

Handwritten notes in a red-bordered box in the top left corner.

UNIVERSITY OF HAWAII LIBRARY

DEPARTMENT OF AGRICULTURE,
FIJI.

NOV 29 1961 NOV 17 7 17 AM '69

Bulletin No. 5.

SOME PRELIMINARY NOTES

ON A

SCALE INSECT INFESTING THE BANANA
IN FIJI.

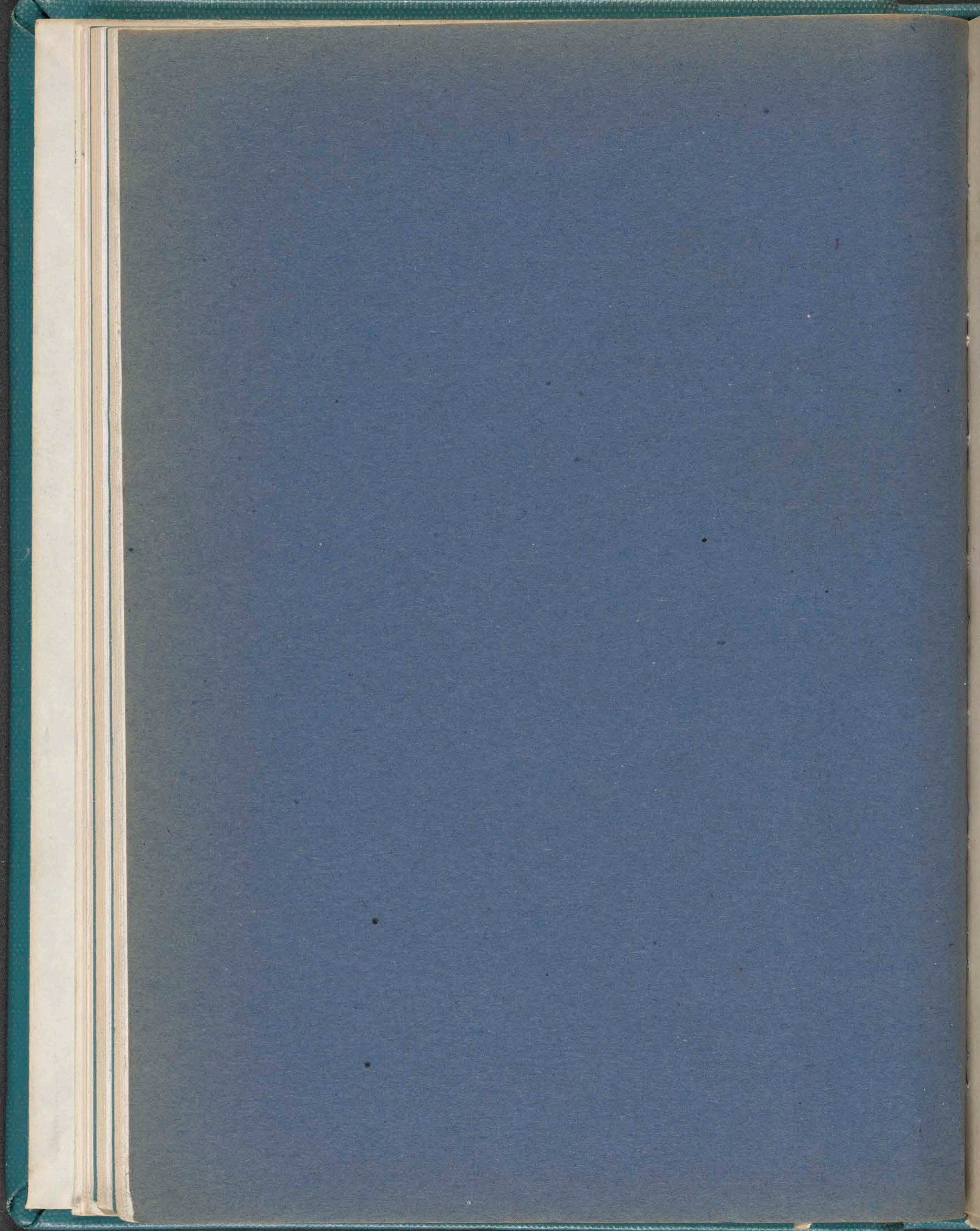
BY

FRANK P. JEPSON, B.A. (Cantab.), F.E.S.,
GOVERNMENT ENTOMOLOGIST.

