

ZOOLOGY.—*New distributional records for two athecate hydroids, Cordylophora lacustris and Candelabrum sp., from the west coast of North America, with revisions of their nomenclature.* CADET HAND, Mills College, Oakland, and University of California, Berkeley, and G. F. GWILLIAM, University of California, Berkeley. (Communicated by F. M. Bayer.)

### I. CORDYLOPHORA

In August 1950 an unidentified hydroid was found in a collection at the University of California at Berkeley. The label bore no collection date or collector's name, but it did report the locality from which the animal was taken as Antioch, Calif., which is located on the San Joaquin River 5 miles upstream from its junction with the Sacramento River. The hydroid was subsequently identified as the widely distributed fresh- and brackish-water form, *Cordylophora lacustris* Allman.

On August 26, 1950, the writers found this hydroid growing on pieces of old manila rope suspended from a floating dock in the San Joaquin River at Antioch. The ropes were literally covered with colonies of varying sizes. A sample of the river water taken at this time showed a chlorinity of 1.02 parts per thousand (5.4 per cent of sea water).

What appears to be the first recognizable description of this hydroid was that of Allman (1844), who found it in the docks of the Grand Canal, Dublin, Ireland. Roch (1924) in a paper dealing with many aspects of the biology of this hydroid reviewed its distribution, listing the following general localities in which *Cordylophora* occurred: Germany, Holland, Denmark, Sweden, Finland, Esthonia, Courland (now part of Lithuania), Russia, France, Belgium, England, Ireland, United States, Brazil, Egypt, Australia, Tasmania, New Zealand, China.

In North America, Leidy (1870) first detected this hydroid at Newport, R. I., and later in the vicinity of Philadelphia, Pa. Since that time *C. lacustris* has been found in several localities in North America, some of them a considerable distance inland.

Fraser (1944, p. 35) reports the American distribution as: "Newport, R. I. (Leidy); St. Andrews, Gaspé, Seven Islands (Stafford); New England (Kingsley); Woods Hole (Nutting); several ponds near Woods Hole, Marthas Vineyard (Hargitt); Miramichi estuary, Frenier Beach, La. (Fraser);

Gatun locks, Panama canal." In addition, Ward and Whipple (1945) list the following: Illinois River at Havana, Ill.; Mississippi River at Granite City and at East St. Louis, Ill.; Arkansas River at Little Rock, Ark.; and the Red River at Shreveport, La.

The present report is the first record of the existence of this organism on the west coast of North America. This was not entirely unexpected, as Fraser (1946, p. 101) stated: "It has not yet been reported from the eastern Pacific, but it has extended along the whole length of the North American Atlantic, and as it has entered the Panama canal as far as the Gatun locks, it may show up in the Pacific before long."

Several varieties of *C. lacustris* have been described. Schulze (1921) mentions the forms *albicola*, *transiens*, and *whiteleggei*. Fyfe (1929) described a new subspecies (*otagoensis*) from New Zealand. Earlier Leidy (1870) gave to what he recognized as a small variety of *C. lacustris* the name *C. americana*. Briggs (1931) points out that *C. lacustris* is extremely variable in growth form and that growth form may depend upon salinity. It appears that all the named subspecies and forms of *C. lacustris* are nothing more than variations in habit. The present writers have found such extensive variation in the specimens studied that the recognition of named varieties seems to have no taxonomic significance.

There is some doubt as to whether the proper specific name of *Cordylophora* is *lacustris* or *caspia*. Pallas (1771) described a hydroid from the Caspian Sea as *Tubularia caspia*. This is said by some to be identical with *C. lacustris* Allman (Roch, 1924; Cordero, 1941). Other writers feel that Pallas' description is too vague to permit an exact diagnosis (Briggs, 1931; Bedot as quoted by Briggs) and prefer to retain *C. lacustris*.

The present writers have studied the Pallas description and find it so generalized that it might as well refer to many other



hydroids as to *C. lacustris*. Further, there seem to be no valid records of this hydroid from the Caspian Sea since the time of Pallas. Because of this, coupled with the fact that *C. lacustris* Allman has had such wide usage, the present writers choose to retain Allman's name until it can be clearly shown that *Tubularia caspia* Pallas is identical with *Cordylophora lacustris* Allman.

