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TWO SPECIES OF WHALE-LICE (AMPHIPODA,
CYAMIDAE) PARASITIC ON A
RIGHT-WHALE

BY

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(With 4 Plates)

Our knowledge of the whale-lice in the seas surrounding Japan is limited entirely to S. ISHII's note (1915), which, in a few lines, dealt with a form (probably referable to *Paracyamus boopis*) parasitic on *Berardius bairdii* caught in the sea off Tateyama, Province Awa, Central Japan. Recently, through the kindness of Mr. Shiro OKUDA, I was able to examine some rich material of Cyamids found attached to the skin of a right-whale (*Balaena gracialis* BONNATERRE) captured in the North Pacific by a whaler of the Tosa Whaling Company of Akkeshi, Hokkaido. On examination, I found the material to be composed of two species, *i.e.*, *Cyamus ovalis* ROUSSELL DE VAUZÈME and *Cyamus erraticus* of the same author, both new to Japan, and of which I shall give a short description in the following pages.

1. *Cyamus ovalis* ROUSSELL DE VAUZÈME, 1834

(Plates IV & VI)

The male

(Plate IV; a & b)

Body dorso-ventrally depressed, about two and a half times longer than wide; 13.2 mm long and 5.6 mm wide in the largest specimen examined.

Cephalon elongated, and united to the first peraeon segment. Peraeon elliptic in outline, with seven segments, of which the second is the longest, and the third and fourth are subequal both in length and in breadth. Antero-lateral margins of the second segment sloping, and the post-lateral corners with blunt processes. Antero- and post-lateral corners of the third segment and the post-lateral corners of the fourth segment are produced into rather prominent processes. Posterior segments diminishing in size from the fifth to the seventh, the fifth with both the anterior and the posterior margins convex in front, the seventh segment being lozenge-shaped. The sixth segment with two pairs of pointed tubercles on the ventral surface, the seventh segment with three pairs of them, of which the hindmost pair are the largest.

First antennae (Pl. VI; a) far larger than the second antennae, and about two-fifths the body-length. Peduncle three-jointed, each joint diminishing in length and breadth from the basal to the ultimate. Distal end of the third joint armed with short bristles. Flagellum rudimentary, being represented by only one joint, which is rounded at the summit and is bordered with short bristles.

Second antennae (Pl. VI; b) extremely reduced, shorter than half the length of the basal article of the first antennae. They are composed of four articles, the basal one very small, the following three larger than this, gradually decreasing in size from the proximal to the distal, and armed with short bristles at the distal ends of each joint.

Upper lip (Pl. VI; c) quadrangular, with a slight median terminal depression, and with a prominent central thickening on the posterior surface.

Mandibles pyramidal in shape, with a retinaculum on the inner surface. Right and left mandibles differ in structure from each other. Left mandible (Pl. VI; e & f) with incisor process composed of two longitudinal denticular plates, one with four and the other with five teeth at their apices. On the inner border below the incisor process are found a few rows of rather stout ciliated spines. Right mandible (Pl. VI; g & h) smaller than the left one, having only one incisor

denticular plate provided with six teeth. A molar process with many rows of denticles is found inside the incisor process, and is accompanied by a few ciliated spines below.

Lower lip (Pl. VI ; d) with two paired lobes ; the inner ones fused together on the median line and making a somewhat triangular lobe with a slight median terminal incision ; the outer ones with pointed ends, and inclining towards the inner lobes.

First maxillae (Pl. VI ; i & j) without inner lobe. The apex of the outer lobe is furnished with a group of seven denticular spines, some of which are pectinated. Palp reduced, single-jointed and armed with a group of long bristles at the apex which never reaches the distal end of the outer lobe.

Second maxillae (Pl. VI ; k). Inner lobes of both sides come into contact on the median line, and each carries two bristles at its apex. The outer lobes are rounded distally and are armed with long bristles.

Maxillipeds (Pl. VI ; l). The inner lobes are triangular in shape, while the outer are rectangular and far smaller than the former. Palp well developed, four-jointed, the ultimate joint being claw-like, with the bifurcated tip, and a row of fine setules on its flexor surface.

