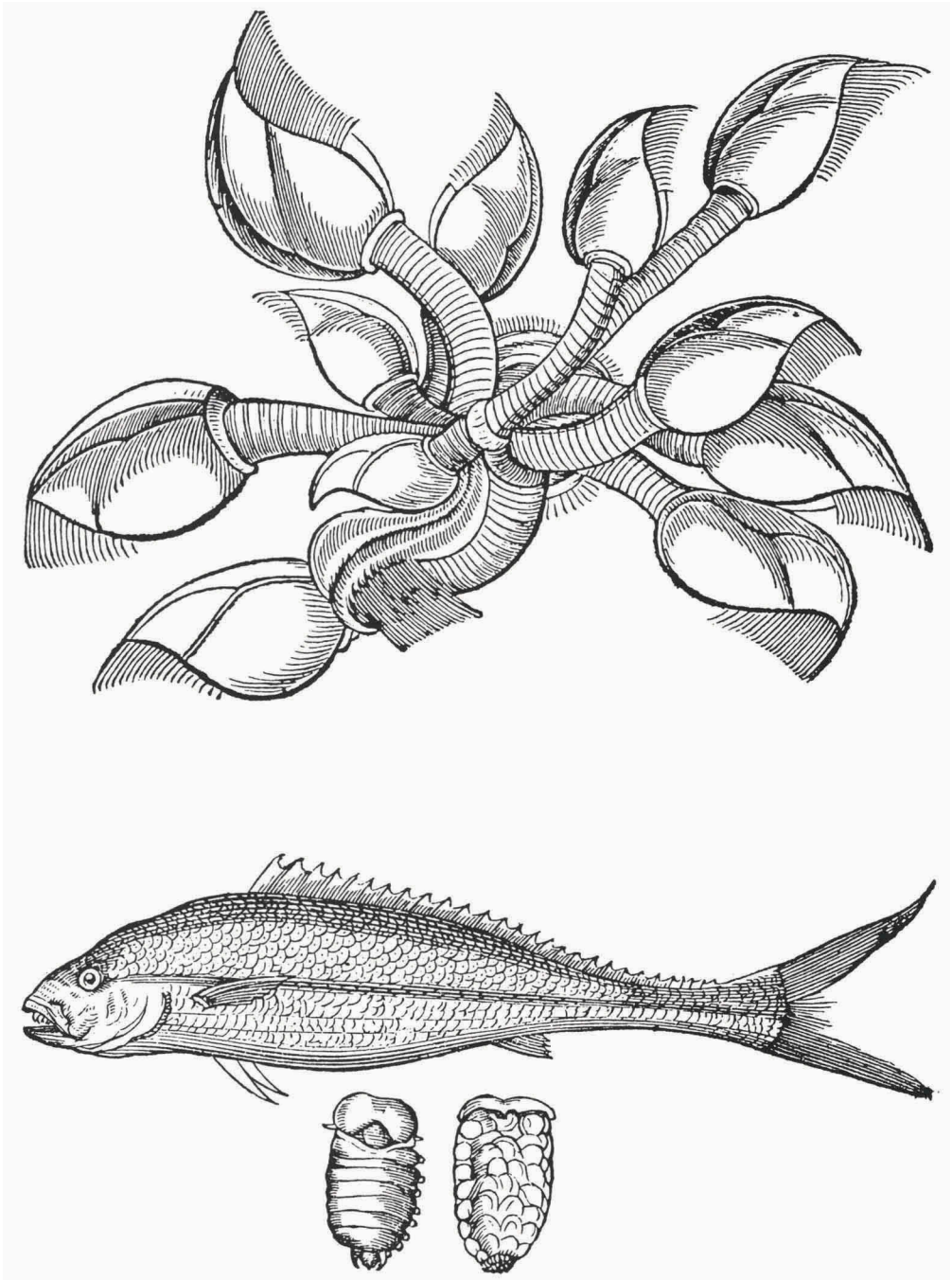

Fig. 28a (above). Reriapiya (= *Lepas hillii* (Leach) and *Conchoderma virgatum* (Spengler)). After Marcgraf, 1648: 188. Fig. 28b. *Cymothoa excisa* Perty. After Marcgraf, 1648: 155.


Fig. 29. *Megabalanus tintinnabulum* (L.)? Reriapiya, in Leningrad drawings, (B): 43.

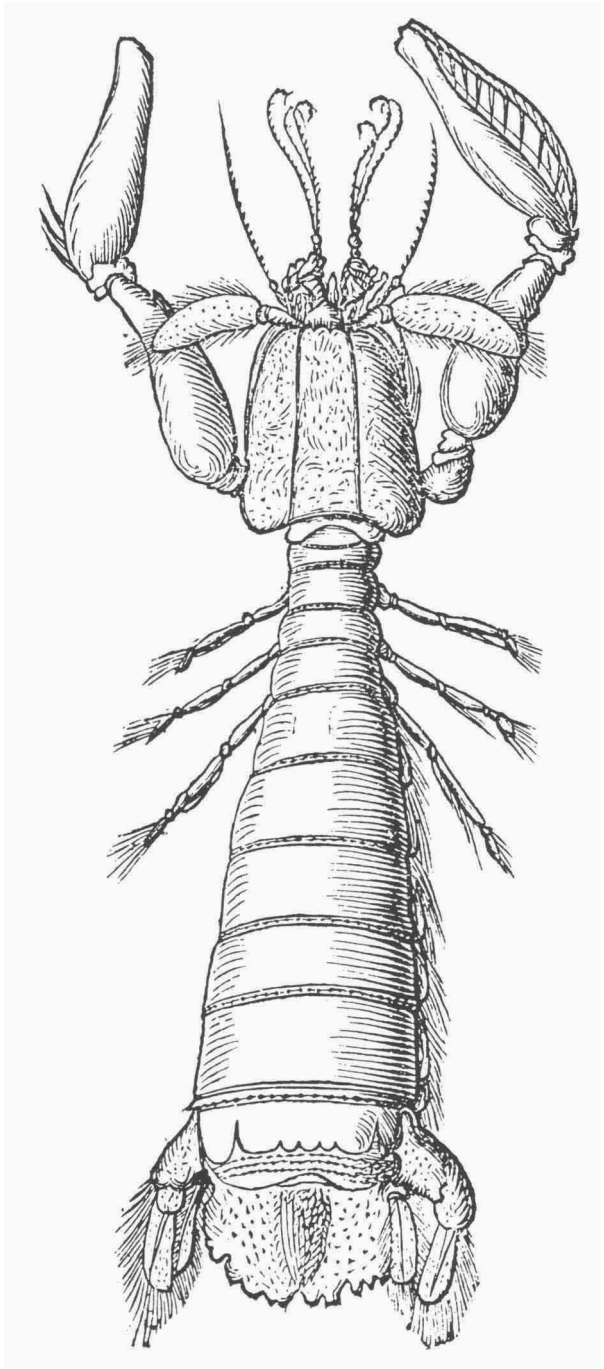

Fig. 30. *Lysiosquilla scabricauda* (Lamarck). Tamaru Guacu. After Marcgraf, 1648: 187.