BY AUTHORITY: S. BACH, GOVERNMENT PRINTER, SUVA.—1913.

c.
400
5F52
-5

UNIVERSITY OF HAWAII LIBRARY



DEPARTMENT OF AGRICULTURE,
FIJI.

Bulletin No. 5.

SOME PRELIMINARY NOTES

ON A

SCALE INSECT INFESTING THE BANANA
IN FIJI.

BY

FRANK P. JEPSON, B.A. (Cantab.), F.E.S.,

GOVERNMENT ENTOMOLOGIST.

BY AUTHORITY: S. BACH, GOVERNMENT PRINTER, SUVA.—1913.

BANANA SCALE.

	PAGE
INTRODUCTION	3
SCALE INSECTS	3
BANANA SCALE	4
PREVENTION AND REMEDIES	6

BANANA SCALE.

INTRODUCTION.

DURING September, 1912, the Inspectors of imported vegetable matter at Sydney and Melbourne respectively, had occasion to call attention to the fact that Fiji bananas often arrived infested with a scale insect (*Aspidiotus hederæ*, Vall), commonly known as the Oleander scale. For some years bananas have been subject to a system of inspection as to suitability for export, but this form of inspection was primarily instituted in order to prevent over-ripe, under-sized, or "scabby" fruit from leaving the Colony. The fruit was believed to be entirely free from insect or fungoid pests, and it was with some degree of surprise that planters recently learnt that their bananas were arriving in Australia infested with scale insects. The attention of the Department of Agriculture having been called to this matter, it was decided to make a careful examination of the next shipment of fruit offered for export. As a result of this inspection, scale insects were found upon the stalk-end of some of the bananas as well as on the stalk of the bunch. Less frequently the insects were found scattered over the surface of each banana. The scale was identified as *Aspidiotus sp.* The bananas from certain localities appeared to be more grossly infested than fruit from other districts, but few banana-growing centres are free from infection. Visits to certain plantations have shown the scale to be plentiful on the leaves, fruit and stalks. It has also been found in isolated cases on old leaves of Para rubber plants and commonly on leaves of the Kulava (*Wormia biflora*). Hitherto this scale has escaped the notice of planters, and even now a great many are unfamiliar with its appearance. Specimens may be seen at the office of the Department of Agriculture.

SCALE INSECTS.

The family *Coccidæ* includes the scale insects and mealy-bugs, which are minute insects with a single claw to the foot. The male insect has one pair of wings and no mouth parts, while the female is wingless and so degenerate in form that only rarely can such appendages as legs and antennæ be distinguished. The female scale insect generally lies hidden under a scale-like mass composed of an accumulation of excreted matter together with the cast skin or skins of the larva. It is this scale or shell, with which the observer is ordinarily familiar, and the insect itself cannot be detected until the shell is removed. The mealy-bugs on the other hand do not form scales, but live under an accumulation of white powdery matter which they excrete. The female scale is provided

with a long slender rostrum, with which she pierces the epidermis of the plant upon which she is parasitic. Having once taken up her position the female becomes fixed for the rest of her life. The eggs are found amongst a woolly mass beneath the scale.

The typical post-embryonic development of a *Coccid* is as follows:—Upon hatching from the eggs, the young larvæ, which are active six-legged creatures, roam about until they find a suitable spot, and then proceed to form a scale which gradually increases in size. The newly-hatched coccids are all similar, and the sexes cannot at this stage be distinguished, although the scale or shell formed by the female is larger than that of the male. In both sexes, however, the legs and antennæ disappear as the insect moults, in consequence of which it loses all power of movement. If the larva is going to become a female, it undergoes no further change beyond growth. On the other hand the male proceeds to enter upon a series of instars, gradually increasing in size in spite of the fact that it takes no food. The antennæ, legs, and wings soon appear, but no mouth parts are developed. The wings appear at first as bud-like projections and are developed outside the body.