Another nomenclatural problem is brought up by Finlay (1928). Finlay declares that the family Clavidae to which *Cordylophora* belongs is an invalid name due to preoccupation by the gastropod genus *Clava* Martyn (1784) over the hydroid genus *Clava* Gmelin (1791). Finlay suggests that the name Clavidae be replaced by the name Cordylophoridae, *Cordylophora* being the next available generic name. This solution changes the type genus of the family, an action for which there is no valid taxonomic reason, and, further, Finlay fails to reassign the species of *Clava* (the hydroids) to any other genus. In considering this matter it has been pointed out to us by Dr. H. A. Rehder, curator of mollusks, U. S. National Museum, that the system used by Martyn in his "Universal Conchologist" is non-Linnaean, and that Martyn's names are therefore not available and do not preoccupy. The change suggested by Finlay (*op. cit.*) was therefore unnecessary, and the hydroid genus *Clava* Gmelin (1791) stands as the valid type of the family Clavidae.

Material from the University of California collection (U.S.N.M. no. 49727), the San Pablo Reservoir, and fresh material from Antioch (U.S.N.M. no. 49726) has been carefully examined and compared and no characters separating these from *C. lacustris* have been found.

#### Family CLAVIDAE

Genus *Cordylophora* Allman, 1844

*Cordylophora lacustris* Allman

*Colony*: Growth form variable. Sometimes a main axis with hydranths given off alternately, sometimes more diffuse and irregular, or colony branched, lacking a main axis. Hydrocaulus arising from creeping hydrorhizae. Perisarc well developed. Longest hydrocaulus observed approximately 6 cm.

*Trophosome*: Hydranth clavate, pedicellate,

with up to 30 scattered, filiform tentacles. Perisarc at bases of pedicels often annulated, but occasionally smooth or "corrugated" on one side only. Perisarc extending only to base of hydranth. Tentacles quite extensile, mouth terminal. Nematocysts; desmonemes (4.0–6.0 by 3.0–4.0 $\mu$ ) and microbasic euryteles (7.5–11.0 by 4.0–4.5 $\mu$ ).

*Gonosome*: Dioecious. Sporosacs sessile or borne on short pedicels which may or may not be annulated at their bases as in trophosome. Gonophores enclosed in a thin perisarc, and arise from hydrocauli or pedicels. In the female the eggs are extruded from the generative tissue into a jelly-like mass. The generative tissue regresses as the eggs are extruded, finally leaving a variable number (approximately 1–8) of recognizable ova. At this site the ova develop into planulae and are then released. In general, the female gonophores tend to be more spherical than the male. In life female gonophores pinkish, male whitish.

*Habitat and distribution*: On sticks, ropes, floating docks, etc. in fresh or brackish water. In California, *C. lacustris* occurs at Antioch, and has been reported from Lake Merced, San Francisco (Dr. R. C. Miller, California Acad. Sci., personal communication) and from the San Pablo reservoir system, El Cerrito, California (Dr. H. Kirby, Jr., Univ. California, Berkeley, personal communication). Also, according to Dr. T. Kincaid, Univ. Washington, Seattle (*in litt.*) this species occurs in the Puget Sound area. It has evidently been in California for a number of years. The old University of California specimen mentioned above is thought to be 20 to 40 years old.

## II. CANDELABRUM

On May 6, 1950, three specimens of *Candelabrum* sp. (= *Myriothele* sp.) were collected from a pholad hole on the under-surface of a rock at approximately the zero foot tide level (mean lower low water) at Pigeon Point, San Mateo County, Calif. The authors do not feel that this is sufficient material to warrant specific identification, especially since none of the polyps bear mature gonophores. Several attempts were made to obtain more material, but thorough searching has failed to reveal the presence of further specimens. It may be that it is a stray in the intertidal zone and exists in numbers subtidally. Some indication of this may be gained from the fact that several



of the known species of *Candelabrum* are subtidal forms. Of the generic identification, we feel that there is no doubt.

As nearly as the authors have been able to determine there are now nine valid species of this genus. The first was described as *Lucernaria phrygia* by Fabricius (1780). This was later redescribed by Sars (1850), apparently unaware of Fabricius' description, as *Myriothela arctica*. De Blainville (1830; reprinted, 1834) realized that Fabricius' animal was not a *Lucernaria* and proposed the name *Candelabrum* for it. He indicated at the same time that it was related to the Sipunculids. Allman (1872, p. 381) states: "De Blainville, seeing that Fabricius's animal had no relation with *Lucernaria*, constituted for it, in 1834, his genus *Candelabrum*, and as this name has priority over *Myriothela*, it is accepted by Agassiz as the legitimate name of the genus." Allman goes on to explain that De Blainville did not recognize its true affinities, while Sars did. He chooses to retain *Myriothela* Sars in spite of the law of priority, an action that the present authors do not deem justified. The replacement of the name *Myriothela* by *Candelabrum* necessitates the renaming of this monogeneric family, which we now designate as the Candelabridae (= Myriothelidae Allman).

