

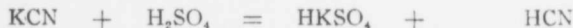
would tend to make a complete combination less sure, thus rendering liable the presence of too much free alkali. *Complete and thorough stirring is essential to success.* Caustic soda should be handled with precaution, since in concentrated form it easily injures the skin.

The authors show that when caustic soda can be got for 4½ cents per pound and the fish-oil at 29 cents per gallon, the material for 40 pounds of soap costs \$1.14, or 2.85 cents per pound.

#### Hydrocyanic-Acid Gas, HCN.

This insecticide is used largely in the fumigation of nursery stock. It is also used for destroying scales on orchard trees and for ridding mills, stores, and elevators of grain pests and rodents. The applicability of it was first demonstrated in California, where it was found useful in combatting the cushiony scale affecting citrus trees, but it has since found a very extended use against other insect enemies.

The gas is not bought as such, but is prepared at the time of use from a substance known as potassium cyanide (KCN). The cyanide is a solid body and when treated with sulphuric acid ( $H_2SO_4$ ) is decomposed or broken up and the gas liberated as:



Pot. cyanide. Sulphuric acid. Pot. acid sulphate. (Hydrocyanic acid gas).

The gas at low temperature is condensed to a liquid and is then called *prussic acid*. The liquid boils at  $26.5^{\circ} C.$ , and thus is easily changed into the gas again. Being quite light, the gas rapidly diffuses and penetrates to every little nook and corner of the fumigating enclosure. For this reason it is very effective, and, when supplied in sufficient quantity, leaves nothing undone.

Fumigation of trees is best done while in the dormant state; if trees in foliage are treated, night should be chosen as the time of action, since the actinic or light-giving rays of the sun have a very damaging effect on leaves for some time after they have been surrounded by the gas.

As the gas is *extremely poisonous*, great care should be taken that it be not inhaled; and before a building or tent is entered after the operation, a thorough airing should be given.

For generating the gas, an open glazed vessel is used, an ordinary crock serving the purpose admirably. The water is first placed in the vessel, the sulphuric acid is then added, and last, the potassium cyanide is dropped in and the door quickly closed. All ventilators, cracks and openings should be tightly closed to prevent any leakage or waste of gas. The amounts of the different materials employed are as follows:

Potassium cyanide (98 per cent.) .....	1 ounce.
Sulphuric acid (1.83 specific gravity) .....	1 fluid ounce.
Water .....	3 fluid ounces.