First and second gnathopods are strongly unequal. The first gnathopods (Pl. VI ; m), situated ventrally behind the eyes, are far smaller than the second pair. They are six-jointed, the coxopodite and basipodite being fused into one, constituting a long basal joint which is a little longer than the combined length of the meropodite and the carpopodite, and has a small ridge dorsal to its proximal end. The ischiopodite is the shortest of the six joints, and the meropodite comes next, the latter being provided with a small pointed tubercle on its dorsal border. Both the propodite and the carpopodite are bilaterally compressed, and each has the dorsal border as sharp as a keel. Dactylopodite regularly arched, its inner border being about half as long as the palm border, which is provided with an obtuse triangular process.

The second gnathopods (Pl. VI ; n & o) are very massive, and are inserted in the ventral surface of the second segment. They are

five-jointed, the basal article (coxopodite + basipodite + ischiopodite) is very short and flattened. Meropodite thick, its dorsal margin forming a sharp ridge. Carpopodite small and pyramidal. Propodite very large, semi-lunar in shape, two times longer than wide, with the palm border nearly straight, and the dorsal margin arched and keel-like. The palm-border is provided, near its distal end, with two strong teeth approximated together. Dactylopodite nearly equals the palm border in length.

Third and fourth segments without appendages, but carrying a pair of gills in place of them. All of these gills (Pl. VI; r & s) are biramous, the ventral rami being shorter than the dorsal. Accessory gills small, simple in the third segment, bicornic in the fourth.

Peraeopods (Pl. VI; p & q) three pairs, diminishing in size posteriorly, are six-jointed. Coxopodite and basipodite are fused together, and form a basal joint, attaching themselves to the post-lateral corners of each segment. Ischiopodite with a sharp ridge on the dorsal margin, and peraeopods of the fifth and sixth segments having each a small pointed tubercle on the ventral surface. Meropodite small, with rounded teeth pointed posteriorly. Carpopodite voluminous, the prominent dorsal ridge being like the carina of a bird, and with a blunt process on the ventral margin. Propodite elongated, about two times longer than wide, and the palm without teeth. Dactylopodite always shorter than the palm border.

Pleon (Pl. VI; v, x, & y) very small, situated at the hinder end of the peraeon, and provided with one median and two lateral processes at its end. A pair of very short pleopods are fused on the median line, and form a slender basal part and a terminal part which spreads out into the shape of an inverted heart.

The female

(Plate IV; c & d)

The female differs from the male in the following points.

1) Body-size. Maximum length 12.5 mm, and width 6.4 mm, broader than the male as compared with its length.

2) The third segment of the peraeon has at its antero-lateral corners one more process than in the male.

3) The second and third segments of the peraeon have no accessory gills (Pl. VI; t & u), and have each a pair of oostegites in their place.

4) A pair of genital valves are present at the middle of ventral surface of the fifth segment.

5) The sixth segment of the peraeon has on its ventral surface only two pairs of pointed tubercles, and lacks the most prominent pair present in the male.

6) Pleopods are entirely wanting (Pl. VI; w).

2. *Cyamus erraticus* ROUSSELL DE VAUZÈME, 1834

(Plates V & VII)

The male

(Plate V; a & b)

Body more slender than in *C. ovalis*; more than two times longer than wide, 9.6 mm long and 4.1 mm wide in the largest specimen in my hand.

Peraeon nearly spindle-shaped, widest at the fourth segment and gradually decreasing in breadth both anteriorly and posteriorly. The second segment, somewhat rectangular in outline, is provided with blunt antero-lateral and sharp prominent post-lateral processes. The third and fourth segments are furnished with blunt processes at the post-lateral corners. The fifth to seventh segments have each on their ventral surface two pairs of pointed tubercles, the posterior pair of the seventh segment being the longest of all.

The first antennae (Pl. VII; a) are similar in structure to those of *C. ovalis*. The basal joint of the second antennae is very small; the second joint is markedly dilated distally, and the third is the longest of the four segments.

