

ON THE TYPE LOCALITIES OF CERTAIN TEXAS PHYLLOPODA

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Packard, in the August, 1871, issue of Silliman's journal¹, published a number of new species of phyllopod crustacea, among which were five from Texas, namely, *Limnetis gracilicornis*, *Estheria belfragei*, *Limnadia (Eulimnadia) texana*, *Streptocephalus texanus*, and *Apus aequalis*. For the last species the designated type locality was Matamoros, Tamaulipas, Mexico; while the other four species were described with "type localities" as follows: *Streptocephalus texanus*, *Limnadia texana*, and *Estheria belfragei* were described from Waco, in McLennan County; while no locality was given for *Limnetis gracilicornis*. In Packard's later extended monograph² the type locality for *Limnetis gracilicornis* is given (p. 302) as "Waco, Tex., with *Eulimnadia texana* and *Streptocephalus texanus*." These Texan species were collected by the well-known entomologist, Gustaf W. Belfrage³, who for the last fifteen years of his life lived in Texas, and from the year 1868 to his death late in the year 1882, lived in McLennan and [chiefly] Bosque Counties, whence he sent rich collections of insects to specialists and museums throughout the world. For several

¹ Packard, A. S., Jr. (1871), "Preliminary Notice of new North American Phyllopoda". *Amer. Jour. Sci. & Arts* (III) 2:108-113 [dated from Peabody Academy of Science, Salem, May 20, 1871].

² Packard, A. S., Jr. (1883), "A Monograph of the Phyllopod Crustacea of North America, with Remarks on the Order Phyllocardia". *Twelfth Ann. Rept. U. S. Geol. & Geogr. Surv. Territories, Part I*, pp. 295-514, pls. i-xxxviii.

³ Brief accounts of the life and work of Belfrage are contained in two papers by the present writer: "Naturalists of the Frontier: III. Gustaf Wilhelm Belfrage", in *Southwest Review*, 14:381-398, 1929; "G. W. Belfrage's Texas Localities". *Ent. News* [in press].

years Belfrage was a correspondent of Packard, and sold widely, after 1875, specimens of Texas phyllopods⁴. The type localities given for these species by Packard in his various papers have been repeated subsequently by students of the phyllopods, although, as shall appear below, the "type localities" originally given were erroneous.

It is not possible at this date to find the type specimens. A very careful search through the phyllopod collections in American museums has been disappointing in its results. Only one of the *types* of Packard's 1871 species is to be found. This is of *Apus lucasanus* Pack., which is in the Museum of Comparative Zoology at Cambridge. Regarding the original collection localities of these species, we have an explicit statement from Belfrage himself⁵ to the effect that his phyllopod crustaceans "were discovered by me a few years ago [Belfrage is writing in 1876] in some shallow ponds in Bosque Co[unty], and so far as I know this is the only locality for them." He then goes on to say that the ground on which the temporary pools of his collection were located was soon to be under cultivation, which may account for Packard's complaint (1883, p. 302) that he was unable, sometime before 1877, to obtain Texas specimens of *Limnetis gracilicornis*, etc., for dissection and study. In the Natural History Museum at Stockholm⁶ the Belfrage phyllopod crustacea are labeled "Am. Journ. Sc., Clifton, Aug. 1871", and this material includes the three species *Streptocephalus texanus*, *Limnetis gracilicornis*, and *Estheria belfragei*. This would corroborate Belfrage's statement

⁴In Nos. 12, 13, 14 of the first volume of the *Quart. Rev. Conchol.*, 1875, Belfrage advertised for sale various objects on the natural history of Texas; among them, phyllopod crustacea. In the *Fifth Ann. Rept.* of the Trustees of the Peabody Academy of Science [for 1872], acknowledgment is made of the receipt of Texas phyllopods. These specimens have since disappeared.

⁵G. W. Belfrage to Ph. R. Uhler, June 5, 1876. [Orig. in library of the Museum of Comparative Zoology, Cambridge.]

⁶I am very greatly indebted to Prof. Dr. Yngve Sjöstedt and Prof. Dr. Sixten Bock of the Naturhistoriska Riksmuseum of Stockholm, for repeated acts of kindness and help in regard to the present questions. Professor Sjöstedt caused the archives of the Museum and the Vetenskapsakademi to be searched for Belfrage letters to Boheman, Stal, and Loven, and supervised their transcription for me; while Professor Bock very kindly looked up the phyllopod material in the museum, and transcribed the labels.

that his material came from Bosque County, and not from Waco, forty-five miles to the eastward.