This scale has now been determined in Australia to be *Aspidiotus destructor*, Sign., and not *Aspidiotus hederæ*, as first reported. It is known as the Transparent Coconut Scale.

Froggatt* says,—“ This scale insect was described by Signoret from specimens “ sent to him from Reunion where, he says, ‘ this species does great damage to the coconut “ groves of the island.’

“ Banks says,—‘ *Aspidiotus destructor*, Sign., is by far the most pernicious of the “ “ scales which attack the coconut in the Philippines. It occurs most frequently on “ “ young trees having from one to five years’ growth, in many cases completely covering “ “ the under surfaces of the leaves, giving them a characteristic yellow tinge.’

“ Doane, in his notes on the scale in Tahiti, says,—‘ It is one of the greatest pests “ “ upon coconut palms in the Society Islands. Here it infests both old and young trees “ “ in a similar manner, but on the old trees besides the foliage, it spreads over the flower “ “ spikes and even the coconuts become coated with the scale. Many trees have been “ “ killed while others, on account of this infestation, bear no nuts, and on some islands “ “ it has become so bad that no nuts are gathered. At one time it appeared as if all the “ “ trees would become barren, as all the young palms become smothered with the scale “ “ from the older infested trees.’ ”

This scale is known as the *Bourbon aspidiotus* in the West Indies, and it is recorded in many West Indian Islands.

Urich, in *Preliminary Notes on some Insects affecting the Coconut Palm*, Trinidad, 1911, says this scale is always associated with ants (*Azteca chartifex*, Forel) which, being exceedingly fond of the honey-dew secreted by the scales, protect and probably propagate them for purposes of obtaining a food supply. He suggests getting rid of the ants by means of kerosene-emulsion and thinks that the scale insect may be left to its parasites.

Froggatt remarks that although the members of the *Aspidiotus* group of scales are usually hard and horny, this particular species is much thinner and lighter in texture

* *Pests and Diseases of the Coconut Palm*, Sydney, 1911.

than most species and is therefore much more readily destroyed by unfavourable weather conditions and by the attacks of parasites. It is also much more amenable to treatment with spraying or fumigation.

Banks* describes the insect as follows :—

“ THE TRANSPARENT SCALE (*Aspidiotus destructor*, Sign.).

“ *Egg*.—Length, 0.2 millimeter ; width, 0.1 millimeter ; regularly, bluntly oval ; one side more convex, very pale lemon-yellow, smooth, laid in two or three more or less regular concentric rows around the parent within the scale. This regular distribution necessitates a nearly complete rotation of the female around the point of insertion of the proboscis. This is accomplished by an undulating motion of the body and may be observed by placing the live insect upon a piece of glass, under the microscope.

“ *Larva*.—Immediately after hatching the length is 0.25 millimeter, the width 0.15 millimeter. Pale yellow, slightly lighter in colour than egg. Eyes dark red ; antennæ five-jointed, slightly setose, last joint three times as long as the first four ; transversely, microscopically striate, biapical, with a single seta from each apex ; mouth two-fifths of distance from frontal to anal margin. Anal margin dentate, giving indication in both sexes of existence of pygidial lobes. These disappear in the male upon the second molt. Legs moderately long, femora somewhat stout ; tarsi single-jointed, with two knobbed spines on the dorsal margin. Proboscis about as long as the body. Four minute hairs project from the frontal and two from the anal margin of body, the anal being four times the length of the longest frontal.

“ *Male puparium*.—Oblong-oval, pale, translucent, larval exuviae at centre slightly darker yellowish.

“ *Female puparium*.—Differs from male in being more nearly circular. Colour as in male. Larval exuviae at or slightly removed from the centre. Darker than the scale itself, yellowish.”