Mouth-parts are essentially the same as in *C. ovalis* except for some minute points. Left mandibles (Pl. VII; f) with two rows of denticular plates, the inner one with four teeth and the outer with five, as against the condition found in the former species, in which the inner plate has five teeth, and the outer four. Ciliated spines on the right and the left mandibles are smaller in number than in *C. ovalis*. Right mandibles (Pl. VII; e) with an incisor process provided with six teeth, and a molar process produced, at one corner, into an irregular denticular plate.

First gnathopods (Pl. VII; j) similar to those of *C. ovalis*. Prominent lateral projections of the ventral epidermis of the first pereon segment cover the bases of the first gnathopods.

Meropodite of the second gnathopods (Pl. VII; k & l) with two ridges; the one antero-ventral and transverse, and the other dorsal and longitudinal. Both the anterior and posterior ends of the latter are produced forwards and backwards respectively. Ventral surface of the carpopodite forming a longitudinal ridge, with a rather prominent tubercle at the anterior end. Propodite elongate, more than two times longer than wide, both dorsal and ventral borders concave ventrally, the former being keel-like and the latter with two small teeth situated wide apart from each other near the distal and proximal ends of the palm respectively. The dactylopodite forms a claw, and surpasses the palm-border in length.

The second and third segments with gills, long and uniramous, extending far beyond the head, and each with a small bicornic accessory gill (Pl. VII; o & p) at the base, both rami of which are short and pointed, the posterior one being somewhat leaf-like. Three pairs of pereopods (Pl. VII; m & n) are almost equal in size and structure. The dorsal ridge of the ischiopodite is narrow, and the anterior end is sharply pointed, the ventral surface being rounded and with a small tubercle anteriorly. Carpopodite with a dorsal carina-like process and a sharp ventral spine. The dactylopodite is long, and equals the length of the palm border of the propodite, which is nearly straight.

Pleon as in *C. ovalis* (Pl. VII; s).

The female

(Plate V; c & d)

Differs from the male in the following points:

- 1) Body-size, 10.5 mm long and 4.9 mm wide in the largest specimen at hand.
- 2) The third and fourth segments have each one and two processes at their antero-lateral corners, the fourth segment being destitute of a post-lateral process.
- 3) The anterior rami of the accessory gills are modified into oostegites, and the posterior ones (Pl. VII; q & r) are dilated and leaf-like.
- 4) Only one pair of pointed tubercles are found on the fifth and seventh peraeon segments, and on the former are found a pair of genital valves.
- 5) Pleopods wanting (Pl. VII; t & u).

In conclusion, my hearty thanks are due to Professor Tohru UCHIDA for his kind guidance in preparing this paper, and to Mr. Shiro OKUDA for his generosity in placing the specimen at my disposal.

