

Gooding, R. 1957  
**GOODING**

from the ANNALS AND MAGAZINE OF NATURAL HISTORY  
Ser. 12, vol. x, p. 695, September, 1957.

“*CALLIANASSA PUGETTENSIS*” (DECAPODA, ANOMURA),  
TYPE HOST OF THE COPEPOD *CLAUSIDIUM*  
*VANCOUVERENSE* (HADDON).

With a note on *Hemicyclops pugettensis* Light & Hartman, another  
copepod associated with Callianassids.

By R. U. GOODING,  
Zoology Department, University of Washington, Seattle.

[Plate XXV.]

*Callianassa pugettensis*.

IN 1912, Miss Kathleen Haddon, described the copepod “*Hersilia* (*Clausidium*) *vancouverensis*”\* as a new species, giving the host as “*Callianassa pugettensis*”. Specimens of the latter were stated (p. 84) to have been collected by the late Dr. F. A. Potts in 1911 “. . . from a stretch of sandy beach at Hammond Bay, near Nanaimo, Vancouver Island”. According to Stevens (1928), there are only four species of callianassids which occur on the Pacific Coast of North America: *Upogebia pugettensis* (Dana), *Callianassa gigas* Dana (with which she equated *C. longimana* Stimpson), *C. californiensis* Dana and *C. affinis* Holmes. Since systematic work on *Clausidium vancouverense* is at present in progress, it became important to determine the status of its type host.

A search of the literature revealed no mention of *Callianassa pugettensis* other than Haddon's. The latter might have been a manuscript name of Potts in which case it would now be a *nomen nudum*. However, since Haddon gives no authority for her usage and no mention of the name is made in the list of decapods from British Columbia published in 1912 by the Rev. G. W. Taylor, who was Director of the Biological Station at Nanaimo during Potts' visit, it is unlikely that Potts intended to create a new species. The more probable explanation is that confusion occurred, either by misidentification or *in litteris*, with one of the species mentioned above. I find it difficult to believe that *Callianassa affinis* could be implicated: the species is found only beneath large stones on exposed rocky coasts, has not been recorded north of Santa Monica Bay, California, and is never infected with *Clausidium* (MacGinitie & MacGinitie, 1949, and personal communication from Professor MacGinitie). Light & Hartman (1937) have suggested that the name might refer either to *Upogebia pugettensis* or to *Callianassa californiensis*; since these authors state (p. 174) that all the three callianassids under discussion harbour *Clausidium*, *C. gigas* will also be considered in the present paper.

\* The generic name had been established as *Clausidium* by Embleton (1901) but her paper is not mentioned by Miss Haddon.

CARDED JUN 27 1961

INVERTEBRATE  
ZOOLOGY

Cross-section

Haddon reported that her specimens of the copepod “. . . occurred in vast numbers. . .” (1912, p. 84). In the North-eastern Pacific, I have found this species to infect mainly *Callianassa* spp., on which it is very abundant; the only local record on *Upogebia* is a single female specimen, collected by Dr. P. L. Illg at False Bay, San Juan Island, Washington, on July 8th, 1953. Further south, however, this association of *Clausidium vancouverense* with *Upogebia* is more common: MacGinitie & MacGinitie (1949) record it (from Elkhorn Slough: personal communication); I have found a few *Clausidium* on specimens collected and sent to me in 1956 from Bodega Bay by Dr. Ralph Smith; and there is one lot of five of these copepods in the U.S. National Museum (Cat. No. 90945) taken by Mr. A. B. Burch in June, 1936, from the gill-chamber of a *Upogebia* at Newport Bay, California (personal communication from Dr. T. E. Bowman). Light & Hartman's work (1937) makes it clear that this Californian form is conspecific with Haddon's. But, to the best of my knowledge, *C. vancouverense* never occurs in such large numbers on *Upogebia* as it does on *Callianassa gigas* and *C. californiensis*.

