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PARASITOLOGY IN THE HIGH SCHOOL CURRICULUM

ELERY R. BECKER

In his retiring address to the American Society of Parasitologists, Dr. F. C. Bishop (1938) made the following plea: "I believe there is need for a textbook on parasitology suitable for grade and high school students, and that this society might well take the initiative in getting included in the curriculum of every high school in this country an elementary course in a subject which touches, often in a vital way, the life of every individual." Shall the schoolmen of Iowa take his plea seriously?

Residents of the temperate zone are inclined to refer matters of parasitological interest to mankind dwelling in the tropics or subtropics, and to feel themselves isolated from the sphere of parasites' activities. Such smugness came about as a matter of course, and was entirely justifiable; but, if coming events cast their shadows before, it may be time to consider a change of position. Without aspiring to play the rôle of alarmist and, as a consequence, draw the fire of your condemnation, I hope to develop the thought that Iowa now faces one major parasitological problem, that others are appearing on the horizon, and that the youth of the state should be educated to comprehend and to meet these situations.

There have appeared in the *Des Moines Register* since the first of the year two timely editorials on the subject of trichiniasis, one with the caption *An Enemy Iowa Is Smart To Face*, the other entitled *A Tip For The Hog Industry*. These comments were stimulated by the much-publicized address of Professor Thurlow C. Nelson to a New York audience in which he is said to have declared that there are 17,000,000 cases of trichinosis in the United States. Nearly all of these unwilling *Trichinella* hosts acquired the infestation from eating pork, and right here is where the matter becomes of immediate concern to every Iowan. The fact that some people are lax in cuisine no longer serves to absolve pork producer and packer from responsibility. Anyhow, there is a certain amount of pertinent innuendo in the thought expressed by a writer in the *Chicago Tribune* who headed his article on trichinosis *Before Eating Worms, Cook Them*. It is hoped that discussion of the *Trichinella* problem in your presence will not result in your disapprobation on account of the delicacy of its relations to the

economic life of our state, because the damage has already been done, and is being done, by the press. As evidence, I quote from an editorial in the *Journal of the American Veterinary Medical Association* for March, 1939: "The recent publicity, good, bad, and indifferent, given to the subject of trichinosis in the lay press, has the potentialities of doing irreparable damage to the swine industry of the country. The newspaper articles that have come to our attention certainly will not do very much to increase consumption of pork." The situation plainly calls for less of the sensational, and more of the educational. Before audiences of this kind, composed as it is of teachers of science, are the proper places to discuss it.

What data are available strongly indicate that the incidence of the parasite among swine is closely correlated with the feeding practices and herd management of the raiser. Porkers fed garbage show a higher incidence than lot-fed; the latter, in turn, more than pasture-raised. Pork trimmings from the kitchen are not so precious but that they can be discarded, or fed to chickens where they are innocuous. Pigs fed in lots infested with rats are much more likely to have the opportunity to eat rat flesh than those that roam pastures. Certain types of building construction are more favorable for rat infestation than others, while other types wall them out completely. Thus the problem can be attacked on the farm by applying principles and practices already worked out.

The youth of the state could be educated thoroughly to comprehend various aspects of the *Trichinella* problem. A student should know the life cycle of the worm; he should see preparations of muscle containing the parasite; he should become keenly aware of the danger of producing trichinous pork, both to the consumer and the producer; he should know how farmers ought to manage their swine herds to avoid introducing the parasite; and, finally he should be inspired to put Iowa pork at the top in quality as well as in quantity. In fact, pork from Iowa, Illinois, and round about seems already to be in a favored position, as regards infestation with the parasite in question, but there is room for improvement. I haven't mentioned teaching that pork and other meats should be thoroughly cooked in order to kill possible parasites, because the thought of eating worms, though they be cooked, is repulsive to some people, just as eating vinegar eels, though they be harmless. In order to avoid creating prejudice, why not teach, in addition, that cooked pork is a palatable and nutritious dish eaten by peoples of all the great nations? The

wrong kind of instruction might do for pork what culinary experts did for lard when they emphasized the use of vegetable oils. Now they wonder why they did it, since lard is said to be superior in shortening power and digestibility!

Next, I hope to enlist the interest of this section of the Academy in four diseases that appear to have become more or less endemic in Iowa; namely, tularemia, endemic typhus fever, malaria, and Rocky Mountain Spotted Fever. Since there has appeared in *The Iowa Science Teacher* (Becker, 1939) a paper largely concerned with them and their vectors, they will receive only brief consideration. Here are shown in semi-tabular form the reports of cases of the four diseases, as made to the Iowa State Department of Public Health. While it could hardly be said that the situations

Disease	1933	1934	1935	1936	1937	1938
Tularemia	9	8	2	19	11	107
Endemic Typhus	0	0	0	1	0	0
Malaria	2	4	24	12	12	13
Rocky Mountain Spotted Fever	5	6	6	15	15	5

depicted in the table represent major parasitological problems, nevertheless they do involve possibilities unpleasant to contemplate. The life cycles of the fleas, ticks, mites, and mosquitoes principally concerned, as well as their relationships to their hosts, are matters of prime interest in themselves even when disease-transmission does not come into consideration.

The next subject, bubonic plague, is one that has likewise been discussed in *The Iowa Science Teacher* (Becker, 1939). The situation in a nut-shell is this: The rat and the tropical rat flea, the vector of bubonic plague, have become established in the Middle West. We certainly have here a susceptible human population. There are reliable records to establish that tropical rat fleas are biting man in this part of the country. But there is no bubonic plague, because of the non-appearance of the etiological agent, *Pasteurella pestis*. But it seems to be on its way. The microorganism made its appearance among the ground squirrels of California in 1908, or previously. Since that time it has spread among ground squirrels and marmots as far east as Uinta County, Wyoming. In his great book, *The American Doctor's Odyssey* (p. 98), Heiser states that in 1935 plague-infested ground squirrels were found in Nebraska. The United States Public Health Service is carefully following its path, though it is not putting out much publicity on the subject. The possibility may seem remote at the present time, but there is every likelihood that sooner or later bubonic plague

will become endemic among our spermaphiles. The history of such occurrences in South Africa and elsewhere has been that once the infection becomes established among the field rodents, it is not long before the rat acquires it. It is, of course, the rat's habit of living in human habitations and out-buildings that makes it a menace to man.

Perhaps the point has been made that Iowa now is confronted with at least one major parasitological problem of human interest, and that several others that may become of considerable or major interest are in sight. It is probably also agreed that somehow or other the youth of the state should be given accurate instruction in the parasites of human interest concerned, and perhaps still others that live in or on domesticated and wild animals. Should Dr. Bishop's suggestion that parasitology be taught in high schools be given serious consideration? In view of the present demands upon students' time, it is doubtful if that could be done. But since general science is already taught in most high schools in Iowa, and biology in a great many of them, there ought to be opportunity to teach some of the facts regarding the most important parasites already in or threatening our state and how to avoid them. Hygiene and agriculture courses also provide excellent opportunity to present this material. It appears to be a problem for each separate high school to work out, but it is a civic duty to do something about it.

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