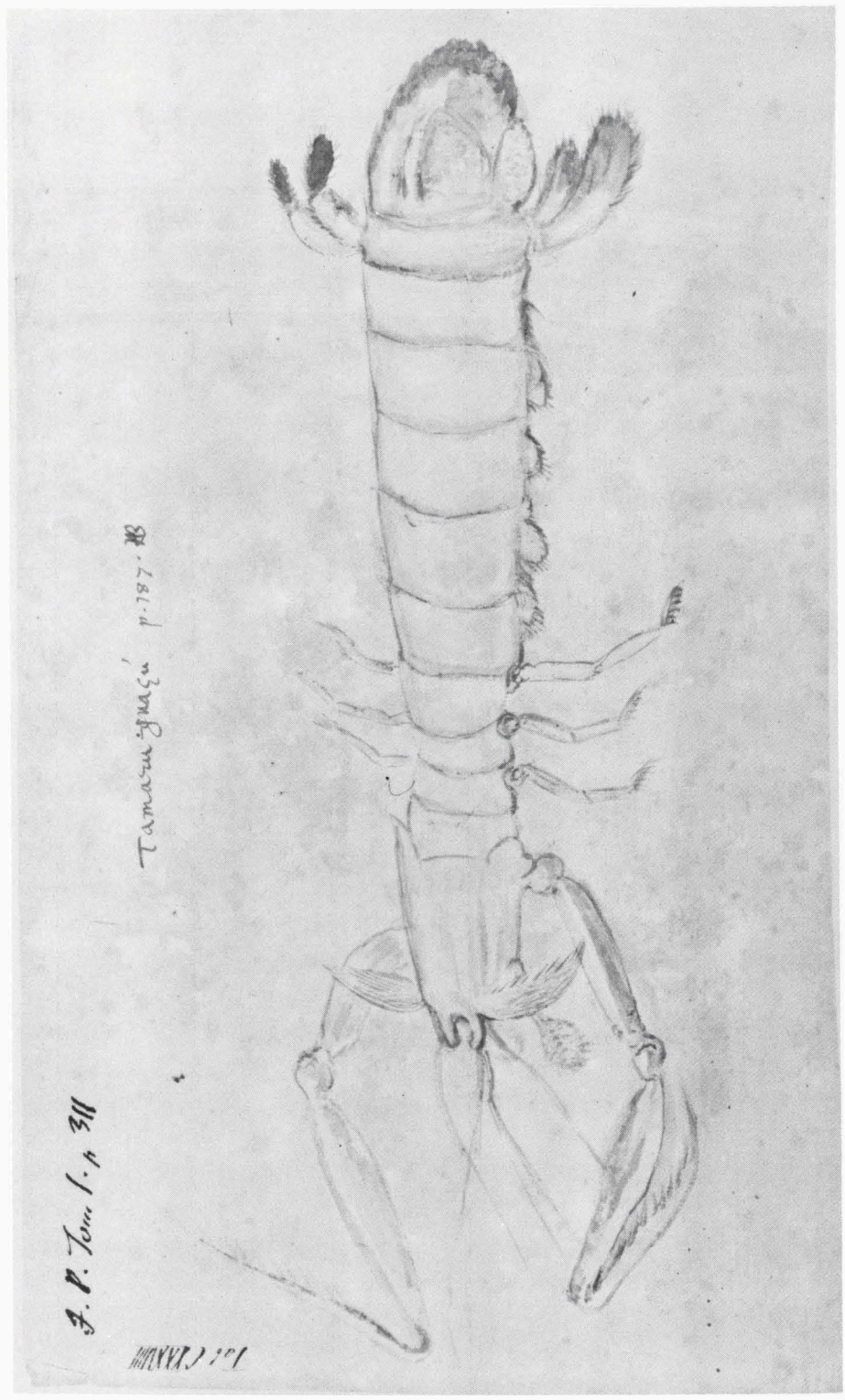


Fig. 31. *Lysiosquilla scabricauda* (Lamarck). Tamaru guaçú, in Leningrad drawings, (B): 143.