That *C. gigas* did not occur in Hammond Bay while Potts was at Nanaimo is suggested by Taylor's (1912) statement “I have not seen British Columbia specimens of this species. . .” He records it (as *C. longimana*) from Esquimalt Harbour (near Victoria) and Stevens (1928) states that specimens have been found at Boundary Bay (south of Vancouver). Thus its occurrence in the Nanaimo region is not impossible. However, Miss Hart (Dr. Josephine Carl) states (in correspondence) that she has found only *C. californiensis* at Departure Bay and Qualicum Beach.

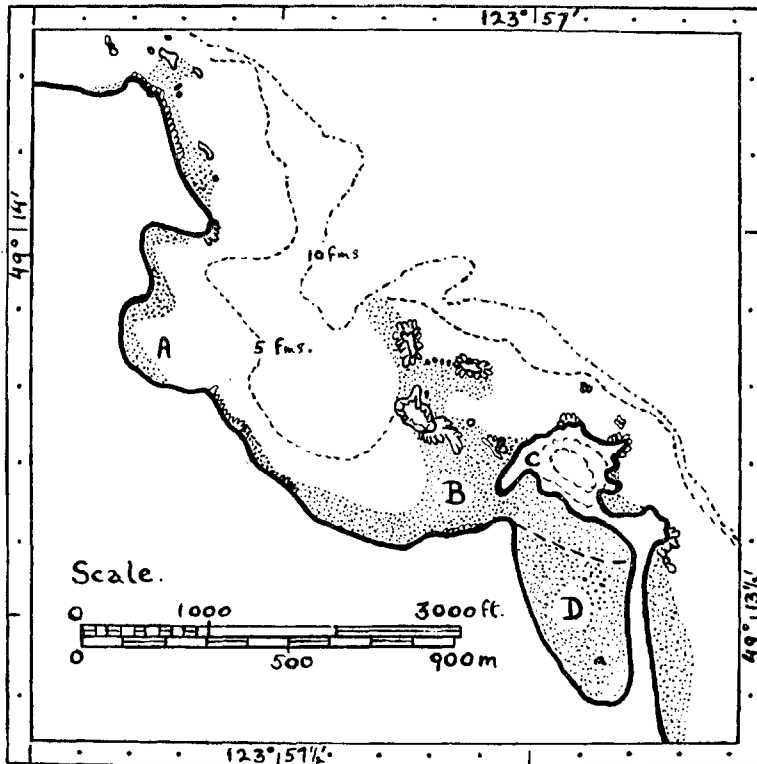
The following institutions were approached in order to determine whether Potts' specimens of *Clausidium vancouverense* or its host were still extant: the Pacific Biological Station, Nanaimo; the University of British Columbia; the Royal Ontario Museum; the National Museum of Canada; the British Museum (Natural History); the University Museum of Zoology, Cambridge; the Stazione Zoologica, Naples; and the U.S. National Museum. None of these had any record of either species in this connection; however, Dr. Charles Goodhart (Cambridge) suggested (personal communication) that the material might have been among some “. . . more or less unlabelled and dried up specimens . . .” found in Dr. Potts' room after his death in 1937 and subsequently thrown away. Correspondence with Miss Haddon (now Mrs. Rishbeth) revealed that she had no recollection what had happened to the material she used. It seemed, then, that further evidence could only be obtained by collecting in the type locality.

Hammond Bay is a small indentation in the coastline about one and a half miles north of the town of Nanaimo; it lies between 49° 13' 24" N., 123° 56' 48" W. and 49° 14' 0" N., 123° 57' 48" W. At present, the shore is composed mainly of rocks and/or small stones, but there is a stretch of relatively clean sand at A (fig. 1) and a region of muddy gravel, partly covered by *Zostera*, at B. Through the latter leads the narrow channel which connects the bay proper with a smaller offshoot at its south-

eastern corner: Piper's (or Page's) Lagoon (fig. 1D). This has a level, shallow bottom of sandy mud, grading into gravel near the entrance, and is almost entirely exposed at low tide (Pl. XXV).

In July, 1956, time permitted only one short visit to Hammond Bay, and this was used to examine the gravel at B. Only *Upogebia* were found and none of the twenty specimens examined was infected with *Clausidium*. On June 28th and 29th, 1957, during +0.6 low tides (U.S. West Coast Tide Tables 1957, corrected for Nanaimo) both the bay

Fig. 1.