Signoret's description is very meagre. It is as follows :—

“ The scale is round, of a transparent white with the exuviae at the centre, and of a yellowish transparent white. The female is yellow, round ; the extremity with six lobes, of which the two median are shortest ; the pygidium with four groups of wax glands of eight to ten orifices in each (group) agglomeration.”

Banks then goes on with full descriptions of the adult male and female which have been prepared from fresh material. It is perhaps unnecessary to give the full description of the insects here since the scales themselves are sufficiently easily recognised for our purpose.

The size of the adult female is given as, length, 0.80 to 0.90 millimeter ; width, 0.65 to 0.75 millimeter ; colour, bright pale-yellow ; shape, broadly oval, nearly circular.

The adult male is an insect having iridescent hyaline obovate wings.

* *The Principal Insects Attacking the Coconut Palm*. Parts I and II, Manila, 1906.

PREVENTION AND REMEDIES.

The two recognised methods of dealing with scale insects are by fumigation and spraying; where practicable, the former method is more effective, but for standing crops is in many cases out of the question, although this treatment is extensively employed in the orchard centres of America, fumigation being carried out by means of portable tents, which are placed over the trees. For obvious reasons sprays are more widely used and these are of many kinds, depending upon whether the scale to be treated is hard or soft bodied and also upon the season of the year. Many sprays which have an extensive use in temperate climates, where most trees are defoliated during the winter months cannot be employed in the Tropics where foliage is abundant throughout all seasons, as such sprays burn the leaves. The spray which has the most extensive use in tropical countries for soft-bodied *coccidæ* is kerosene-emulsion, although it may also be used for hard-bodied scales, when the larvæ are crawling from beneath the scales. Lime-sulphur wash is also extensively used and has the advantage of possessing both insecticidal and fungicidal properties. When it became known in Fiji that scale-infested bananas would be refused admittance to the Commonwealth of Australia the following methods of dealing with the matter presented themselves for consideration:—

1. Spraying the plants on the plantations, and so attempt to correct the trouble at its source.
2. Fumigating the bunches in the punts before shipping, or possibly in the steamer itself.
3. Dipping the bunches in a scalecide before loading them into punts.

While both fumigating and dipping would without doubt, cause the death of the scale insects, the scales themselves would remain on the fruit. The Victorian authorities will not permit fruit which is marked with scale, dead or alive, to be offered for public sale. The second and third methods of dealing with this matter can therefore be dispensed with as regards Victoria, and it appears that the only method of treatment which can be recommended is a systematic course of spraying upon plantations, while the plants are growing. Some means must also be devised of dealing with the plant after the fruit has been removed, as *scale-infested stems which are left standing about plantations form a nursery for the development of the pests*. In the absence of facilities for burning or burying old stems, they should be sprayed.

The following are two sprays which are recommended for scale insects in this country:—

KEROSENE EMULSION.

Formula.

Kerosene	..	..	..	2 gallons.
Water	..	..	..	1 gallon.
Hard Soap	..	..	..	8 ounces.

Preparation.—Dissolve the soap in boiling water and while still hot add the kerosene, churning for about twenty minutes by means of a force-pump, until the mixture becomes a creamy emulsion. This forms the stock solution, which should be diluted when required for use in the proportion of one part of emulsion to ten parts of water.

