

time and materials than would pay for the best special implements, in addition to which, when the work is done, it is neither satisfactory nor effective. There are a great many kinds of implements for distributing both dry and liquid insecticides, many of which are advertised in the agricultural and horticultural papers.

*Pumps.*—Before deciding on what kind to use, it is advisable for one who has not used these implements to consult his neighbours who have done so, then write for catalogues to the best known makers; and with a view to making it a general principle always to procure the most suitable and the best of its kind. The difference in the initial cost between a poor, cheap implement and a thoroughly good one is small, compared with the subsequent loss and inconvenience from using a cheap pump or a poor nozzle. Spraying pumps are made in four sizes: (1) hand pumps, suitable for small gardens, which can be procured at prices ranging from \$2 to \$5; (2) larger pumps mounted on wheels or suitable for loading on a stone-boat, and consisting of an ordinary 40-gallon barrel, with a strong force pump to be worked by hand, which will cost about \$20, and will be all that is required in an orchard of from fifty to a hundred trees, or in a large garden; (3) knapsack sprayers, which are useful machines, consisting of a tank of about four gallons' capacity, to be carried on the back, and useful when treating outbreaks of cut-worms, turnip aphids, etc., in field practice; (4) power machines; these are of various kinds, and are for use in large plantations, or for spraying street trees where great power is required to elevate the spray. These are worked by steam, by being geared to the wheels of the vehicle on which the tank is drawn, or by the escape of carbolic acid gas. The cost of these will vary very much according to the make and size of the machines.

*Spraying nozzles.*—Of equal importance with a proper force pump in distributing liquid poisonous applications is a suitable nozzle, by means of which the liquid can be distributed evenly. The late Professor Riley, who did much in the development of spraying machines, said: "The desiderata in a spraying nozzle are: the ready regulation of the volume to be thrown, the greatest atomising power with the least tendency to clog, facility of cleansing or separation of its component parts, cheapness, simplicity and adjustability to any angle."

Almost every maker of spraying nozzles has some special make which he recommends; but many kinds now in the market have not the qualities necessary for spraying crops for injurious insects in the best way. All that can be said here is that some of these nozzles are far better than others, and that great care is necessary in choosing one which will come up to Dr. Riley's requirements, as mentioned above. The experience of others is a valuable guide in this work; and, both at the Dominion Experimental Farms and at the similar Provincial institutions, spraying work is carried on every year, which can be witnessed by all who wish to do so, and advice will be freely given by the officers in charge.

The operation of "spraying" consists of applying liquids by means of a force pump and spraying nozzle with such force as to break up the liquid so thoroughly that it falls upon the plants treated as an actual mist or spray. Such terms as *sprinkling* or *showering* are inaccurate for the operation here