Map of Hammond Bay, Nanaimo, Vancouver Island (adapted from Canadian Government Chart No. 3558). A—sandy beach, B—region of muddy gravel, C—point from which photograph (pl. XXV) was taken, D—Piper's Lagoon.

proper and Piper's Lagoon were explored. The beach at A was found to be too sandy to support any callianassids, but the bottom of Piper's Lagoon was riddled with their burrows. *Upogebia* occurred over the whole area of the Lagoon; *Callianassa californiensis* was more common in the region below the heavy dashed line (fig. 1 D). Specimens of both were rather small (5.1 cm. was the average length for infected *Callianassa*; the

largest *Upogebia* measured about 6 cms.\*) The *Callianassa*, however, were adult since several of the females bore eggs. The Lagoon was sampled at intervals over its surface but no *Callianassa gigas* were found. *Clausidium* occurred only on the *C. californiensis*: forty infected specimens yielded 69 adult females of this copepod (42 of them with males attached and 37 ovigerous); approximately 50 per cent of the *Callianassa* were infected. In addition, two *Callianassa* carried the bopyrid *Ione cornuta* Bate in the gill-chamber of one side and each of four *Upogebia* one of a pair (male and female) of *Phyllodurus abdominalis* Stimpson on the swimmerets. (Distribution records and literature for these isopods are given by Hatch, 1947). The *Callianassa* infected with *Ione* were not found to possess *Clausidium*, but this is not regarded as significant evidence for exclusion since the double association has been observed on specimens of *C. californiensis* collected near Kingston, Washington, by the author.

It is most probable (cp. especially fig. 1 and Pl. XXV, with the descriptive data given above) that Piper's Lagoon is the locality from which Potts' specimens came. On the basis of this and the other evidence, then, *Callianassa californiensis* is here proposed as the name of the type host of *Clausidium vancouverense*, and "*Callianassa pugettensis*" considered a synonym of the former. It should be emphasized, however, that this evidence is indirect only: it is possible that Potts collected not in Piper's Lagoon but either from the beach at A or from some other "sandy stretch" which has since disappeared and that *Callianassa gigas* occurred there. No information on changes in the physical conditions of Hammond Bay is available. However, it is unlikely that the problem of *Callianassa pugettensis* can be resolved further.

Specimens both of *Clausidium vancouverense* and its host, *Callianassa californiensis*, have been distributed to the U. S. National Museum, the British Museum (Natural History), the National Museum of Canada, the Zoölogisch Museum (Amsterdam), the Naturhistoriska Riksmuseet Evertebratavdelningen (Stockholm), the Muséum National d'Histoire Naturelle (Paris) and the Allan Hancock Foundation (Los Angeles). Some are also being retained in the Zoology Departmental collections at the University of Washington and in the author's private collection, from either of which examples may be obtained on request. It is suggested that the copepod material should be regarded as topotype and, in case it is ever desirable to create neotypes, an ovigerous female with male attached has been isolated from the specimens deposited in the U.S. National Museum and has received the separate Catalogue No. 100900. There is also a taxonomically important lot of *C. vancouverense* in the British Museum (Natural History) (Reg. No. 1912.3.14.146-155). These ". . . were collected by Miss Helen Pixel (later Mrs. Goodrich) in 1911 from the Marine Station, Departure Bay, Vancouver Island on *Callianassa californiensis*" and identified by Miss Haddon (personal communication from Dr. J. P. Harding).

\* All measurements are from the tip of the rostrum to the end of the telson.

\* *Hemicyclops pugettensis*.