In addition to *Candelabrum phrygium*, the other known species and the localities from which they were taken are: *C. mitrum* (off coast of Norway near Bergen, deep water, Bonnevie, 1898); *C. minutum* (near Tromsø, Norway, intertidal?, Bonnevie, 1898); *C. verrucosum* (locality not given, Bonnevie, 1898); *C. giganteum* (Greenland Sea, deep water, Bonnevie, 1898); *C. austrogeorgiae* (off Cumberland Bay, South Georgia Island, deep water, Jäderholm, 1904); *C. cocksii* (Falmouth, England, intertidal, Cocks, 1849, as a nomen nudum; Cocks, 1853, name validated); *C. harrisoni* (New South Wales, Australia, intertidal, Briggs, 1928); *C. australe* (New South Wales, Australia, intertidal, Briggs, 1928).

Fraser (1946, p. 168) reports that only one species is known from North America (*C. pyrgium*) and states concerning it: "The only American location so far reported is off Grand Manan Island, at the mouth of the bay of Fundy, but its range extends

eastward by way of Greenland and Iceland to Great Britain, Norway, Nova Zembla, and the Siberian Polar Sea."

Family CANDELABRIDAE, nom. nov.

Genus *Candelabrum* de Blainville, 1830

*Candelabrum*, sp. ind.

U. S. N. M. no. 49725.

*Hydranth*: Not branched, solitary, naked and arising from a creeping hydrorhiza or possibly a disc. Hydrorhizae invested with perisarc. Exclusive of hydrorhizae, polyp divisible into two zones; a distal tentacle-bearing zone and a proximal tentacle-free blastostylar zone. The tentacle-bearing zone composes five-sixths or more of the polyp length and bears approximately 500 tentacles in the adult; cylindrical, approximately the same diameter throughout. Tentacles densely packed, short, capitate and not arranged in any discernible pattern. Mouth terminal. Blastostylar zone swollen, of a slightly greater diameter than the tentacle bearing zone. Sometimes separated from tentacle-bearing zone by a constriction; at the proximal end tapering sharply to hydrorhiza. Structures referred to by Allman (1875) as "claspers" not present on specimens examined. Blastostyles giving rise to more than one gonophore. Largest specimen (preserved) 2.5 cm long by 0.15 cm. in diameter (including the tentacle.)

Of the known species of *Candelabrum*, the species described above most closely resembles *Candelabrum harrisoni* Briggs. In fact there are no obvious differences, but in view of the unusual distribution which Briggs' species would then have, plus the paucity of material available, it does not seem wise to make the two conspecific at this time.

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ZOOLOGY.—*The diplopod family Campodesmidae (Polydesmida)*. RICHARD L. HOFFMAN, Clifton Forge, Va. (Communicated by E. A. Chapin.)

The name Campodesmidae was proposed in 1895 by O. F. Cook. Appearing in a key to the tropical African families of polydesmoid millipeds, the original description was rather inadequate. Subsequently, in several publications cited below, additional information (of a fragmentary nature) was given about the family and its two genera, but later workers have never been able to derive a very satisfactory idea of the nature of the group. It is a matter of some interest that campodesmids have never been encountered by other workers, who have managed to come across most of the other West African genera described by Cook.

Since the great majority of Cook's Liberian species have never been adequately described and have been mostly ignored by later workers, it appears necessary to re-describe them. Through the unfailing co-operation of Dr. E. A. Chapin, I have been able to study the Cook collection now in the U. S. National Museum. The present paper, the first of a planned series, is concerned with the campodesmids and with the systematic position of the family.

#### Family CAMPODESMIDAE Cook

Campodesmidae Cook, Proc. U. S. Nat. Mus. **18**: 82. 1895; Amer. Nat. **30**: 414. 1896.

*Diagnosis*.—Male gonopods large, prominent, protruding from a large oval sternal aperture. Coxae subcylindrical, attached loosely to each other, largely concealed within the aperture. Prefemur small, with a large unbranched laminate prefemoral process. No distinction between femur and tibiotarsus, the latter distally elongate, slender, forming nearly a complete circle.

Gnathochilarium and mandibles typical of the usual polydesmoid form.

Antennae of moderate heaviness, with a few scattered hairs. Four sensory cones, concealed within the seventh article.

Head finely granular, with a well-defined vertical groove. A prominent ovoid longitudinal swelling immediately under each antennal socket. Clypeal area much swollen, raised above level of frons, glabrous.

