

**On the Status of the Eastern Pacific Cymothoid Fish Parasite
Braga occidentalis Boone, and Its Synonymy with
B. patagonica Schioedte and Meinert (Crustacea:
Isopoda: Cymothoidae)**

Amid the various collections examined by the naturalist Pearl Lee Boone in her lifetime, is a single specimen of cymothoid isopod she chose to name *Braga occidentalis*. The specimen was allegedly collected from an unspecified locality "off the west coast of California" by James D. Dana and John L. Le Conte in 1866 (Boone 1918). This species has not been reported since and its validity has been seriously questioned by Lemos de Castro (1959), who suggested the possibility that it is in reality a synonym of *Braga patagonica* Schioedte and Meinert, 1884, a South American freshwater species. Lemos de Castro apparently did not examine the type of *B. occidentalis*. Our examination of this type specimen (deposited as a holotype in the Peabody Museum of Natural History, Yale University, YPM No. 302) has confirmed Lemos de Castro's suspicions and we herein synonymize *Braga occidentalis* Boone, 1918 with *B. patagonica*.

There is no original collection label associated with the type specimen, and considerable doubt is cast upon the data associated with it by Boone. First, there is no record of Dana and/or Le Conte having participated on any oceanic or coastal expeditions in the alleged year of the collection (1866). Secondly, the five other known species of the genus *Braga* are restricted in their distribution to freshwater habitats within the eastern drainage of South America (Trilles 1973). Lastly, no other specimens of *B. occidentalis*, or any congeners, have been reported from the Pacific or any other marine habitat.

During the year 1866, when the specimen was reported by Boone to have been obtained, neither Dana nor Le Conte were in a position to make such a collection. Just a year after the Civil War, Le Conte (ending an appointment as Surgeon of Volunteers) was acting geologist on an overland survey for the extension of the Union Pacific Railroad. Dana was gradually recovering from a severe physical breakdown following his completion of the United States Exploring Expedition Report on the Crustacea and Zoophytes, and was never again capable of extended travel.

The possibility still exists that either Dana or Le Conte collected the specimen Boone designated as *B. occidentalis*, but not in the year she reported. Le Conte traveled on an expedition to California in 1850-1851 collecting a considerable variety of material in many marine taxa, including crustaceans. The list of Crustacea was subsequently published by Dana (1854), but contained only intertidal and terrestrial species, suggesting that offshore collections were not made. There appears to be no record of Le Conte ever accompanying an expedition to the east coast of South America (although he did travel as far south as Honduras).

Dana, on the other hand, traveled extensively around the world as a geologist and naturalist for the U.S. Exploring Expeditions of 1838-1842, collecting along both the Atlantic and Pacific coasts of South America. Dana might have collected

the specimen in question from a freshwater or estuarine habitat along the east coast of South America, failing to describe it in his report on the Crustacea (Dana 1853). The Crustacea listed in his report included five genera of cymothoid isopods: *Cymothoa* and *Lironeca* (3 species each), collected from Rio de Janeiro and the Hawaiian Islands; *Nerocila* (6 species) from Rio de Janeiro; *Aegathoa* (2 species), from the Bahamas, Rio de Janeiro, and Tierra del Fuego; and *Ceratothoa* (2 species), from the Atlantic coast of North America and the Indo-Pacific. All 16 of these species are strictly marine in distribution, and none were reported from the eastern Pacific. Unfortunately, Dana did not include collection dates for any of the species he discussed.

We believe there are two possible explanations regarding the collection data reported by Boone for *Braga occidentalis*. First, one of Le Conte's South American colleagues may have sent the specimen to him, Le Conte subsequently forwarding it to Dana. Second, Dana may have collected the specimen along the Atlantic coast of South America while on the U.S. Exploring Expedition and later sent it to Le Conte for examination. Le Conte then would have returned the specimen (unidentified) years later, after the completion of Dana's report. The year presently associated with the specimen might then be the year Dana received the specimen back from Le Conte, and/or the year it was accessioned into the Yale Peabody Museum. Many years passed until Pearl Boone found the specimen on the shelves of the Yale Peabody Museum and described it, assuming it to be part of the Le Conte-Dana California collection.