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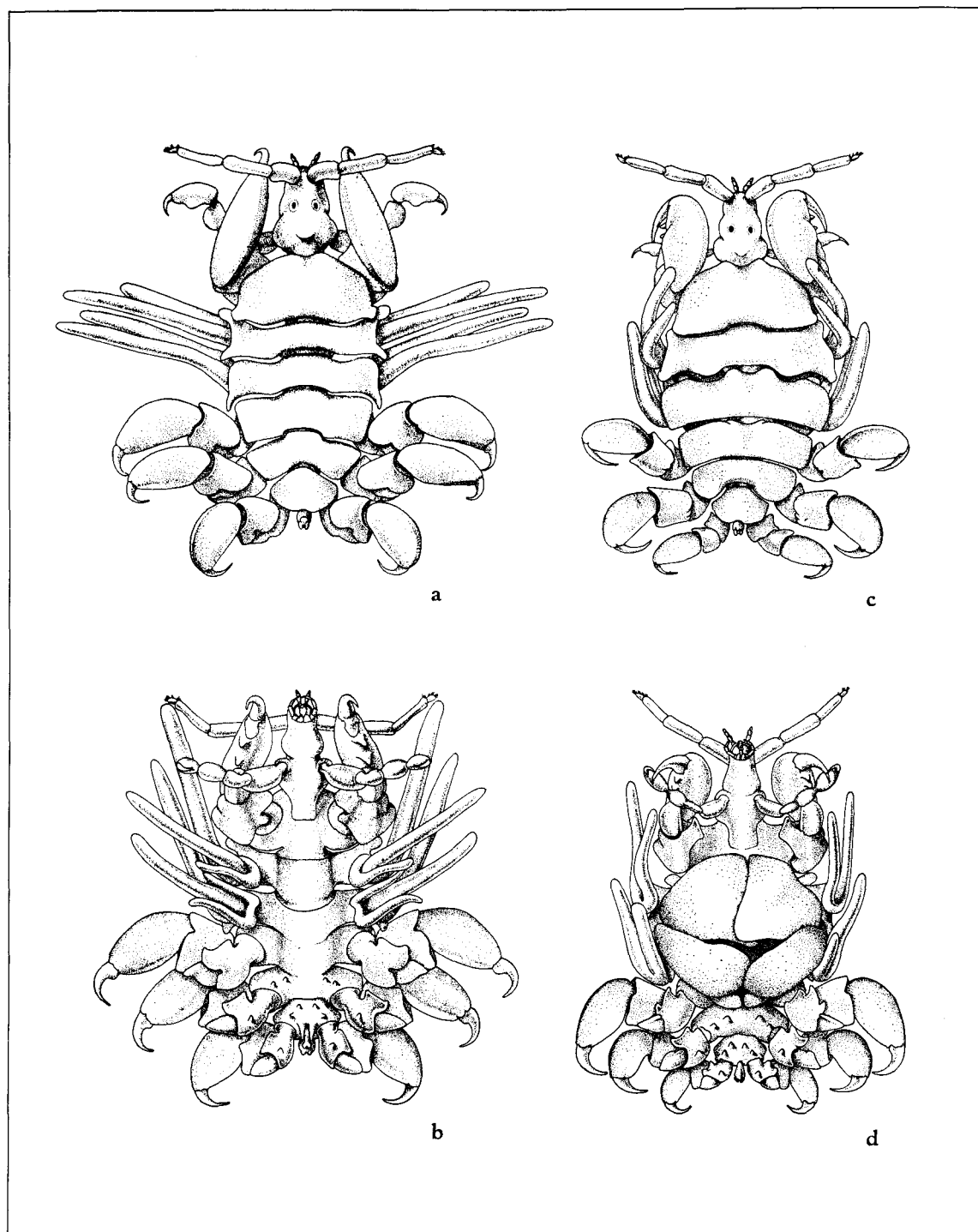
Plate IV

Explanation of Plate IV

Cyamus ovalis ROUSSELL DE VAUZÈME

× 4.2

- a. Dorsal view of the male.
- b. Ventral view of the male.
- c. Dorsal view of the female.
- d. Ventral view of the female.



