large quantities and stored. Label barrel "poison," and be careful to keep white arsenic itself labelled "poison." Keep barrel covered to prevent evaporation. Stir well before using.

N.B.—With Bordeaux, 1, 2 or 3 may be used; with lime-sulphur, 1; the others cause burning.

4.—WHITE HELLEBORE.—1 oz. to 2 gals. water, or dust undiluted over the plants. For root maggot dust close to plants, or pour around roots.

II.—CONTACT POISONS (chiefly for sucking insects).

1.—KEROSENE EMULSION—

Kerosene (coal oil)	2 gals.
Rain water	1 gal.
Soap	½ lb.

Dissolve the soap in water by slicing and boiling; take from fire, and while hot pour in kerosene and churn vigorously for five minutes. For use dilute with 9 parts of water, so that the above 3 gals. of stock emulsion will make 30 gals. of spray mixture.

2.—WHALE-OIL SOAP—For brown or black aphids, 1 lb. in 4 gals. For green aphids, thrip and leaf-hopper, 1 lb. in 6 gals.

3.—TOBACCO WATER—Steep 1 lb. refuse tobacco in 2 gals. of water for 1 hour, make up for water that evaporates.

4.—Black leaf 40, sold by Tobacco Product Co., Louisville, Kentucky.

5.—PYRETHRUM (or insect powder).

Pyrethrum Powder	1 oz.
Water	2 to 3 gals.

Dry mixture. Mix thoroughly 1 part by weight of pyrethrum with 4 of cheap flour, and keep in air-tight vessel for 24 hours before dusting over plants.

Note.—Pyrethrum is useless if left exposed to the air.

6.—LIME-SULPHUR WASH—

(See under fungicides.)

FORMULAE FOR FUNGICIDES.

I.—BORDEAUX MIXTURE—

Copper Sulphate (Bluestone)	4 lbs.
Unslaked Lime	4 lbs.
Water	40 gals.

Dissolve the copper sulphate in a wooden or brass vessel with hot water, pour into a barrel and add cold water to make 20 gals.; slake the lime, preferably with hot water; add cold water to make 20 gals. Stir both barrels well, and pour lime into the copper sulphate barrel. (Never mix concentrated milk of lime and copper sulphate solutions.)

A stock solution of each may be made and kept indefinitely if not mixed. Dissolve 40 lbs. copper sulphate in 40 gals. of water by suspending just below the surface of the water in a coarse sack. Each gallon of the liquid will now contain 1 lb. copper sulphate. Slake any desired quantity of lime and put into a box or barrel in shaded place, or sunk in the ground. Keep covered with small amount of water to exclude the air. Calculate how much is required for 4 lbs. lime if well stirred.

To test Bordeaux mixture, let a drop of ferrocyanide of potassium solution fall into a little of the mixture in a saucer, when ready. If this causes it to turn reddish brown, add more lime until no change takes place.

II.—LIME-SULPHUR WASH.

1.—HOME-BOILED (for use on dormant wood only).

Fresh stone lime	20 lbs.
Sulphur (flour or flowers)	15 lbs.
Water	40 gals.

Slake 20 lbs. of lime in about 15 gals. boiling water in a kettle or other boiling outfit. While slaking add the 15 lbs. sulphur made into paste by the addition of a little water. Boil vigorously, with stirring, for 1 hour. Dilute to 40 gals. with cold or hot water. Strain and apply at once.

HOMEMADE CONCENTRATED LIME-SULPHUR—This may be used as a substitute for commercial lime-sulphur, but is only about ⅔ as strong as a rule.

Sulphur (a fine grade)	100 lbs.
Fresh stone lime, high in percentage of calcium	50 lbs.
Water	40 or 50 gals.

Put about 10 gals. water in the boiling outfit, start fire, add sulphur, stir to make paste and break lumps, then add remaining water, and when near boiling put in lime. Stir frequently while slaking and till all the sulphur and lime are dissolved. Add water from time to time to keep up to 40 or 50 gal. mark. Boil 1 hour, then strain through a screen of 30 meshes to inch into storage barrels. Make enough at once for season's work. Cover well to keep out air, or pour oil of any kind over surface to depth of ½ inch for same purpose.

