Total Arsenious Oxide in Paris Green. Since Paris green owes its insecticidal value to the arsenic which it contains, it follows that the larger the proportion of arsenious oxide there is present in it, the more effective it will be when used against insects. The value of any arsenical is determined by its arsenic content. Pure Paris green contains 58.65 per cent.  $As_2O_3$ . Any quantity above that must be present in the free state, and any quantity below that lowers the insecticidal, and, thus, the market value, just to the extent to which it is deficient. The commercial article is never ideal; in reality its manufacture is difficult, and many chemicals enter into the process. However, from analyses which we have made here and from results obtained elsewhere, most Paris greens contain at least 56 per cent, and there is no reason why they should contain less than 56 per cent of arsenious oxide, providing any reasonable degree of care be exercised in the making.

Total Copper Oxide in Paris Green. Copper aceto-arsenite contains 31.29 per cent. CuO, which bears a relation to the total arsenious oxide present of 1: 1.87. Since it is necessary that arsenious oxide be combined with copper in order that it be not in the free state, then, any result of analysis showing a greater factor than 1.87 indicates free arsenic. White arsenic cannot be added as an adulterant without seriously disturbing this ratio.

*Physical Conditions.* The best grade of Paris green is a powder which will pass through a sieve of not less than 100 meshes to an inch. A coarse green is one that will settle rapidly from its suspension in water and will require constant agitation during the spraying operation in order that it may be distributed evenly over the foliage.

Adulterants and their Detection. The more common ones occurring in Paris green are white arsenic, barium carbonate, barium sulphate, gypsum, and road dust. The white arsenic may be added to bring the arsenic content up to the standard, but the presence of any of them is fraudulent, and they can only be classed as mere "make weights" which increase the cost of purchase for actual insecticidal value received. As previously stated, white arsenic may be detected under the microscope, when it appears in the shape of white octohedral crystals. The other adulterants mentioned are all insoluble in ammonia, thus any quantity of residue left on dissolving the green in ammonia gives good ground for rejecting a sample on account of adulteration. This test is simple and can be applied by any one. A teaspoonful of the sample is placed in some receptacie, preferably glass, and about ten teaspoonfuls of strong ammonia (sp. gr. .90=25° Bé.) added and the whole then thoroughly stirred and left to stand for half an hour. The Paris green readily dissolves to form a deep blue solution, whereas the adulterants present are left as solid particles in the bottom of the vessel. As before stated, white arsenic is also guite readily soluble in ammonia, and a complete solution does not show the absence of this material.

1;

a

ţ.

q