M. Iwasa del.

M. Iwasa : Two Whale-lice Parasitic on a Right-whale

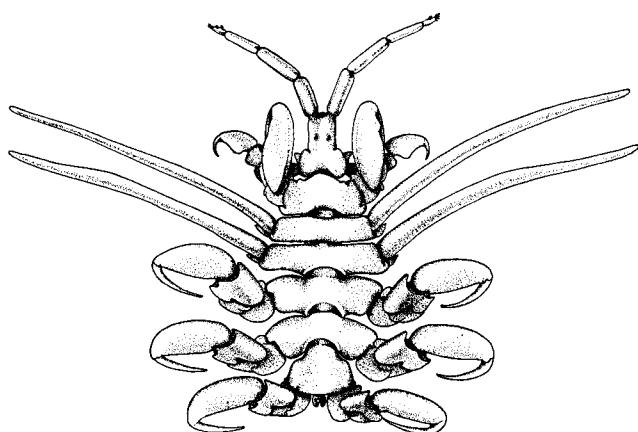
Plate V

Explanation of Plate V

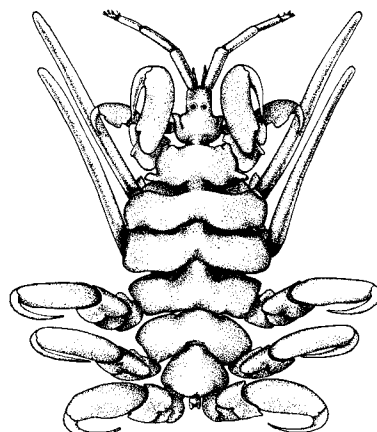
Cyamus erraticus ROUSSELL DE VAUZÈME

×4

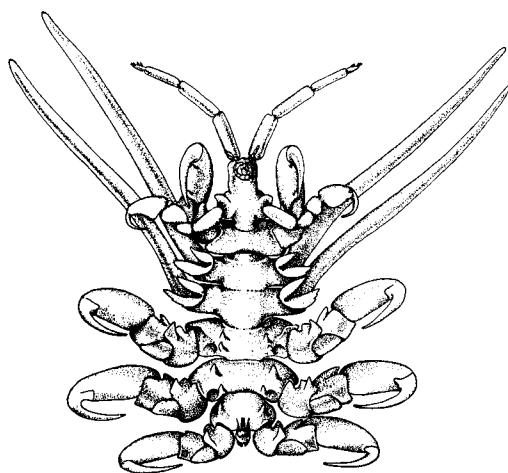
- a. Dorsal view of the male.
- b. Ventral view of the male.
- c. Dorsal view of the female.
- d. Ventral view of the female.