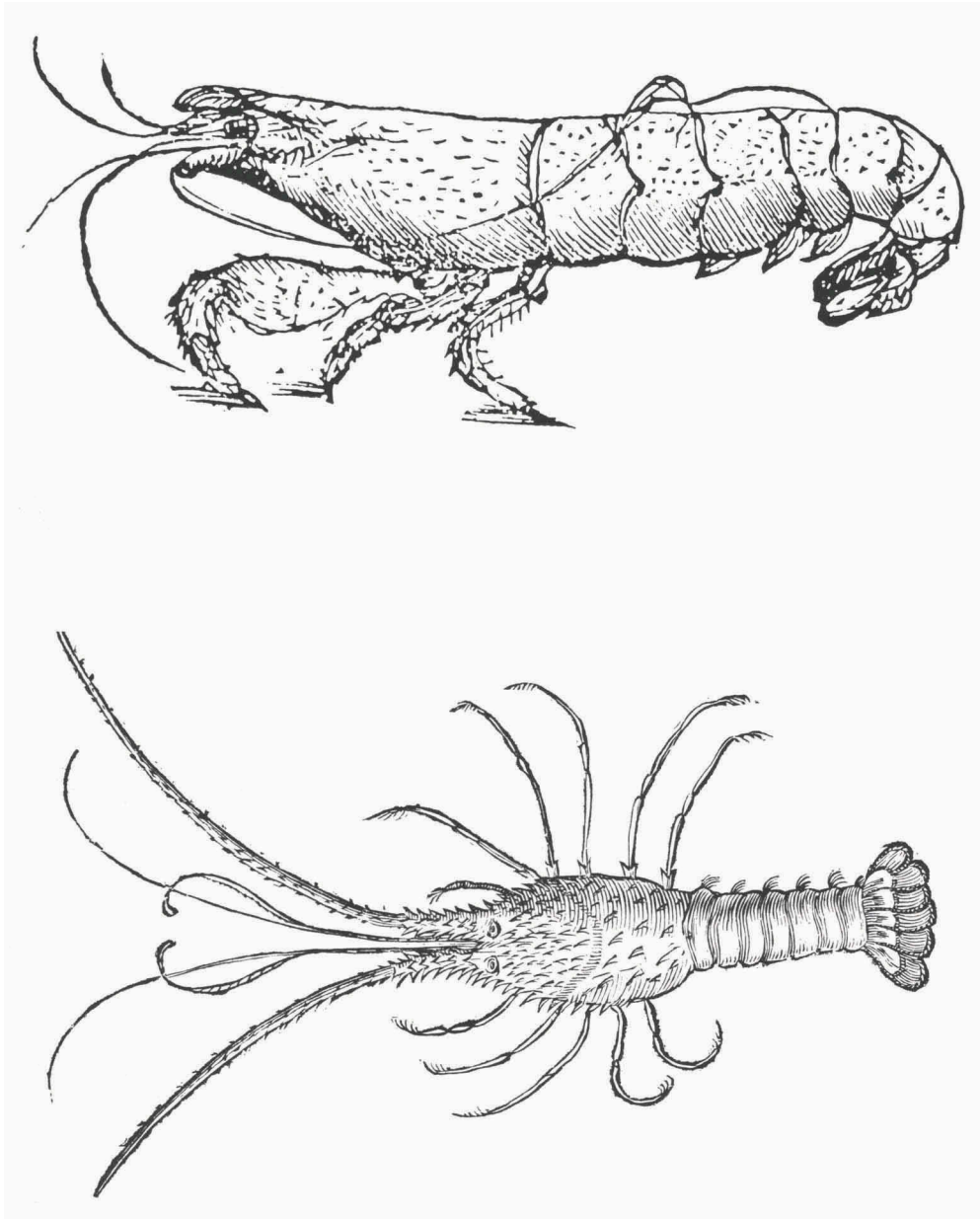

Fig. 32a (above). *Atya scabra* (Leach). Guaricuru. After Marcgraf, 1648: 187.
Fig. 32b. *Panulirus echinatus* S.I. Smith. Potiquiquiya. After Marcgraf, 1648: 186.


Fig. 33. *Macrobrachium* spec. Potîpêma, in Handbook, 2: 319.

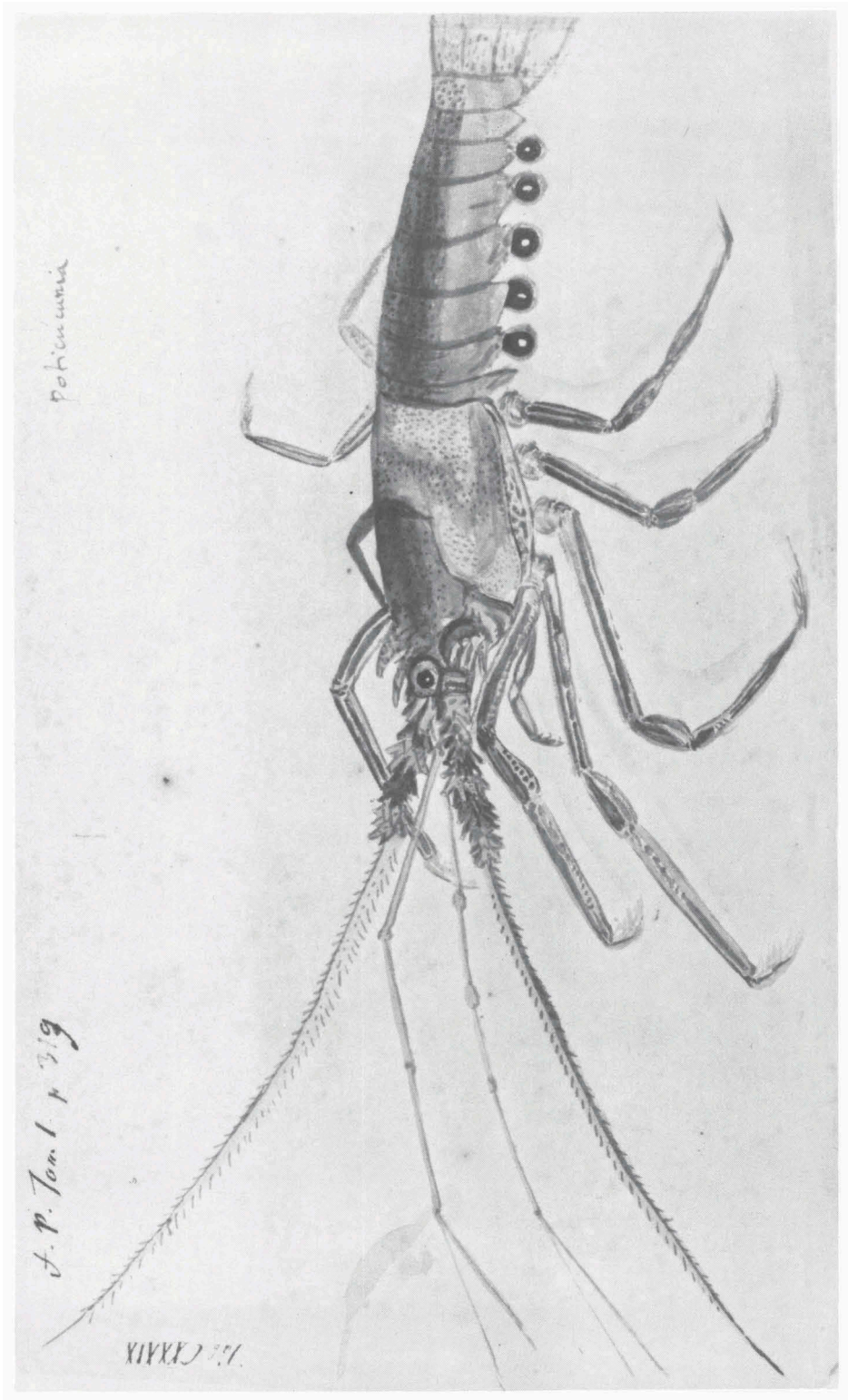


Fig. 34. *Panulirus echinatus* S.I. Smith. Poticucuma, in Leningrad drawings, (B): 144.

