

a combination of arsenic, copper, and acetic acid or "vinegar," called by chemists copper aceto-arsenite, along with varying quantities of other substances present as impurities. Theoretically, pure Paris green contains 58.65 per cent. arsenious oxide (As_2O_3), 31.29 per cent. copper oxide (CuO), and 10.06 per cent. acetic acid. Commercially, however, these proportions do not obtain, since there is always a small amount of moisture present in the green together with some sodium sulphate or Glauber salt, a compound formed in the process of manufacture and never afterwards completely removed. This latter substance has no insecticidal value, and if present in more than normal quantity only increases the cost of the green and should be classed as a mere "make weight." If care is used in the manufacture, there is no reason for it being present in more than very small amounts, say one half of one per cent.

Free or Soluble Arsenious Oxide in Paris Green. It is on account of the presence of this substance in Paris green that we sometimes find that after spraying the leaves of the plant treated turn black, having the appearance of being burnt, or even, in more extreme cases, drop off altogether, leaving the plant defoliated. This, of course, is very objectionable, since the physiological functions of the plant are thus severely checked, a case where the cure is as bad as, or worse than, the evil.

To account for the occurrence of this scorching, J. K. Haywood, of Washington, D.C., states three causes.*

(1) There may be a certain amount of arsenious oxide over and above that combined with the other constituents. This is "free" arsenious oxide and until recently it has been considered the only cause of the scorching of the foliage by Paris green.

(2) The greens may be poorly made, so that the constituents are very loosely held together. When such greens are brought in contact with water, especially water containing carbon dioxide, they soon break up and arsenious oxide is set free. Between the water of the spray and the action of dew and rain, enough oxide may be liberated to severely scorch the foliage.

(3) The green may be extremely fine. The best greens when ground to a fine powder and applied to foliage will scorch. This is doubtless due to the fact that more surface is exposed to the action of water which, containing carbon dioxide, would soon set enough arsenious oxide free to cause serious damage.

Following up these statements, however, Mr. Haywood says: "It is a very common occurrence to secure a commercial Paris green that scalds because of one of the first two causes, but the writer has never found a commercial sample of green that scorched because it was in too fine a condition."

As to the breaking up of Paris green when in contact with water, with the liberation of free arsenious oxide, Colby, of California,† ex-

*U. S. Department of Agriculture, Bureau of Chemistry, Bull. 82, pp. 5-6.

†College of Agriculture, Bull. 151, p. 19.