

When digging the young stock in the fall for distribution, the lice may be cleansed from the roots by dipping in nicotine sulphate without injurious effects.

**Aphids in general** were kept well in check this year by natural control, and many species of regular economic importance were a negligible quantity, as far as my observations went. The apple-grain aphid was in very small quantity on either host and was heavily parasitized all summer by a small hymenopteron. Coccinellids and Syrphids were abundant this year and kept all species in check effectually.

Amongst insects of general importance, several species of sawfly, especially on roses, were more than usually abundant, whilst the opposite extreme was attained by the Red-legged locust (**Melanoplus femurrubrum**), whose numbers were very small after a period of abundance for three years. It would be interesting and useful to know the exact causes of these fluctuations.

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## THE RELATION OF BOTANY TO ENTOMOLOGY

BY W. B. ANDERSON, VICTORIA.

In offering you these few remarks, I do not purpose going deeply into my subject, nor have I made this paper too long. It is, in a way, a filler-up, as so many of our older members seem to have given up the writing of papers for these meetings, for the entertainment or the instruction of such of us as have had less time or fewer opportunities for systematic collecting. This is much to be deplored, for to the existence of this Society we are indebted to the zealous efforts of the older Provincial Systematists, and it is to be hoped that another year will see more of our old friends, and again hear from them of some of their delightful and entertaining experiences.

I have taken for title, "The Relation of Botany to Entomology," and propose to show, in so far as I am able, the value of a knowledge of Botany to the collector.

Among Economists, this is being demonstrated every day, in most cases quite unwittingly. As, for example, a searcher for the Codling Moth goes through apple orchards; for the Leaf Slug, among the cherries and pears. For the Vine Weevil among grapes, strawberries and primulas. So with other pests which harry the soul of the orchardist or the farmer, or gardener. But everyone knows the trees and plants just named, and the average Economist, were he to find any one of the pests enumerated on any other host plant but those he has been accustomed to associate with the particular insect, will be quite at sea, and unable to name the plant without collecting specimens and submitting them to someone of Botanical knowledge.

But when I say that, to be a really successful Entomologist, one should have a knowledge of Botany, I do not wish to give the impression that one must be a finished, scientific Botanist, for in Canada to-day these are nearly as rare as the Great Auk—, but merely that one should be so up in the rudiments of the science that he will be able to recognize, at least, members of the principal orders and their following genera. To the systematic collector this knowledge is particularly valuable, especially where the taking of the rarer species is concerned. Taking a certain section of our much varied Province, should one be keen on capturing certain species of Lepidoptera, Hymenoptera, Diptera or Coleoptera known to frequent the particular region one may be in, and one's time being limited, one loses no time, but searches primarily for a spot where grows the plant one knows to be attractive to the particular insect sought. Conditions of flowering, etc., being right, one is then fairly certain of a catch off the shrub or herb. To give a few examples:

The uncommon Geometer, **Marmopteryx marmorata**, may be taken only on the shrub called "False Grease Wood" or "Antelope Bush," **Kunzia tridentata**. It is simply waste of time looking for the insect elsewhere than on this shrub, or close to where it grows, and, should a stray specimen be taken on other vegetation, it is a surprise, while on its own particular shrub large numbers may be found in season.

**Platea trilinearia**, another rare and beautiful Geometer, is never found except on the "Sage Bush," **Artemisia tridentata**. Several of the rarer Blues seem to affect the mountain Lupines. The "Milkweed Butterfly" **Danais plexippus**, and its imitation, **Basilarchia archippus** must be looked for among the Milkweeds, **Asclepias**. Some years ago the country about Lillooet and other semi-dry belt areas were overwhelmed with what is ordinarily a rare Butterfly in the Province, **Aglais californica**. Apparently no damage was done to crops or other vegetation on the lower levels, but far up the mountain sides great areas of **Ceanothus sanguineus**, a white flowered shrub of the higher altitudes, were completely denuded of foliage by the larvae. After emergence, the insects seemed to drift gradually to the lower levels, where they finally numbered thousands. The following year this insect was conspicuous by its rarity.

Among the other orders this partiality to certain plants is perhaps stronger. Certain Coleoptera may be found only on "False Milkweed," **Apocynum** sps, others on certain of the Umbelliferae, others again on Composites, while many others feed entirely on certain Agarics and other Fungi. Gums of certain plants are highly attractive to many insects, these exudations being a sort of natural "sugaring," so largely practised by Old World collectors. Some of these natural sugars are evidently of more than prohibition strength, as many insects taken thus are quite incapable of action.

With these few remarks I shall close this paper. While possessing

a very limited knowledge of Botany myself, I have found that little of immense value in my collecting trips, and have often been puzzled by an attempted description of some plant on which other collectors have perchance taken rare specimens. Hence I have ventured to bring to the notice of this Society the value of some Botanical knowledge, so that we may remind ourselves that (excuse the paraphrase) "it is never too late to learn."

### EFFECT OF FUMIGATION ON CERTAIN INSECTS

BY W. H. LYNE, VANCOUVER, B. C.

The danger of nursery stock carrying objectionable insects from one country to another might be entirely overcome if the stock could survive the treatment necessary to destroy the insects.

Fortunately the San Jose Scale (*Aspidiotus perniciosus*), is one of the species of insects hydrocyanic acid gas will kill without injury to the trees or shrubs exposed to the fumes. Provided, of course, the correct formula and exposure are used. This, of course, has reference to the ordinary application of the gas not applied under vacuum pressure.

It is, of course, understood that the San Jose Scale, being ovoviviparous, there are no eggs to contend with, simply the old or young insects, both of which are affected by the gas and so the extermination is complete; unless a very unique instance with which I happen to be familiar may be taken as an exception. On one occasion, after fumigating some apple trees infested with San Jose Scale, I examined a well developed female specimen with my hand lens and noticed a newly born specimen almost attached to the old one. Within half an hour an examination was made under the microscope and we were very much surprised to discover three newly born specimens all alive. The old female was apparently dead, but the young ones lived for several hours. There were several other specimens on the same tree, but all were dead after exposure to the gas.

Other species of *Aspidiotus* scale insects giving birth to living young include *ostreaeformis* and *hederae*, on which the hydrocyanic acid gas should be just as effective as with *Aspidiotus perniciosus*.

#### EGG-PRODUCING SCALE INSECTS

*Aspidiotus ancyclus* and *forbesi*, *Diaspis*, *Chionaspis*, *Mytilaspis* and *Lecanium*, from which the young hatch from eggs deposited by the female, present another problem. The mother scale may be killed by the gas, but the eggs are liable to survive its effect.

Under the circumstances the only recourse is that of dipping the stock in a caustic solution, such as lime sulphur, whale oil, soap and nicotine or distillate oil emulsion. The hardy nature of the stock would suggest the best formula to use.