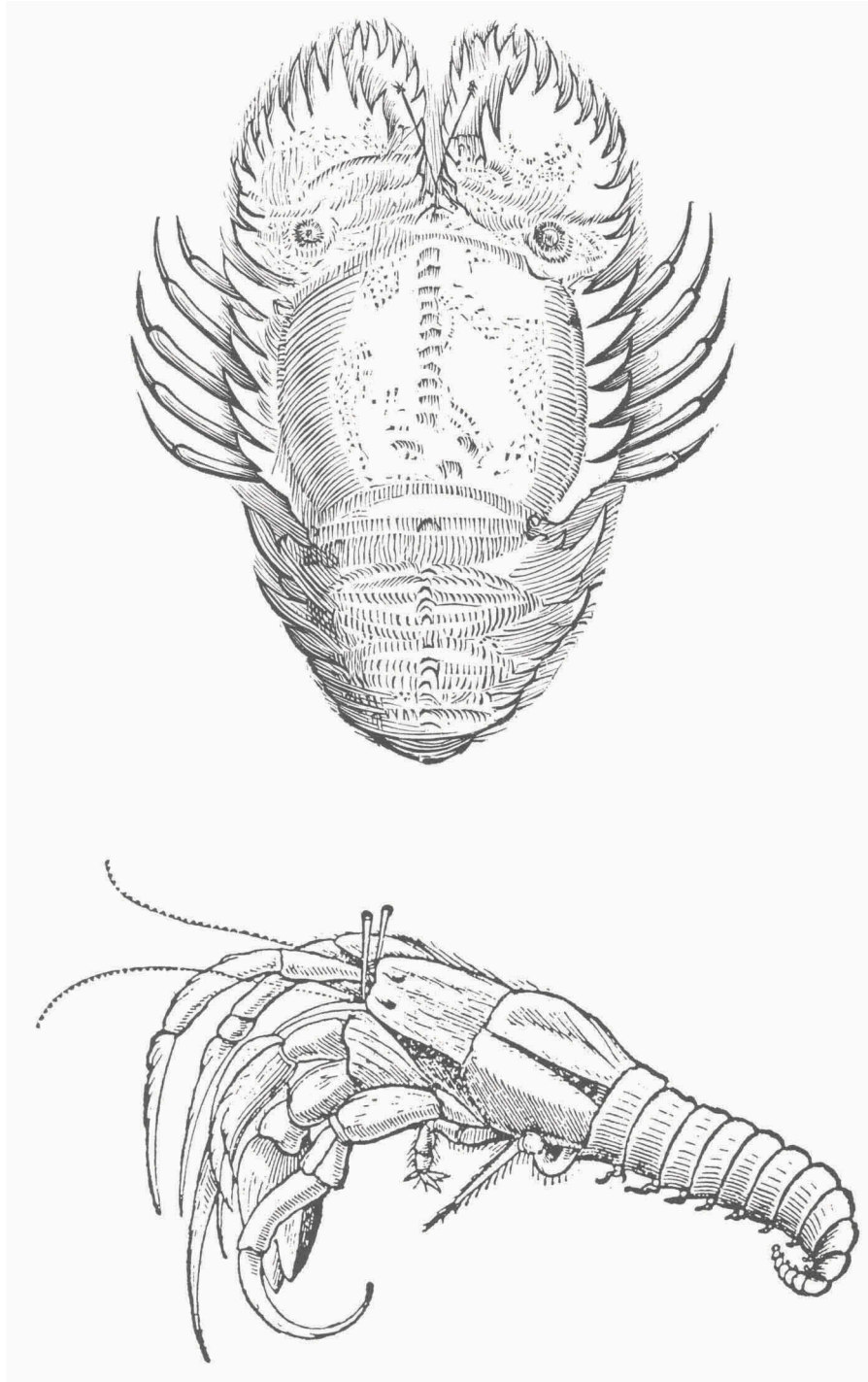

Fig. 35a (above). *Parribacus antarcticus* (Lund). Potiquiquyixe. After Marcgraf, 1648: 186.
Fig. 35b. *Petrochirus diogenes* (L.). Paranacare. After Marcgraf, 1648: 188.

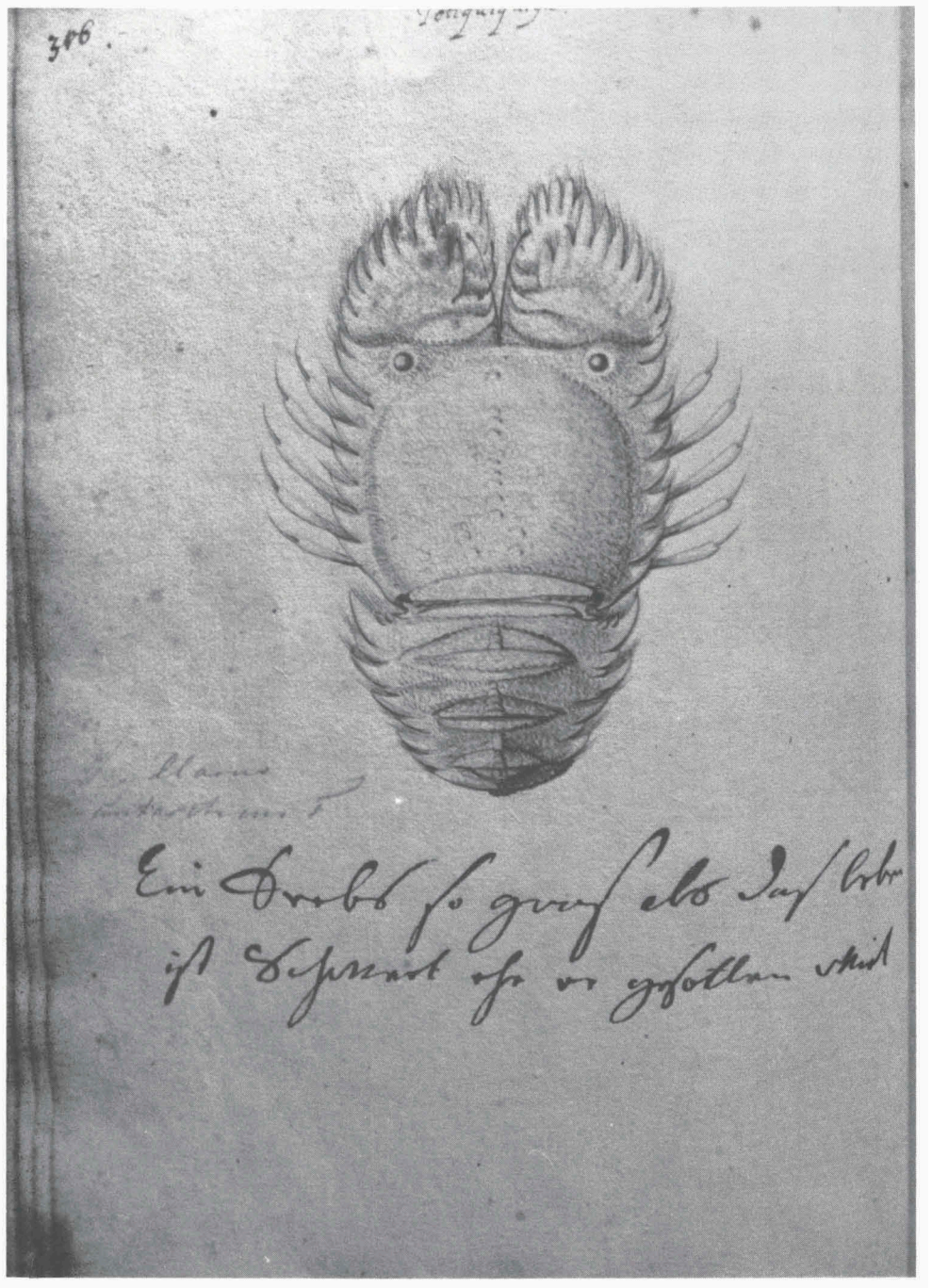

Fig. 36. *Parribacus antarcticus* (Lund). Potiquiquiya, in Handbook, 1: 316.

