

Letters to the Editor

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NOTES ON POINTS IN SOME OF THIS WEEK'S LETTERS APPEAR ON P. 659.

CORRESPONDENTS ARE INVITED TO ATTACH SIMILAR SUMMARIES TO THEIR COMMUNICATIONS.

Winter Feeding of the Tick, *Dermacentor andersoni*, Styles

ONE of us (J. D. G.)—recently engaged in investigating the feeding habits of ticks at the Dominion Entomological Station at Kamloops, British Columbia, with special reference to the dissemination of disease—at the end of September, 1934, brought to the zoological laboratory at the University of Alberta, Edmonton, a limited number of adults of *Dermacentor andersoni* (native at Kamloops) for winter study. In contrast to their behaviour through the summer months, these ticks consistently refused to feed when brought to Edmonton in the autumn. Incidentally, one

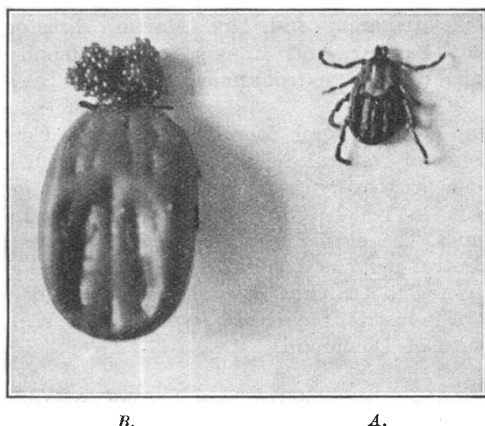


FIG. 1. A. Adult female tick (*D. andersoni*) unfed. B. Engorged female, at the commencement of egg-laying, February 10, 1935. $\times 3$.

individual placed on a sheep at Kamloops, as early as the beginning of September, had refused to engorge and was finally removed after two weeks. This observation appears to agree with the experience of the Rocky Mountain Laboratory at Hamilton, Montana, where thousands of ticks are reared annually.

In all, eight adults were used on domestic rabbits and man (J. D. G.) during November and December, but although willing to attach or to shift their positions and re-attach, none of them attempted to engorge (or if they attempted it, did not succeed) during the six days that constituted the test period in each case.

The ticks being useless for practical purposes whilst behaving like this, it was suggested by the other of us (W. R.) that if appropriate modification could be induced in the physiological state of the host, the parasite might exhibit a corresponding change of behaviour upon attachment. The scheme of controlled illumination originally used on the *Junco*¹, resulting in the conversion of a sexually dormant autumn individual into a fully sexed spring bird in a few weeks and evidently conducive to profound changes in physiology and metabolism, suggested an obvious method of treatment which was accordingly adopted.

On December 14 a domestic rabbit was provided with a cage in which illumination could be precisely controlled, and for the week following was restricted to a day of seven hours duration. On the eighth and subsequent days the period of illumination (ordinary electric light bulbs) was increased by ten minutes daily. A month later an adult, unfed tick (which had received no illumination or analogous treatment) was placed on the rabbit. It attached almost immediately and was replete at the end of two weeks. (The normal summer engorging period for *D. andersoni* is nine days.) Two more adults were then simultaneously applied but both, unfortunately, were females. One of these had failed to feed on man at the end of November but now, after two days of indecisive attachments, began to engorge and was replete on the fifteenth day. Eight days after removal it began to lay eggs, inevitably infertile (Fig. 1). The second individual changed positions spasmodically for a week, when engorgement ensued.

Depletion of the stock of adult ticks permitted the use of only one other. This was first placed on an untreated rabbit, on which it remained attached for five days without signs of engorgement. It was then transferred to the illuminated host, caged under an opaque capsule strapped to the skin of the rabbit, with intervening water baths absorbing the heat from the illuminating bulbs. It attached itself permanently on the fourth day, when engorgement commenced.

An additional supply of newly emerged adult ticks was received from Kamloops on February 18. In view of the fact that by this date the days had been lengthening for two months, three were at once placed on an ordinary stock rabbit. Two attached and began engorging on February 19. The third has failed to engorge to date.

The limited material that has been available would, no doubt, make a lengthy discussion of these results premature. The most suggestive points are self-evident. They seem to be sufficiently novel, however, to justify publication at this stage and to warrant repetition and expansion in the future.

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March 1.

¹ Rowan, W., "Relation of Light to Migration and Developmental Changes", NATURE, 115, 494; 1925.

The Antihæmorrhagic Vitamin of the Chick OCCURRENCE AND CHEMICAL NATURE

IN earlier papers^{1,2} a new deficiency disease in chicks has been described which is characterised by a tendency to large hæmorrhages. It has been ascribed to the lack of a specific antihæmorrhagic factor which is different from vitamin C. More recent work has demonstrated that the factor in question is a fat-soluble vitamin occurring in hog