Collum rather small, not concealing the head and much exceeded in width by the keels of the second segment.

Keels of midbody segments well developed, wide as body cavity but narrow and widely



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#### I. CORDYLOPHORA

In August 1950 an unidentified hydroid was found in a collection at the University of California at Berkeley. The label bore no collection date or collector's name, but it did report the locality from which the animal was taken as Antioch, Calif., which is located on the San Joaquin River 5 miles upstream from its junction with the Sacramento River. The hydroid was subsequently identified as the widely distributed fresh- and brackish-water form, *Cordylophora lacustris* Allman.

On August 26, 1950, the writers found this hydroid growing on pieces of old manila rope suspended from a floating dock in the San Joaquin River at Antioch. The ropes were literally covered with colonies of varying sizes. A sample of the river water taken at this time showed a chlorinity of 1.02 parts per thousand (5.4 per cent of sea water).

What appears to be the first recognizable description of this hydroid was that of Allman (1844), who found it in the docks of the Grand Canal, Dublin, Ireland. Roch (1924) in a paper dealing with many aspects of the biology of this hydroid reviewed its distribution, listing the following general localities in which *Cordylophora* occurred: Germany, Holland, Denmark, Sweden, Finland, Esthonia, Courland (now part of Lithuania), Russia, France', Belgium, England, Ireland, United States, Brazil, Egypt, Australia, Tasmania, New Zealand, China.

In North America, Leidy (1870) first detected this hydroid at Newport, R. I., and later in the vicinity of Philadelphia, Pa. Since that time *C. lacustris* has been found in several localities in North America, some

of them a considerable distance inland.

Fraser (1944, p. 35) reports the American distribution as: "Newport, R. I. (Leidy); St. Andrews, Gaspe, Seven Islands (Stafford); New England (Kingsley); Woods Hole (Nutting); several ponds near Woods Hole, Marthas Vineyard (Hargitt); Miramichi estuary, Frenier Beach, La. (Fraser);

Gatun locks, Panama canal." In addition, Ward and Whipple (1945) list the following: Illinois River at Havana, 111.; Mississippi River at Granite City and at East St. Louis, 111.; Arkansas River at Little Rock, Ark.; and the Red River at Shreveport, La.

The present report is the first record of the existence of this organism on the west coast of North America. This was not entirely unexpected, as Fraser (1946, p. 101) stated: "It has not yet been reported from the eastern Pacific, but it has extended along the whole length of the North American Atlantic, and as it has entered the Panama canal as far as the Gatun locks, it may show up in the Pacific before long."

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belongs is an invalid name due to preoccupation by the gastropod genus *Clava* Martyn (1784) over the hydroid genus *Clava* Gmelin (1791). Finlay suggests that the name Clavidae be replaced by the name Cordylophoridae, Cordylophora being the next available generic name. This solution changes the type genus of the family, an action for which there is no valid taxonomic reason, and, further, Finlay fails to reassign the species of *Clava* (the hydroids) to any other genus. In considering this matter it has been pointed out to us by Dr. H. A. Rehder, curator of mollusks, U. S. National Museum, that the system used by Martyn in his "Universal Conchologist" is non-Linnaean, and that Martyn's names are therefore not available and do not preoccupy. The change suggested by Finlay (op. cit.) was therefore unnecessary, and the hydroid genus *Clava* Gmelin (1791) stands as the valid type of the family Clavidae.

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## Family Clavidae

Genus *Cordylophora* Allman, 1844

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Colony: Growth form variable. Sometimes a main axis with hydranths given off alternately, sometimes more diffuse and irregular, or colony branched, lacking a main axis. Hydrocaulus arising from creeping hydrorhizae. Perisarc well developed. Longest hydrocaulus observed approximately 6 cm.

Trophosome: Hydranth clavate, pedicellate, with up to 30 scattered, filiform tentacles. Perisarc at bases of pedicels often annulated, but occasionally smooth or "corrugated" on one side only. Perisarc extending only to base of hydranth. Tentacles quite extensile, mouth terminal. Nematocysts; desmonemes (4.0-6.0 by 3.0-4.0<sup>μ</sup>) and microbasic euryteles (7.5-11.0 by 4.0-4.5  $\mu$ ).

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be annulated at their bases as in trophosome.

Gonophores enclosed in a thin perisarc, and arise from hydrocauli or pedicels. In the female the eggs are extruded from the generative tissue into a jelly-like mass. The generative tissue regresses as the eggs are extruded, finally leaving a variable number (approximately 1-8) of recognizable ova. At this site the ova develop into planulae and are then released. In general, the female gonophores tend to be more spherical than the male. In life female gonophores pinkish, male whitish.