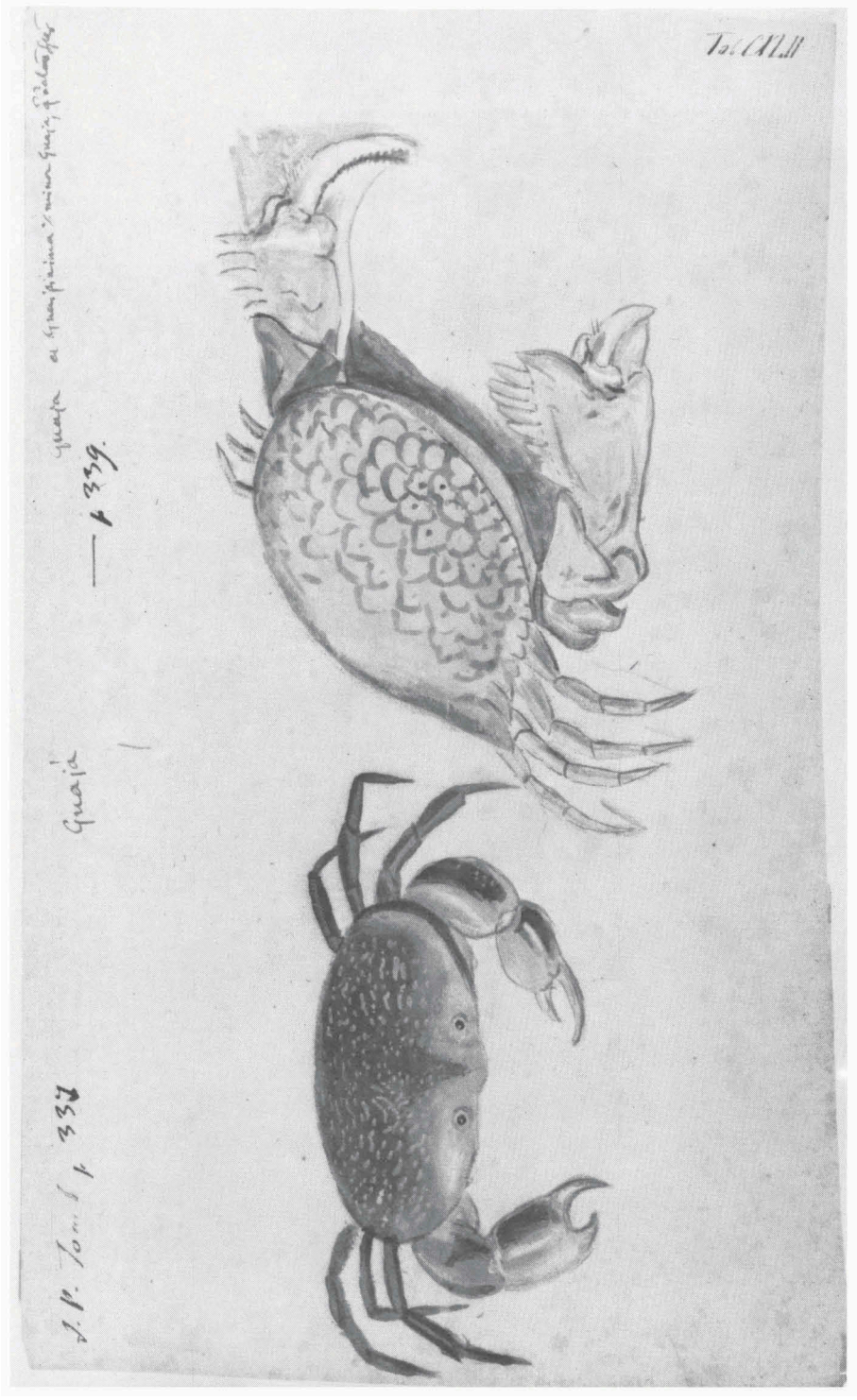

Fig. 37. Page 147 of series B of the Leningrad drawings, showing Guaja (left; = *Carpilius corallinus* (Herbst)), and Guaja et Guai pinima (right; = *Calappa ocellata* Holthuis).

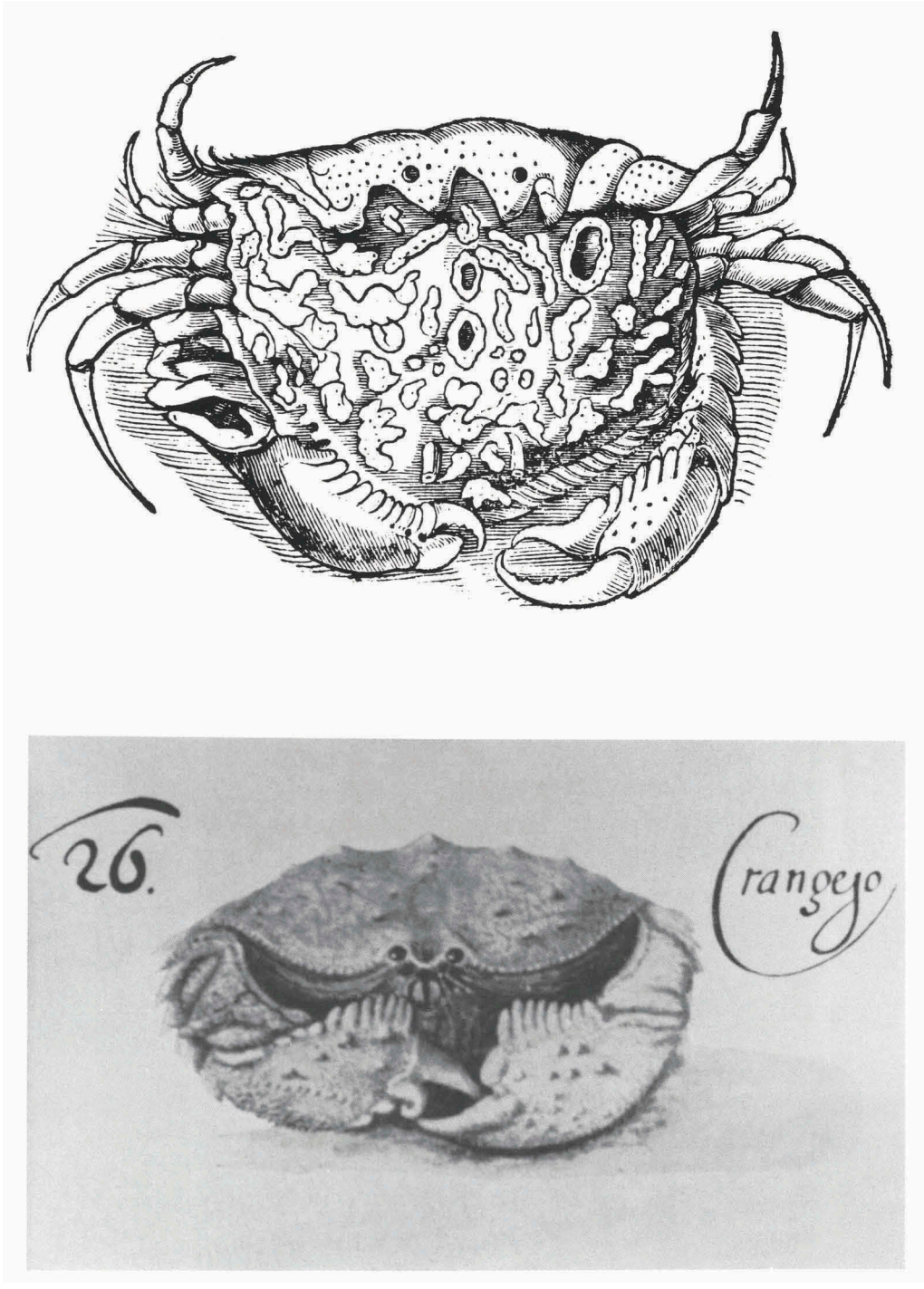


Fig. 38a (above). *Calappa ocellata* Holthuis. Guaia Apara. After Maregraf, 1648: 182.
Fig. 38b. *Calappa ocellata* Holthuis. Crangejo. After Wagener, 1964: 71, fig. 26.

