labial palpi very long, porrected; terminal joint short. Maxillary palpi present, moderately developed, appressed and obscured from view by the labial palpi. Ocelli absent?

No American species has as yet been discovered and the genus is represented at present by the single European species *mucronella* Scopoli, a good series of which is in the U. S. National Museum.

## THE PRICE OF DAIRY PRODUCTS AS INFLUENCING THE ABUNDANCE OF SOME INSECTS.

By F. M. Webster.

The economic entomologist sometimes meets with curious and far-reaching relationships in the matter of influences of certain factors that it would at first seem preposterous to associate with insects at all. The threadbare story involving the maiden of uncertain age, cats, mice, bumble-bees and red clover seed, however, sometimes finds a parallel.

That the price of dairy products could have any influence on chinch bugs, *Blissus leucopterus*, or any other species not an animal parasite, at first seems improbable, yet such appears to be the case, so closely are insects connected with some of our industries; and as a seeming accentuation of this fact, we have a similar combination of interests in a different part of the country, involving another insect in precisely the same manner and with the same result.

The dairyman cultivates comparatively little land; prefers permanent pastures and meadows to crop rotation, for the reason that the additional labor required to change his crop from grass to grain and back to grass again increases the expense of his business, without materially adding to his profits. In the northern portion of the country, timothy is the favorite, and, in fact, almost universal meadow grass. In previous numbers of this Journal, I have called attention to the two forms or races of chinch bugs, and pointed out the partiality of the eastern or short-winged form for the roots of timothy as a food plant, while the western or long-winged race seldom attacks this grass, and never if it can procure other food.

The short-winged or brachypterous race, once it becomes established in a timothy meadow, does not leave it, but continues to increase and lives by extracting the juices from the bulbous root, with the result that the plant discolors and dies. Timothy meadows, within the

areas inhabited by this short-winged race of chinch bugs, if left for a long series of years without rotation with cultivated crops, got over-populated with chinch bugs and the whole meadow is destroyed, whereas a rotation not only destroys a large number of the bugs but serves to keep them reduced over large areas of country. In Jefferson and Essex counties, New York, there is at present a serious outbreak of these chinch bugs in timothy meadows, and this has occurred in Ohio in other years. It has been demonstrated that if a crop rotation is generally carried out in a community, this trouble will be prevented.

In Illinois and some portions of Ohio, the long-winged or macropterous race of chinch bug is the only one present and the timothy meadows, even of long standing, do not suffer from their ravages. But over such areas, the long standing meadows of the dairyman are attacked by other insects, and, though these are in no manner related to the chinch bug, the results are precisely the same. After a couple of years the insects become so abundant as to kill out the timothy entirely, and not only this, but where corn is planted on these grounds, if plowed in spring, the young corn plants are frequently entirely destroyed by the pests that have developed in the field the previous summer. In this case the insect causing the destruction is *Sphenophorus parvulus*, which deposits its eggs in the bulbous roots of the timothy and the larvæ hatching from these eat out the interior of the roots, killing the grass. In some parts of Ohio I have found this insect very destructive to timothy meadows of several years' standing, besides frequently destroying the young corn the following spring, if this was planted. There are some indications that the insect is becoming more numerous and menacing the corn crop over considerable areas. Dr. Forbes has found that in some sections of Illinois, in meadows of two years' standing, from ten to twenty per cent. of the roots were affected and in those that have stood three or four years, from fifty to seventy-five per cent. are affected, but in any case, if the land be fall plowed, the beetles will leave the field and not attack the crop that follows the next year.

Thus, lucrative prices for dairy products stimulates dairying; this increases the area of timothy meadows and tends to their continuance for a series of consecutive years. This increases the abundance of these insects and consequently the magnitude of their ravages.