Another copepod commonly found associated with *Callianassa* in the Puget Sound region is *Hemicyclops pugettensis* Light & Hartman. The present paper seems a suitable place to clarify the original reference to the locality from which the type specimens were obtained. The authors (1937) give this as "False Narrows, Puget Sound, Washington, on the surface of *Callianassa gigas* Dana". No "False Narrows" could be found in Puget Sound; correspondence with Dr. Barbara Oakeson (*née* Miss Blanchard), who collected the specimens of *C. gigas* used by Light & Hartman, elicited the statement that the reference was to False Bay (48° 29' 8" N., 123° 4' 6" W.) on San Juan Island, Washington—where topotype material of the copepod is still readily available. (Type specimens are in the U. S. National Museum: Cat. No. 71678).

The association of this species with *Callianassa californiensis* has not been mentioned in the literature but it has been found by the author at several localities in Puget Sound proper; and two specimens occurred with the *Clausidium* material from Piper's Lagoon, thus extending the northern limit for *H. pugettensis* some fifty miles. *C. gigas* is, however, the more usual host. The species has not been found on *Upogebia* in the Pacific Northwest.

SUMMARY.

The evidence bearing on the identity of *Callianassa pugettensis*, named as host in the original description of the copepod *Clausidium vancouverense*, is examined. It is concluded that the name must represent one of the three callianassids common in the Pacific Northwest: *Upogebia pugettensis*, *Callianassa gigas* or *C. californiensis*; and, of these, the last named is the most likely. Recent collections in the type locality—Hammond Bay, near Nanaimo, Vancouver Island—tend to confirm this although lack of knowledge about physical changes in the area since 1911 precludes certainty. However, the evidence is considered sufficient to warrant naming *Callianassa californiensis* the type host of *Clausidium vancouverense* and making *Callianassa pugettensis* a synonym of the former.

The type locality for the copepod *Hemicyclops pugettensis* is clarified, the association of this species with *Callianassa californiensis* in the Pacific Northwest noted and its northern distribution limit extended to Nanaimo, B. C.

ACKNOWLEDGMENTS.

I wish to thank Dr. Belle Stevens for assistance in identifying callianassids, Mr. and Mrs. Cyril Berkeley for their hospitality on both visits to Nanaimo; and, in addition to these, persons with whom I have corresponded in the institutions mentioned for their cooperation and helpful suggestions. It is also a pleasure to record my appreciation of the enthusiastic assistance rendered by Mr. R. Price Peterson in digging many of the specimens.

\* The author is at present engaged on a taxonomic review of the genus *Hemicyclops*.

This work was supported by Dr. P. L. Illg's research grant from the Initiative 171 Fund at the University of Washington, Seattle. Dr. Illg has also read and criticised the manuscript.

#### REFERENCES.

- EMBLETON, Alice L. 1901. *Goidelia japonica*—a new entozoic copepod from Japan associated with an infusorian (*Trichodina*). *J. Linn. Soc., (Zool.)*, **28**, 211-229.
- HADDON, Kathleen. 1912. *Hersilia (Clausidium) vancouverensis*. *Ann. Mag. nat. Hist.*, Ser. 8, **10**, 84-86.
- HATCH, Melville W. 1947. The Chelifera and Isopoda of Washington and adjacent regions. *Univ. Wash. Publ. Biol.*, **10**, 155-274.
- LIGHT, S. F. & HARTMAN, Olga. 1937. A review of the genera *Clausidium* Kossmann and *Hemicyclops* Boeck (Copepoda, Cyclopoida) with the description of a new species from the Northeast Pacific. *Univ. Calif. Publ. Zool.*, **41**, 173-188.
- MACGINITIE, G. E. & MACGINITIE, Nettie. 1949. *Natural History of Marine Animals*, 473 pp. McGraw-Hill.
- STEVENS, Belle A. 1928. Callianassidae from the west coast of North America. *Publ. Puget Sd. Mar. (biol.) Sta.* **6**, 315-369.
- TAYLOR, George W. 1912. Preliminary list of one hundred and twenty-nine species of British Columbia decapod crustaceans. *Contr. Canad. Biol.*, 1906-1910, 187-214.

#### EXPLANATION OF PLATE XXV.

View of Piper's Lagoon, Hammond Bay, at low tide, taken from point "C" on fig. 1 (from two Kodacrome transparencies, courtesy of D. Montgomery). *Callianassa* were collected mainly from the region in the background on the right side.