To determine how much to dilute for different applications, use a hydrometer with specific gravity readings, and apply the following rule

Put the hydrometer in the clear liquid when it is cold and the sediment has all been settled for a day or two. Note the number to which it sinks. Suppose this is 1240. The strength for use before the buds burst should be 1030, or slightly stronger. To determine how much to dilute a strength of 1240 to get 1030, divide the three figures to the right in 1240 by 30, that is 240 divided by 30=8. This means that each gallon of such a wash must be diluted to 8 gals. with water to give us a strength of 1030, the proper spring strength. For the second application 1009 is about the right strength. To get it divide the 240 by 9, which gives 26⅔, or roughly speaking, 27. This means that each gallon of a wash of the strength of 1240 must be diluted to 26⅔ or 27 gals. to make the right strength for the second application. For the third application and any later ones 1008 is about the right strength, and to get this we proceed in the same way and divide 240 by 8=30, so that each gallon must be diluted to 30 with water for this application. If the strength of the concentrated were 1212 or any other number, you would in the same way divide the three figures to the right by 30, 9 and 8, respectively, to get the proper dilutions for each spraying.

TABLE FOR CHANGING BEAUME READINGS INTO THEIR EQUIVALENT SPECIFIC GRAVITY READINGS.

Beaume.	Specific Gravity.	Beaume.	Specific Gravity.
18	1141	27	1230
19	1150	28	1240
20	1159	29	1250
21	1168	30	1260
22	1178	31	1271
23	1188	32	1282
24	1198	33	1293
25	1208	34	1305
26	1219	35	1317

Note.—Commercial lime-sulphur should be tested with the hydrometer and diluted according to the same rules as the homemade concentrated form.

3.—SELF-BOILED (chiefly for use on peach foliage).

Fresh stone lime	8 lbs.
Sulphur (flour or flowers)	8 lbs.
Water	40 gals.

Best prepared in quantities of 24 lbs. at a time to get sufficient heat. Place 24 lbs. lime in a half barrel, add enough cold water to start it slaking well and to keep the sulphur off the bottom. Dust the 24 lbs. sulphur over the lime, having first worked the sulphur through a screen to break lumps, then add whatever further amount of water is necessary to complete the slaking. Stir well with a hoe to prevent the lime caking on the bottom. As soon as the slaking is over, add enough cold water to cool the whole mass and prevent further combination. Strain into spray tank. Keep well agitated while spraying.

III.—DISINFECTANTS (for pruning tools and for wounds on trees).—

1.—One pint formalin diluted to 2 gals. with water.

2.—Corrosive sublimate, 1 part to 1000 by weight =1 tablet to 1 pint of water. Apply with a swab on end of a stick.

Caution.—Corrosive sublimate is a deadly poison to man or beast if taken internally. It will also corrode iron or metal, so use in a glass or wooden vessel and be sure to wash these out very thoroughly when through using them.

3.—Lime-sulphur about twice spring strength, or bluestone, 1 lb. dissolved in about 14 gals. water, may be used to disinfect wounds or cankers, but is not satisfactory in case of pear blight.

STICKER.

Resin	2 lbs.
Sal Soda (crystals)	1 lb.
Water	1 gal.

Boil together till a clear brown color, which takes from 1 to 1½ hours. Cook in an iron kettle in an open place. Add the above to 40 gallons Bordeaux for use on smooth foliage like onions, cabbage or asparagus. If used with arsenate of lead, Paris green, or arsenite of lime, add 1 or 2 lbs. of fresh lime to every 40 gallons of spray.

Spraying Fruit Trees.

It is admitted by all who have looked into the matter carefully that there are few occupations to-day that are so profitable as fruit-growing, especially apple-growing. Old orchards, in many parts of the Province, that a few years ago were considered almost worthless, are to-day netting their owners from $50 to $150 per acre—a much greater return, as a rule, than they can obtain from any other part of the farm. The reasons for this change are to be found partly in the establishment of co-operative fruit associations, with the consequent businesslike method of picking and packing of the fruit, and of the selling of it in the best markets; partly in new and much-improved methods of pruning, cultivating and fertilizing, and partly in the discovery of comparatively easy and economical methods of keeping under complete control the numerous insects and diseases that, if neglected, render all other efforts of no avail.

