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A NOTE REGARDING MYIASIS, ESPECIALLY THAT DUE TO SYRPHID LARVAE *

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DETROIT

Bruce¹ (1917) has recently published a paper reporting from Vancouver Island a very interesting case of vaginal myiasis in the cow due to the "rat-tailed larva" of the drone fly, *Eristalis*. He does not say how many larva were found, but notes that the vagina was diseased and that a discharge was present. In his paper, Bruce says: "I am unable to find any reference to invasion of the vaginal cavity by the larvae of *E. tenax* in either man or animals." As a matter of fact, Bruce's case is the second recorded case of this sort, the first having been published by Hall and Muir² (1913). Their record is as follows:

In the Bureau of Animal Industry collection of parasites . . . there are also eight *Eristalis* larvae sent in from Laurel, Md., in 1909, with the statement that they were passed in a jelly-like substance from the vagina of cattle. In correspondence relative to these specimens, Dr. B. H. Ransom suggests to the sender:

Probably a diseased condition of the organ in which you found these larvae created an odor which attracted the flies to this particular place, with the result that they have deposited their young in the unusual location.

The above record has been cited by Metcalf³ (1916), but it is not at all surprising that the record escaped the attention of Dr. Bruce. The fact that we now have two records of the presence of *Eristalis* larvae in the diseased vagina of cattle instead of one record, however, does much to establish the validity of both records and the likelihood that similar occurrences do happen from time to time.

Hall and Muir² listed a summary of seven published cases of myiasis in man due to larvae of the *Syrphidae*. To this they add their new case and four cases from the files of the United States Bureau of Entomology, furnished through the courtesy of Dr. L. O. Howard and

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1. Bruce, E. A.: A New Parasite for Cattle. The Larvae of *Eristalis tenax* L. (drone fly), Jour. Am. Vet. Med. Assn., 1917, **1**, 66-68, Fig. 1.

2. Hall, M. C., and Muir, J. T.: A Critical Study of a Case of Myiasis Due to *Eristalis*, THE ARCHIVES INT. MED., 1913, **11**, 193.

3. Metcalf, C. L.: Syrphidae of Maine, Bull. 255, Maine Agric. Exper. Sta., 1916.

Mr. R. S. Clifton, and one from the files of the United States Bureau of Animal Industry, furnished through the courtesy of Dr. A. D. Melvin and Dr. B. H. Ransom, to whose courtesy they were also indebted for the record of the case of vaginal myiasis. Twelve of these were cases of gastro-intestinal myiasis and one (Leidy's) a case of nasal myiasis. To the summary of human cases by Hall and Muir, I wish to add an unpublished case in man, for which I am indebted to the kindness of Dr. Allen J. Smith of the University of Pennsylvania and Dr. F. J. Bardwell of Tunkhannock, Pa., and to note a subsequently published record by Iches⁴ (1914), and three records of Austen (1912, not available), cited by Graham-Smith⁵ (1914).

Under date of April 24, 1913, Dr. Smith wrote me as follows:

I have recorded here in our laboratory reports a case of *Eristalis* in the human stool, definitely regarded as *Eristalis*, and tentatively, for the same reason you assign in your case, *E. tenax* (common occurrence of the fly). The specimens (two) were sent Sept. 9, 1908, by Dr. F. J. Bardwell of Tunkhannock, Pa., through the State Health Department (the bacteriological work of which was then done by this laboratory) as from the stool of B. L., white, male, native, aged 18. No statement as to the condition of the subject and no account of the circumstances of recovery of the specimens were given, although doubtless Dr. Bardwell can furnish them. I note the specimens as 13 and 14 mm. in length, respectively, 4 and 5 mm. thick in anterior part; the "tail" as equaling the body length in the first, somewhat retracted in the second; tail curved anteriorly. Dark brown, firm, apparently brittle, seven pairs of hook-bearing prolegs (numerous hooks arranged in curved rows). Dorsally at head end two pairs of hooks, the posterior the longer and directed forward, the anterior the smaller and directed backward. On each side submedian row of indefinite tubercles, between which are a number of fine transverse ridges of the cuticle. Indefinitely seven-segmented. . . . It has never been published.

In response to a recent request for information in regard to this case, Dr. Bardwell wrote me, under date of Oct. 12, 1917, as follows:

I remember the case you refer to very well. . . . About a year after that, he had the same thing again. There is no doubt about it being a genuine case. Creolin, one dram to quart of hot water, was the treatment. The symptoms are intense irritation of the rectum.