Ho (1975) reported the only other record of *Braga* (n. sp.) from the eastern Pacific. His specimen subsequently has been lost and recent communication with Ho suggests that it was probably a case of mistaken generic identification. Based on his description it appears to have been a juvenile *Lironeca*.

We thank Thomas E. Bowman and Ernest W. Iverson for their critical review of this paper.

This is contribution no. 387 of the Allan Hancock Foundation, University of Southern California.

Appendix

- I. Chronology of J. L. Le Conte pertinent to the present paper (1825–1883)
 - 1850–1851 Expedition to California; stopped at Panama to make collections. Extended explorations through Colorado desert.
 - 1857 Accompanied the Honduras Inter-Oceanic Survey, under J. C. Trautwine. Visited Fuente de Sangu.
 - 1862–1865 Appointed Surgeon of Volunteers during Civil War.
 - 1867 Geologist, surveyed for extension of Union Pacific Railroad southward to Fort Craig, Colorado.
 - 1869–1872 Traveled in Europe, Algiers and Egypt.
 - 1874 President of American Association for the Advancement of Science.

Comments: Although Le Conte worked extensively in the field of entomology (particularly the Coleoptera), he also contributed numerous scientific articles to the fields of vertebrate paleontology and mammalogy.

II. Chronology of J. D. Dana pertinent to the present paper (1813–1895)

- 1834 Upon graduation from Yale appointed as Instructor of Mathematics to the midshipmen of the United States Navy. Traveled extensively.
- 1836–1838 Chemical assistant at Yale College.
- 1838–1842 Served as geologist and naturalist to the U.S. Exploring Expedition to the southern and Pacific Oceans under Comm. Charles Wilkes. The next 13 years were devoted largely to the study of the material collected by the expedition and preparation of his report.
- 1850 Appointed Professor of Geology and Natural History at Yale College.
- 1859 Suffered a severe physical breakdown. Traveled abroad in Europe for a year to regain health.
- 1862–1872 Published several books: *Manual of Geology* (1862), *Text Book of Geology* (1864), *Systematics of Mineralogy*, fifth edition (1868), *Manual of Geology*, new edition (1874), *Corals and Coral Islands* (1872).
- 1887–1890 Revisited the Hawaiian Islands (the "Sandwich Islands") and the Volcano of Kilauea.

Comments: Dana's principal publications dealt with hermatypic corals ("zoophytes"), crustaceans and geological formations. He was the first to propose the concept of cephalization in animals (1852), "The domination of the brain in determining the development of an animal organism," and he proposed a subsidence theory of atolls independently of Darwin's. His zoo-geographical analysis and techniques (1853) represent a landmark in marine biogeographical studies.

Literature Cited

- Boone, P. L. 1918. Description of ten new isopods. *Proc. U.S. Natl. Mus.*, 54(2253):591–604.
- Dana, J. D. 1853. United States Exploring Expedition. Vol. XIII. Crustacea, Part II. 1618 pp. Printed by C. Sherman, Philadelphia, Pennsylvania. (Dated 1852).
- . 1854. Catalogue and descriptions of Crustacea collected in California by Dr. John L. Le Conte. *Proc. Phil Acad. Natrl. Sci.*, 7:175–177.
- Ho, J.-S. 1975. Parasitic crustacea, in Lane, E. D. and C. W. Hill (Eds.), *The marine resources of Anaheim Bay*. Calif. State Fish and Game, Bull. No. 165:69–72.
- Lemos de Castro, A. 1959. Sobre as especies sul-Americanas do genero *Braga* Schioedte and Meinert (Isopoda, Cymothoidae). *Arquiv. Mus. Nac.*, 49:69–95.
- Trilles, J.-P. 1973. Notes documentaires sur les Isopodes Cymothoadiens parasites de poissons d'eau douce de l'Amerique du Sud. *Bull. Mus. Nat. d'Hist. Natur.*, ser. 3, No. 114, Zool., 88:239–272.

Accepted for publication December 2, 1980.

Melinda A. Thun and Richard C. Brusca, *Allan Hancock Foundation, University of Southern California, Los Angeles, California 90007.*