Habitat and- distribution: On sticks, ropes, floating docks, etc. in fresh or brackish water. In California, *C. lacustris* occurs at An+ioch, and has been reported from Lake Merced, San Francisco (Dr. R. C. Miller, California Acad. Sci., personal communication) and from the San Pablo reservoir system, El Cerrito, California (Dr. H. Kirby, Jr., Univ. California, Berkeley, personal communication). Also, according to Dr. T. Kincaid, Univ. Washington, Seattle (in litt.) this species occurs in the Puget Sound area. It has evidently been in California for a number of years. The old University of California specimen mentioned above is thought to be 20 to 40 years old.



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The authors do not feel that this is sufficient material to warrant specific identification, especially since none of the polyps bear mature gonophores. Several attempts were made to obtain more material, but thorough searching has failed to reveal the presence of further specimens. It may be that it is a stray in the intertidal zone and exists in numbers subtidally. Some indication of this may be gained from the fact that son oral

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of this monogeneric family, which we now designate as the Candelabridae (= Myriothelidae Allman).

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Family Candelabridae, nom. nov.

Genus Candelabrum de Blainville, 1830

Candelabrum, sp. ind.

U. S. N. M. no. 49725.

Hydranth: Not branched, solitary, naked and arising from a creeping hydrorhiza or possibly a disc. Hydrorhiza? invested with perisarc. Exclusive of hydrorhizae, polyp divisible into two zones; a distal tentacle-bearing zone and a proximal tentacle-free blastostylar zone. The tentacle-bearing zone composes five-sixths or more of the polyp length and bears approximately 500 tentacles in the adult; cylindrical, approximately the same diameter throughout. Tentacles densely packed, short, capitate and not arranged in any discernible pattern. Mouth terminal. Blastostylar zone swollen, of a slightly greater diameter than the tentacle bearing zone. Sometimes separated from tentacle-bearing zone by a constriction: at the proximal end tapering sharply to hydrorhiza.



Structures referred to by Allman (1875) as "claspers" not present on specimens examined. Blastostyles giving rise to more than one gonophore. Largest specimen (preserved) 2.5 cm long by 0.15 cm. in diameter (including the tentacle .)

Of the known species of *Candelabrum*, the species described above most closely resembles *Candelabrum harrisoni* Briggs. In fact there are no obvious differences, but in view of the unusual distribution which Briggs' species would then have, plus the paucity of material available, it does not seem wise to make the two conspecific at this time.

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ZOOLOGY. — The diplopod family Campodesmidae (Polydesmida) . Richard L.

Hoffman, Clifton Forge, Va. (Communicated by E. A. Chapin.)

The name Campodesmidae was pre  
in 1895 by O. F. Cook. Appearing in a key to  
the tropical African families of polydesmoid  
millipeds, the original description was rather  
inadequate. Subsequently, in several publica-  
tions cited below, additional information (of  
a fragmentary nature) was given about the  
family and its two genera, but later workers



have never been able to derive a very satisfactory idea of the nature of the group. It is a matter of some interest that campodesmids have never been encountered by other workers, who have managed to come across most of the other West African genera described by Cook.

Since the great majority of Cook's Liberian species have never been adequately described and have been mostly ignored by later workers, it appears necessary to re-describe them. Through the unfailing co-operation of Dr. E. A. Chapin, I have been able to study the Cook collection now in the U. S. National Museum. The present paper, the first of a planned series, is concerned with the campodesmids and with the systematic position of the family.

#### Family Campodesmidae Cook

Campodesmidae Cook, Proc. U. S. Nat. Mus. 18: 82. 1895; Amer. Nat. 30: 414. 1896.

Diagnosis. — Male gonopods large, prominent, protruding from a large oval sternal aperture. Coxae subcylindrical, attached loosely to each other, largely concealed within the aperture. Pre-



femur small, with a large unbranched laminate prefemoral process. No distinction between femur and tibiotarsus, the latter distally elongate, slender, forming nearly a complete circle.

Gnathochilarium and mandibles typical of the usual polydesmoid form.

Antennae of moderate heaviness, with a few scattered hairs. Four sensory cones, concealed within the seventh article.

Head finely granular, with a well-defined vertical groove. A prominent ovoid longitudinal swelling immediately under each antennal socket. Clypeal area much swollen, raised above level of frons, glabrous.

Collum rather small, not concealing the bead and much exceeded in width by the keels of the second segment.

Keels of midbody segments well developed, with- as body cavity but narrow and widely