Packard's error in ascribing these species to Waco as the type locality is probably due to Belfrage's unfortunate method of heading his letters with his *forwarding address*, "Care of Forsgard & Co., Waco", instead of his residence, which was at different times at Clifton, Norse, and on Meridian Creek, all in Bosque County, Texas. That Belfrage indifferently used two addresses for his letters is seen in the fact that on one day in 1870 he addressed two letters, one to Dr. Carl Stal and the other to Alpheus Hyatt, with the date lines showing Bosque County and Waco, respectively. It was probably this indifferent use of his forwarding address that gave Packard the mistaken impression that these Texas species of phyllopod crustacea were collected at Waco.

The original letters of Belfrage to Packard are not available. The libraries of the Museum of Comparative Zoology at Cambridge, the Boston Society of Natural History, and of the U. S. National Museum possess quite a number of Belfrage letters to American naturalists. Nevertheless, a very careful search for Packard letters during the past four years (in which I have had the assistance and collaboration of Mr. H. L. Koopman, librarian of Brown University; Mr. G. G. Wilder, librarian of Bowdoin College—Bowdoin inherited Packard's library; and of Mr. A. A. Packard, of Syracuse, N. Y.) has failed to reveal a Packard correspondence. Consequently, we cannot find the original correspondence between Belfrage and Packard over the phyllopod crustacea⁷.

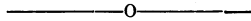
Even in the absence of such correspondence, however, the conclusions are plain. All four species—*Limnetis gracilicornis*, *Estheria belfragei*, *Limnadia (Eulimnadia) texana*, *Streptocephalus texanus*—were first collected in Bosque County, Texas, near the village of Clifton, and the original diagnoses were based on this material. Packard's first

⁷ During the years 1929-33, these correspondents gave such help as they could in the attempt to find Packard correspondence and phyllopod types; and this is gratefully acknowledged.

Texas material of *Apus aequalis* also came from the same source.

Shortly after Belfrage's collection of these species of phyllopods in Bosque County, Jacob Boll⁶, a naturalist resident in Dallas County, collected at Dallas for the Museum of Comparative Zoology (Dec. 7, 1874) individuals of the species *Streptocephalus texanus*, *Estheria belfragei*, and *Limnetis gracilicornis*, all of Packard; 1871. It is probable that these species are very widely distributed in Texas, and concerted efforts to determine their geographical and seasonal distribution would be highly desirable.

⁶ For an account of the life and work of Jacob Boll, see two papers by the present writer: "Naturalists of the Frontier, I. Jacob Boll," in *Southwest Review* 14:184-198, 1928; and "Professor Jacob Boll and the Natural History of the Southwest", in *Amer. Midl. Nat.*, 11:435-452, 1929.



VARIATION IN THE PARASITIC WORM, ASCARIDIA LINEATA, FROM DALLAS COUNTY, TEXAS

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In the course of a recent study¹ of the helminth parasites of domestic fowl in Dallas County, certain interesting variations were observed in the number and distribution of the caudal papillae of one of the parasites, *Ascaridia lineata* (Schneider). These are described below and illustrated in the accompanying figures.

According to Cram², worms belonging to this species are large, thick, and yellowish, with two very prominent white lateral lines. Lane³ describes his (*n. s.*) *Ascaridia hamia* [*A. lineata*] as having no lateral membranes, but a rope-

¹ Adams, F., & Geiser, S. W. (1929). "Intestinal Parasites of the Chicken in Dallas County, Texas." *Anat. Rec.*, 44:266; (1933) "Helminth Parasites of the Chicken (*Gallus domesticus*) in Dallas County, Texas." *Amer. Midl. Nat.* 14. [May, 1933.]

² Cram, E. B. (1927). "Bird Parasites of the Nematode Suborders Strongylata, Acaridia, and Spirurata." *Bull.* 140 U. S. Nat. Museum.

³ Lane, C. (1914). "Suckered Roundworms from India and Ceylon." *Ind. Jour. Med. Research* 2:655-669.