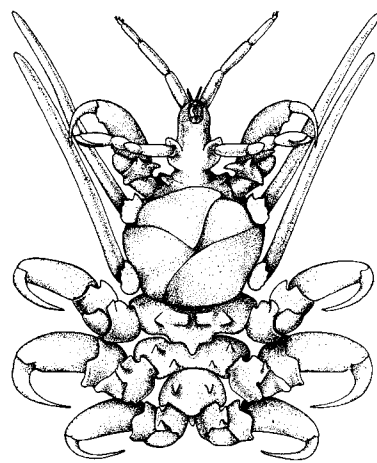
a



c



b



d

M. Iwasa del.

M. Iwasa : Two Whale-lice Parasitic on a Right-whale

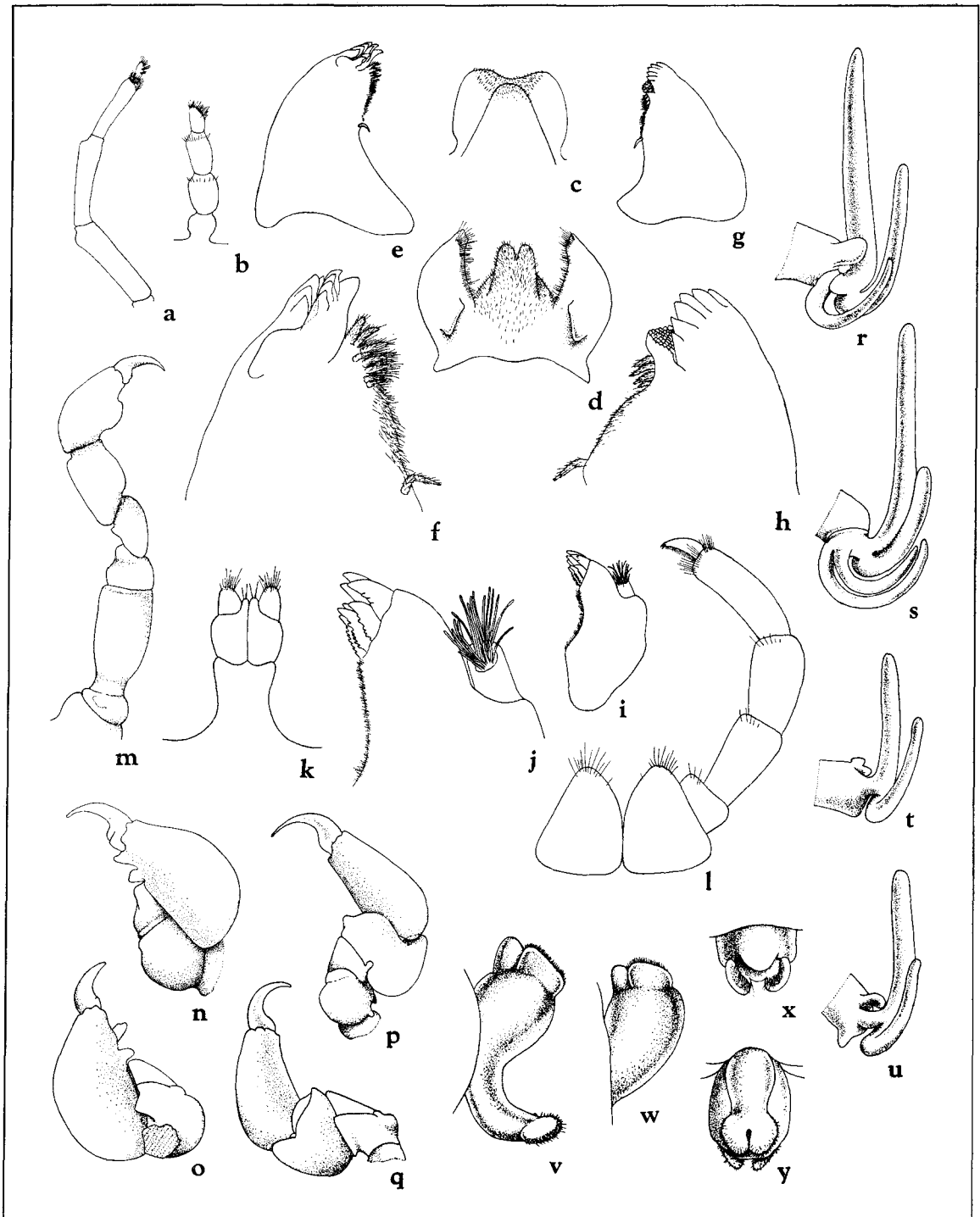
Plate VI

Explanation of Plate VI

Cyamus ovalis ROUSSELL DE VAUZÈME

All figures have been drawn from the male, except t, u, and w, which are from the female.

- a. First antenna. $\times 7$.
- b. Second antenna. $\times 5$.
- c. Upper lip. $\times 42$.
- d. Lower lip. $\times 42$.
- e. Left mandible. $\times 42$.
- f. The same; further enlarged. $\times 120$.
- g. Right mandible. $\times 42$.
- h. The same; further enlarged. $\times 120$.
- i. First maxilla. $\times 42$.
- j. The same; further enlarged. $\times 120$.
- k. Second maxilla. $\times 42$.
- l. Maxilliped. $\times 42$.
- m. First gnathopod. $\times 9$.
- n. Second gnathopod. $\times 5$.
- o. The same; inner view. $\times 5$.
- p. First peraeopod; outer view. $\times 5$.
- q. The same; inner view. $\times 5$.
- r. First gill of the male; ventral view. $\times 5$.
- s. Second gill of the male; ventral view. $\times 5$.
- t. First gill of the female; ventral view. $\times 5$.
- u. Second gill of the female; ventral view. $\times 5$.
- v. Pleon of the male; side view. $\times 22$.
- w. Pleon of the female; side view. $\times 22$.
- x. Pleon of the male; dorsal view. $\times 22$.
- y. The same; ventral view. $\times 22$.



