the paspalum tufts, indicates the general suitability of these clumps as winter quarters. It is difficult to see how ticks could survive the winter in any numbers in short, well-grazed turf. The relation of this to the question of control is obvious.

The first ticks to appear in spring are these nymphs, which come forth from their winter quarters and seek hosts about the middle of July. From then until the following winter development apparently proceeds as indicated in the general life-history just described; but the verification of this will depend upon and guide future field-work.

HOST RELATIONSHIPS.

Although cattle are indubitably the chief hosts of every stage of this tick, it has already been pointed out that horses may be extensively infested, especially by the earlier stages. The list of hosts is, however, very much larger than this, and includes most of the larger animals of the North Auckland Peninsula and a few small birds. A few seed-ticks have been taken on the introduced skylark, thrush, and house-sparrow. Probably the most important of the wild hosts, from a control point of view, is the hare, which carries all stages. Man himself is a not infrequent host, the seed-ticks being often quite a serious nuisance to children, who become infested when playing in the grass. The effects of the bite are in most cases little more than a temporary irritation; but the writer would not dogmatize from his own limited experience, since the effects would doubtless vary both with individual ticks and with individual men.

One point needs further stressing than it has yet received. It is repeatedly asserted that the kiwi (*Apteryx australis* var.) and the sea-gulls (*Larus dominicanus* Licht. and *Bruchigavia novaehollandiae* Steph.) are infested with the cattle-tick and act as carriers. In the case of the kiwi this is totally incorrect, being based on the discovery of kiwis infested with *Ixodes anatis* Chilton, a different species of tick which does not attack stock. To the untrained observer all ticks look somewhat alike. Probably the case of the gulls is open to a similar explanation, since sea-birds of several New Zealand species are infested with *Ixodes eudyptidis* Mask., another of the bird-ticks. Up to the present, however, none of the gulls examined has shown any examples of ticks either of this species or of the true cattle-tick.

NATURAL ENEMIES.

In the existing literature on ticks much has been written about the length of time ticks can exist without food. Ticks have been kept in closed vessels for over two years without apparent harm. So far as the present species is concerned, the writer has a large number of seed-ticks collected from grass-heads six months ago and still quite happy and healthy. The relation of this amazing longevity to the question of control is not so important as is usually imagined,* and the reason can only be that those stragglers which do not find a host before a certain period has elapsed are carred off by natural enemies, thus rendering possible the quite exact delimitation of seed-tick

* Possibly the longevity is more important in the matter of the distribution of ticks in agricultural produce.