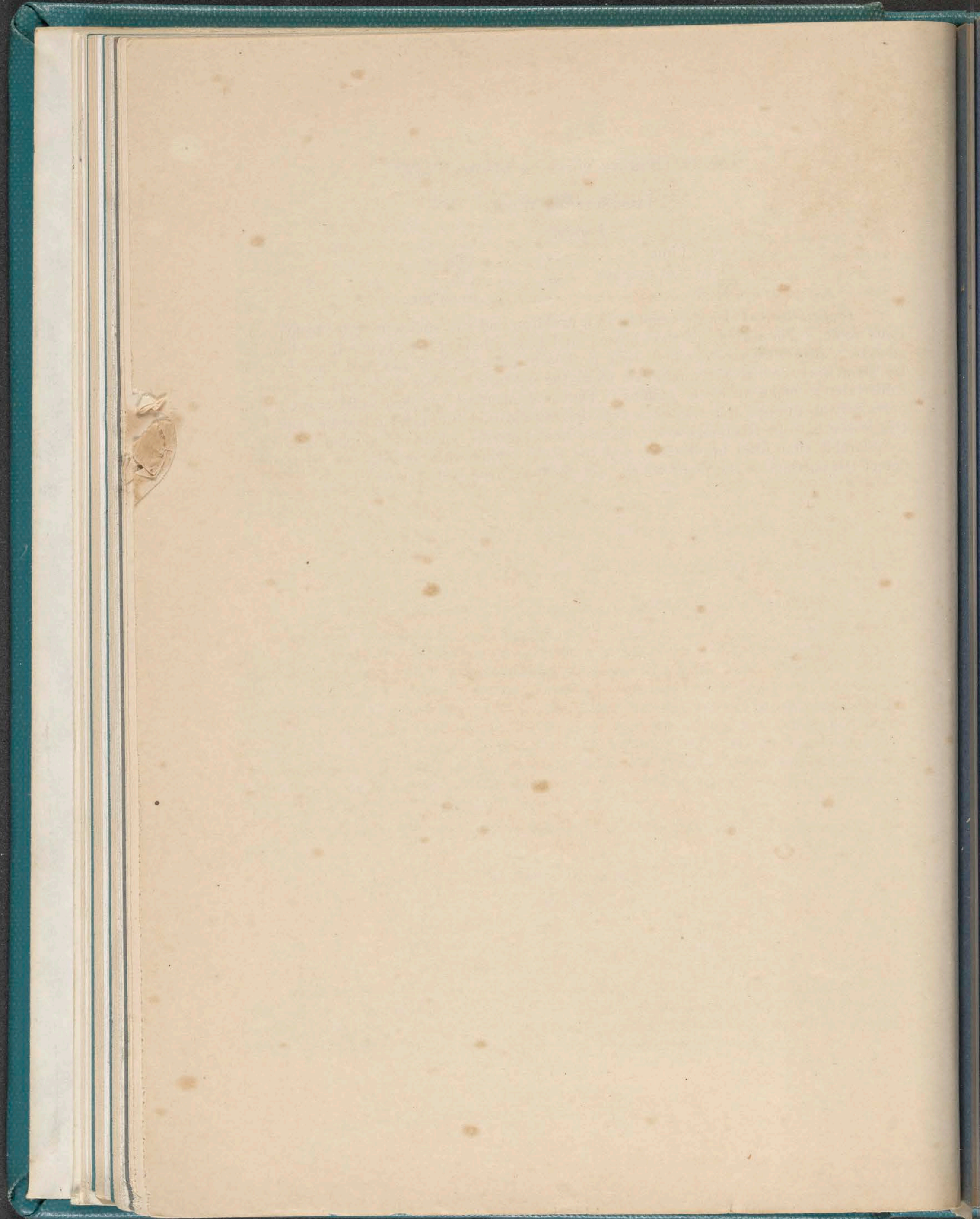
LIME-SULPHUR WASH.

Formula.

Quick Lime	..	..	..	4 lb.
Flowers of Sulphur	..	..	..	3 lb.
Water	..	..	..	10 gallons.

Preparation.—Place the sulphur in a cauldron and add sufficient water to make a thick paste. The mixture is then heated, and boiling having been reached, the lime is added. Add sufficient water from time to time to slake the lime and then allow to boil for about forty-five to sixty minutes, when the mixture becomes dark green in colour. Add water to make up to ten gallons. The spray should be applied while warm. As previously mentioned this wash has both insecticidal and fungicidal properties and for this reason is to be recommended. Its insecticidal powers remain on the plant for some considerable time after application, and the wash drying white enables one to readily detect the portions of the plant which have accidentally escaped the spray.

UNIVERSITY OF MARYLAND LIBRARY



UNIVERSITY OF MARYLAND LIBRARY