M. Iwasa del.

M. Iwasa: Two Whale-lice Parasitic on a Right-whale

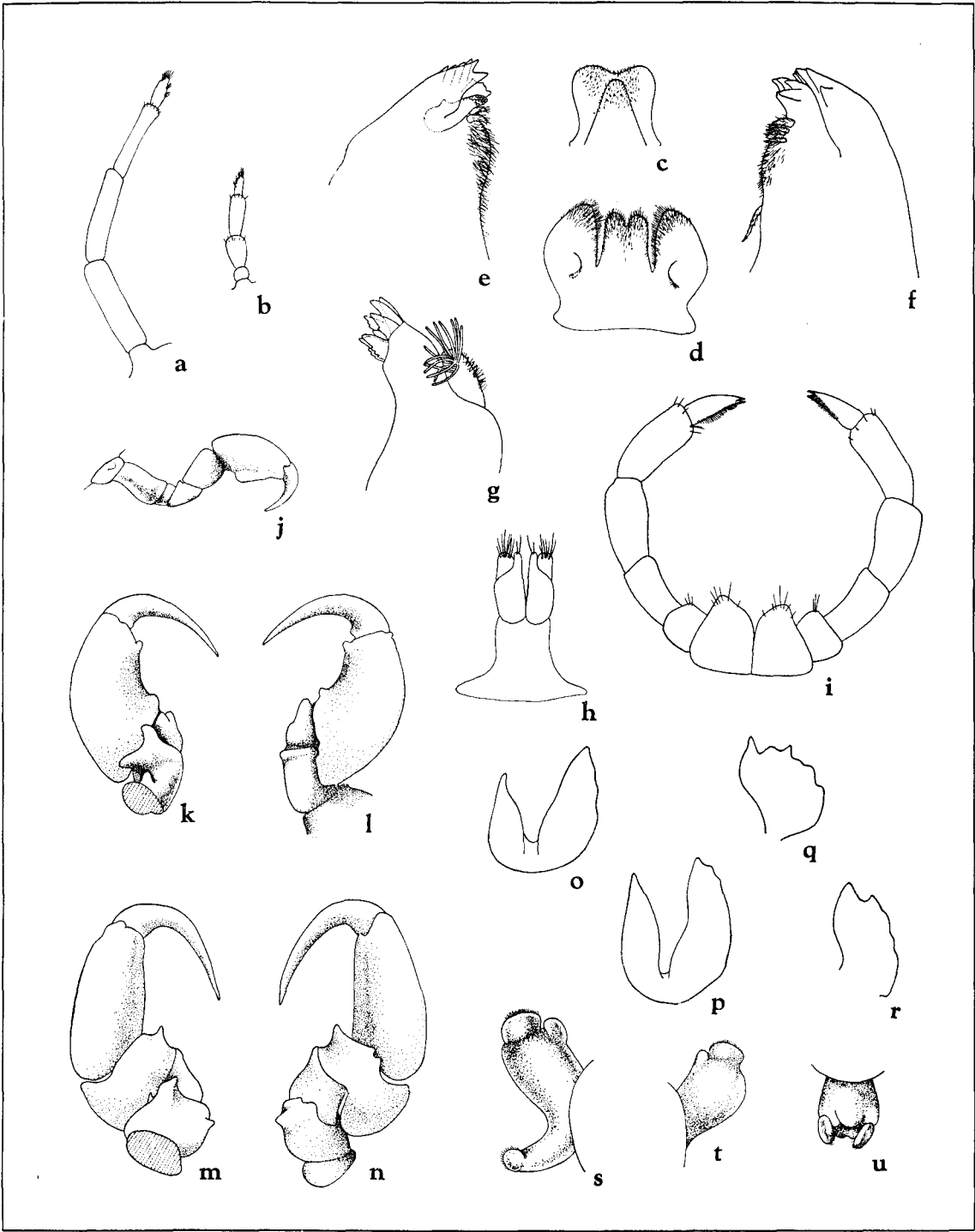
Plate VII

Explanation of Plate VII

Cyamus erraticus ROUSSELL DE VAUZÈME

All figures have been drawn from the female, except o, p, and s, which are from the male.

- a. First antenna. $\times 12$.
- b. Second antenna. $\times 22$.
- c. Upper lip. $\times 42$.
- d. Lower lip. $\times 63$.
- e. Right mandible. $\times 120$.
- f. Left mandible. $\times 120$.
- g. First maxilla. $\times 142$.
- h. Second maxilla. $\times 63$.
- i. Maxilliped. $\times 63$.
- j. First gnathopod. $\times 9$.
- k. Second gnathopod; inner view. $\times 9$.
- l. The same; outer view. $\times 9$.
- m. First peraeopod; inner view. $\times 9$.
- n. The same; outer view. $\times 9$.
- o. First accessory gill of the male. $\times 17$.
- p. Second accessory gill of the male. $\times 17$.
- q. First accessory gill of the female. $\times 17$.
- r. Second accessory gill of the female. $\times 17$.
- s. Pleon of the male; side view. $\times 23$.
- t. Pleon of the female; side view. $\times 23$.
- u. The same; dorsal view. $\times 23$.



M. Iwasa del.

M. Iwasa : Two Whale-lice Parasitic on a Right-whale