Iches⁴ (1914) states that when traveling in the Argentine Republic he found in the entomologic collection which is under Dr. Lahille's supervision, two rat-tailed larvae collected at Necochea in 1904, and was furnished the following history by Dr. Lahille:

A physician at Necochea was called in to attend a 7-year-old girl who complained of a pain in the rectum. Nothing was detected on simple examination and the doctor ordered washing, which brought about no change. He then gave a purgative, which caused the expulsion of the larvae, which were sent

4. Iches, L.: Un cas original d'hospitalisation rectale, Arch. d. parasitol., 1914, **3**, 473.

5. Graham-Smith, G. S.: Flies in Relation to Disease. Non-bloodsucking Flies. Cambridge, 1914.

to Lahille. The two larvae measured as follows: Body 12.5 mm. long by 2 mm. wide; tail 18 mm.; body 11 mm. long by 2 mm. wide; tail 13.5 mm. The color was dirty gray.

Austen's cases of human myiasis due to syrphid larvae are noted by Graham-Smith⁵ as follows: "In England, Austen (1912) has met with . . . two cases due to the larvae of a *Syrphus* or hover-fly, one case due to the 'rat-tailed maggot' of *Eristalis tenax*. . . ."

It would appear, then, that there are at least seventeen records claiming the presence of syrphid larvae in the digestive tract of man; one record claiming their presence in the nostrils of man; and two records claiming their presence in the diseased vagina of cattle.

In passing, it might be noted that Blundeville in his book, "The Order of Curing Horse Diseases," published in 1609, says that a "bottee" has a "great head and small long tail like a needle." This is a very poor description of a bot and a fairly accurate description of a rat-tailed larva. It suggests that Blundeville had seen rat-tailed larvae in horse manure, a favorite breeding place, and regarded them as bots which had been passed by the horse, and this may be a rather common error. It is still a common error to regard free-living forms occurring in feces as parasites which have passed from the digestive tract. Herms⁶ (1915) says that the frequency with which the larvae occur in liquid excrement must lead to caution in accepting reports that they have been evacuated, and adds: "The writer has on several occasions received specimens of 'rat-tailed' larvae which were said to have been evacuated by the 'double handful' and that the patient had 'steadily improved' thereafter."

As regards the species of syrphid involved in these cases, we may quote Metcalf's opinion:

I wish to emphasize the practical impossibility, at our present state of published knowledge, of referring larvae found in such circumstances to a definite species, or even to the genus, unless specimens are reared to the adult. It seems to be the custom to refer any rat-tailed larva to *Eristalis tenax*, or at least to the genus *Eristalis*. Such records, unless based on adults reared from the larvae, must, it seems to me, be discarded as of no specific importance. I . . . have examined a dozen species of rat-tailed larvae belonging to several genera, the separation of which is exceedingly puzzling and difficult, and any one of which might easily be mistaken for the larvae of *Eristalis tenax*.

Hall and Muir² stated in regard to these rat-tailed larvae: "Only an occasional pupa, and never a larva, survives the winter." Regarding this point, Mr. E. R. Warren of Colorado Springs, Colo., a well-known ornithologist and mammalogist, wrote me, under date of March 18, 1913, as follows:

The latter part of February, 1902, I took from an outdoor tank at a fish hatchery near Crested Butte, Colo., a bunch of live rat-tailed maggots, which were identified by Dr. L. O. Howard as *Eristalis tenax*. He made no com-

6. Herms, W. B.: Medical and Veterinary Entomology. New York, 1915.

ment as to the season when they were found, and perhaps did not understand that they were taken in winter. . . .

The tank was a wooden affair, perhaps 4 by 8 by 3 feet deep, in open air, not used for any special purpose, but the water from the hatchery flowed through it. This water is taken from a spring and piped right into the building and flows through the hatching troughs, and hence out into the tank I have mentioned. . . . As the winters are cold there, 9,000 feet, the temperature of the water in the tank was probably not much above 32 F., but as it comes from the spring into the hatchery it is 45 F. the year around.

One sort of myiasis about which little of a specific sort seems to be published is rectal myiasis, due to blow-fly larvae, especially in sick and in moribund animals, and more especially where there is blood in the feces. I have seen a few cases of this sort and had one case in the dog recently. In this case the dog was being used to determine the lethal dose of an anthelmintic, and a resultant hemorrhagic gastritis was the source of the blood in the feces. The day before this dog died, maggots were found to be crawling in and out of the anus. To alleviate this condition, the dog was given a rectal injection of 1 c.c. of chloroform in 9 c.c. of castor oil. On postmortem examination the following day, the rectum, colon and anal region were found free from larvae, but four larvae, dead when collected, were found in the small intestine. It is possible that these four larvae had been driven back up the large intestine by the rectal injection and had entered the small intestine either before or after the death of the dog. The dog had eaten nothing for several days, except a small amount of milk, and it appears more likely in this case that the larvae in the small intestine entered the body by way of the anus than by way of the mouth. It suggests that occasional cases of gastric and enteric myiasis might be explained in this way in cases in which the evidence seemed opposed to the idea of infection by mouth. Graham-Smith⁵ (1914) has noted this as a possible mode of infection in man. He says that "Babies left exposed in an uncleanly condition may become infested. The larvae on hatching make their way into the rectum, and perhaps penetrate into the intestine."