There is scarcely any doubt that our present method of spraying has done as much as anything else to forward the fruit industry. When any person goes into a well-sprayed orchard at packing time, and sees tree after tree of beautiful fruit, in many cases from 95 to 99 per cent. absolutely free from worms or disease, and then visits a neglected, unsprayed orchard near-by, with most of the fruit on the ground, and from 40 to 90 per cent. of it wormy, scabby or deformed, it is enough to make him a convert at once to the great value of spraying.

SPRAYING OUTFITS.

It is very important, when spraying, to have a satisfactory outfit. If the orchard is small, say, not more than five or six acres of large trees, an ordinary barrel pump will do very well. These cost about $25 on an average, including hose, rods and nozzles. For orchards of from 6 to 10 acres, a double-acting pump, costing from $45 to $65, is fairly satisfactory. For larger orchards, it is advisable, as a rule, to purchase a gasoline outfit. These, with pump, tank and wagon, cost from $250 to $350. Most of our growers find that a 2½ horse-power gasoline engine is more satisfactory than a weaker one.

Each outfit should have two lines of hose, one for the man on the ground, and the other for the man on the tank or the tower. The hose should be of good quality, and should be about 35 and 15 feet, respectively, in length, the 35-foot hose being used by the man on the ground.

As a rod for the man on the tank or tower, I like a bamboo pole about 10 feet long, with an aluminum rod inside. This is much lighter than the brass rod. The rod for the man on the ground need not be more than about 7 feet long, and may be a plain, uncovered iron rod. A long rod on the ground is awkward to use.

Good nozzles are very important. On the whole, the most satisfactory kind is the large angle disc brass nozzles. These are about 1 inch in diameter, and, as extra plates are supplied, some with small holes, others with large, one can regulate the coarseness of the spray by using a large or small hole, as desired. It is well to have four nozzles, two for each rod, and also a V, to which they can be attached. With the barrel pump, it is seldom possible to get sufficient pressure to use all four nozzles, and frequently it is better to have only one on each rod, or two on the longer rod used by the man on the tower, and one on the other. The angle on these nozzles enables a man to send the spray in any direction he desires.

The barrel pump is used in a barrel, and has an agitator of its own, but the double-acting pump has no agitator with it, and should be used on a fairly large tank with a rounded bottom, and holding from 120 to 200 gallons. These larger tanks save much time that otherwise must be spent in frequent trips to fill up. One can easily make an agitator for such a tank out of four or five small pieces of inch board about 5 inches wide at center, and 12 or 14 inches long, and rounded on the lower side so as to fit the bottom of the tank. Several holes should be bored through these, and the boards distributed along the bottom of the tank. To keep them in place, they must be nailed to a narrow board, running lengthwise, but a couple of feet shorter than the tank, to allow of motion. To move this agitator, a stout handle runs down through a small opening on top of the tank, and is fastened in the narrow long board. This handle swings on a bolt that passes through it just above the opening into the tank, and that is firmly fastened there by two wooden supports. Gasoline outfits always have agitators supplied with them.

MIXTURES TO USE.

The mixtures to use, and the most desirable strength for each application can be seen by consulting the spray calendar in this issue. In determining the strength of lime-sulphur, one should always have a hydrometer. These little instruments can be purchased from several of the spray companies and wholesale druggists. One with specific gravity reading from 1.000 to 1.350 or 1.400 is the most convenient. They cost about 75 to 85 cents. The method of using them is given clearly in the lower part of the spray calendar.

Remember that, arsenate of lead, being a paste, should, after the right amount has been weighed out, be stirred up in water until it is like milk, and then thrown into the diluted lime-sulphur or Bordeaux mixture in the tank; otherwise, it will not mix up in the tank quickly enough to give a uniform strength.

WHEN TO SPRAY.

The spray calendar also shows the proper time [illegible] spray. Some wish to know