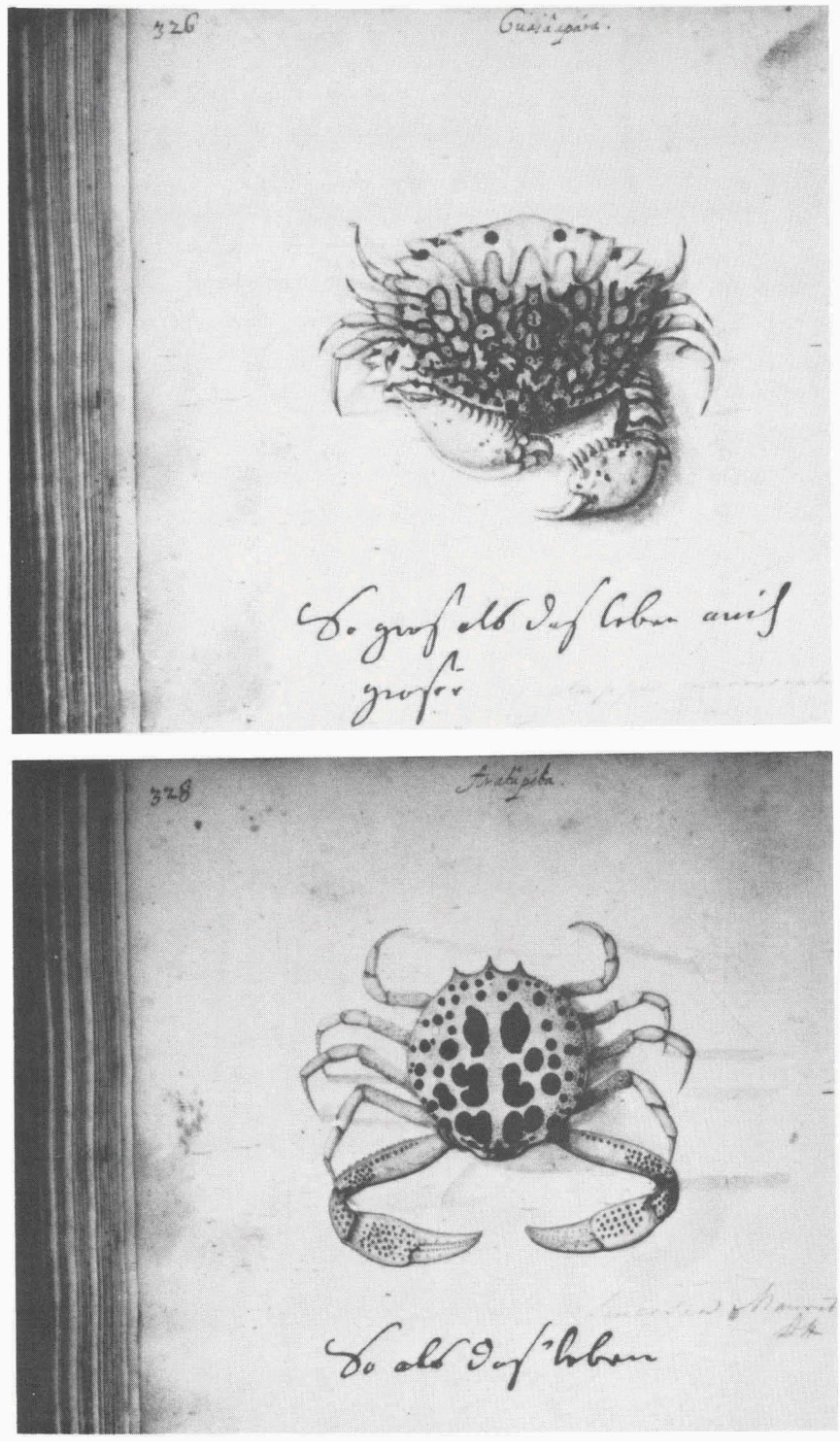


Fig. 39a (above). *Calappa ocellata* Holthuis. Guaiâ apara, in Handbook, 1: 326.
Fig. 39b. *Persephona mediterranea* (Herbst). Aratûpéba, in Handbook, 1: 328.

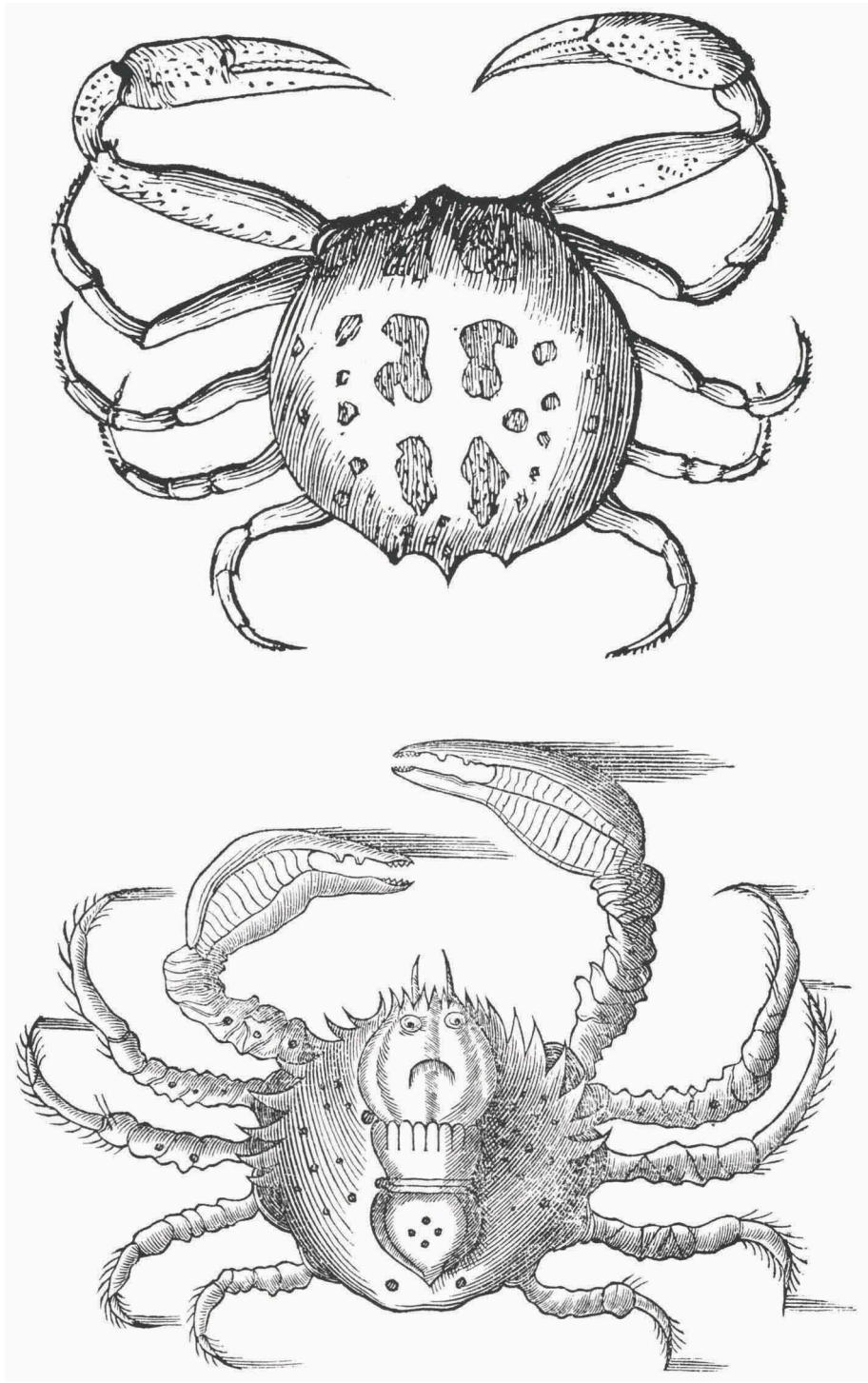

Fig. 40a (above). *Persephona mediterranea* (Herbst). Guaia, alia species. After Marcgraf, 1648: 182.
Fig. 40b. *Mithrax hispidus* (Herbst). Guaia alia species. After Marcgraf, 1648: 183.

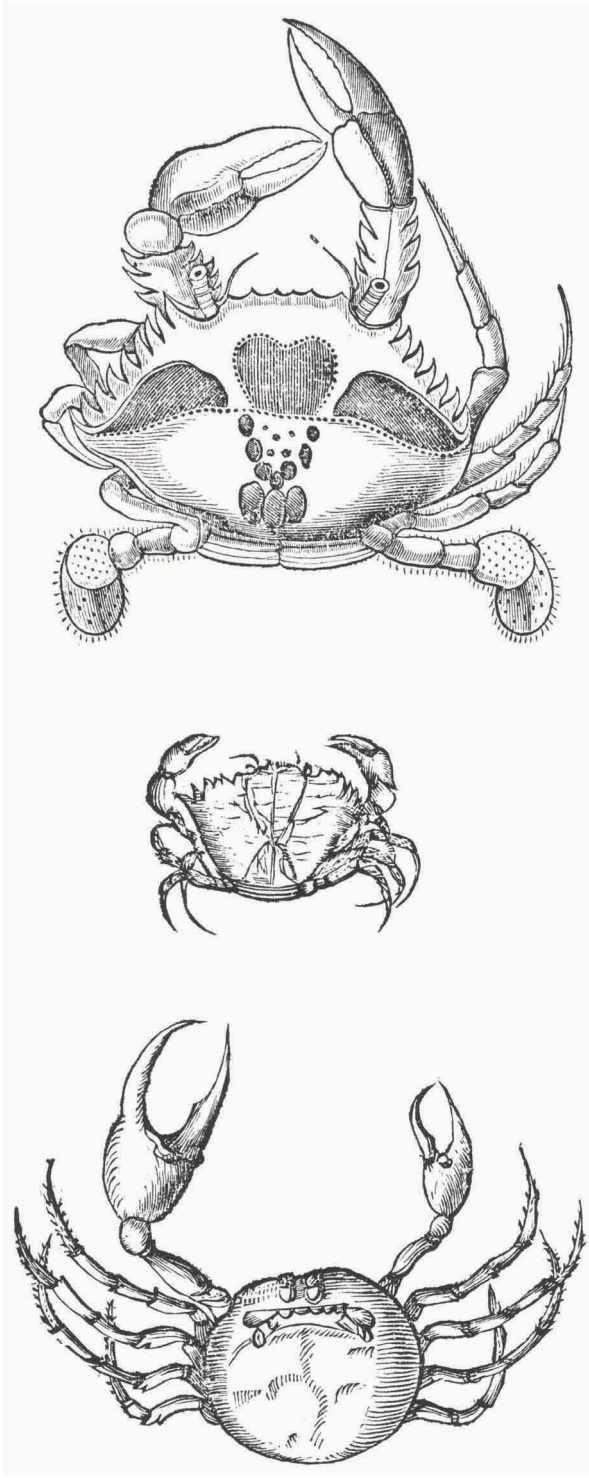

Fig. 41a (above). *Cronius ruber* (Lamarck). Ciri Apoa. After Marcgraf, 1648: 183.
Fig. 41b (centre). *Panopeus lacustris* Desbonne. Guaia Miri. After Marcgraf, 1648: 183.
Fig. 41c (below). *Cardisoma guanhumi* Latreille. Guanhumi. After Marcgraf, 1648: 185.

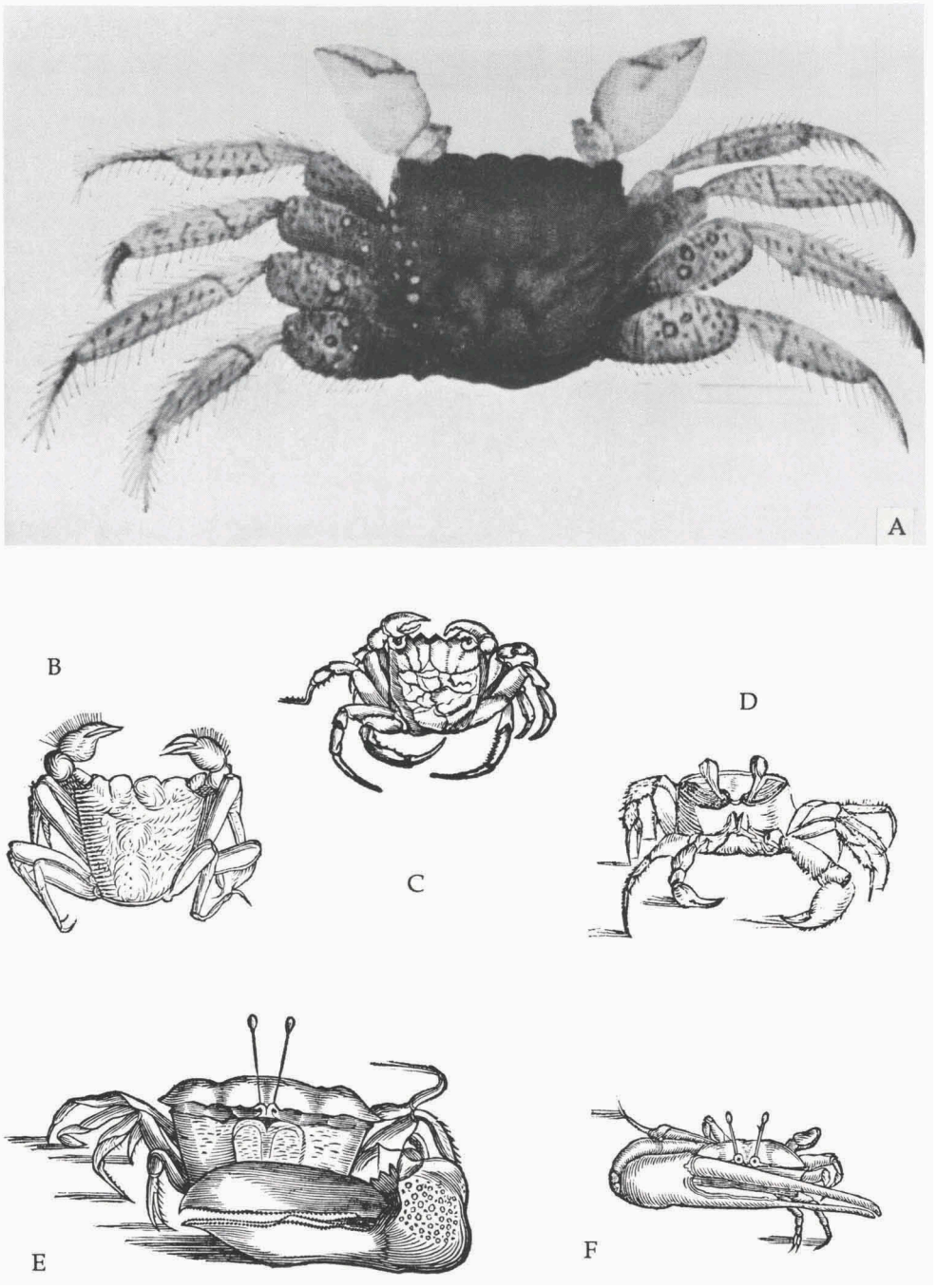


Fig. 42a. *Goniopsis cruentata* (Latreille). Crangejo. After Wagener, 1964: 71, unnumbered figure between 27 and 28. Fig. 42b. *Aratus pisonii* (H. Milne Edwards). Aratu & Aratu pinima [recte Carara pinima]. After Marcgraf, 1648: 185. Fig. 42c. *Sesarma angustipes* Dana. Carara Una. After Marcgraf, 1648: 184. Fig. 42d. *Ocypode quadrata* (Fabricius). Cunuru [recte Aguaru Uca]. After Marcgraf, 1648: 185. Fig. 42e. *Uca maracoani* (Latreille). Maracoani. After Marcgraf, 1648: 184. Fig. 42f. *Uca thayeri* Rathbun. Ciecie Ete. After Marcgraf, 1648: 185.

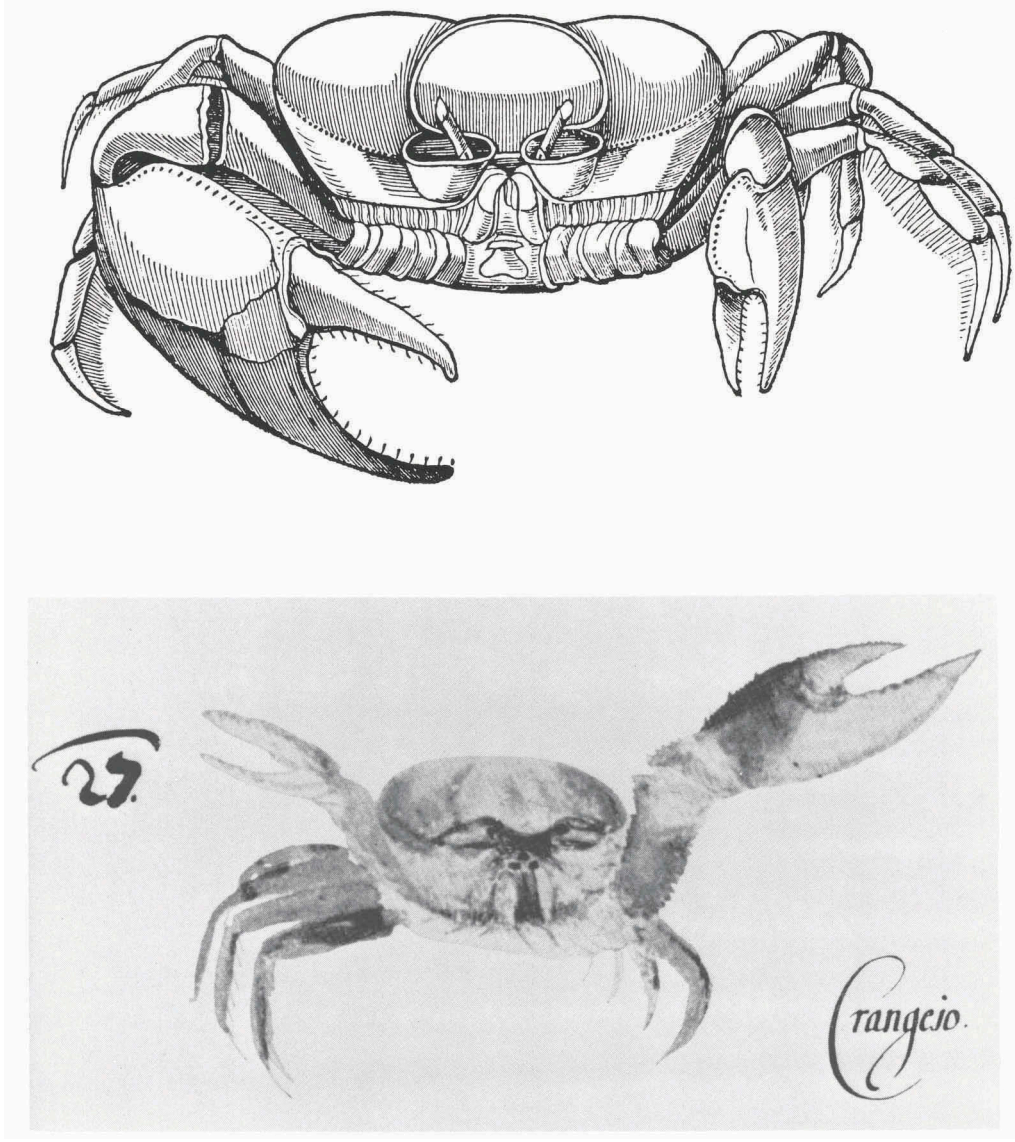


Fig. 43a (above). *Ucides cordatus* (L.). Uca una. After Marcgraf, 1648: 184.
Fig. 43b. *Ucides cordatus* (L.). Crangejo. After Wagener, 1964: 71, fig. 27.