and foliage. It tends to ripen its heaviest crop in September-October, and this, combined with its thorny character, is a distinct disadvantage. The fruit is oblong, with a very sharp pointed nipple. The rind is fairly smooth and sweet to taste. The pith is small, and there are 10 to 11 small regular sections. Another strain of poorer quality is known as the long-thorned type.

(4) Meyer.—This is really a sweet orange lemon hybrid, but is becoming increasingly popular in domestic gardens. It is recommended to be planted at a distance of 15 ft. apart in commercial orchards. It is of a deep, golden yellow colour and beautiful texture, but shape is more broadly oval than the usual lemon. One main crop ripening about May-June is borne.

(5) Eureka.—This lemon, although thornless, is characterised by willowy growth and the bearing of fruit at the ends of the branches. There are two local strains, of which the "sweet rind" is the better. The other type sports freely, and often gives thick-skinned and irregular fruit of low commercial value. It is generally a shorter fruit, with a small nipple. The pith is small, and there are 10 well-defined and regular sections.

Rough Lemon.—This is quite different from the varieties previously mentioned. It is often found at the old Mission stations, and is often miscalled the "Maori" lemon. It is extremely rough, the skin being wrinkled and in many cases loose. The fruit has an open centre, and the juice is low in acid. The rind is of varying shades from yellow to orange when the fruit is mature. For culinary purposes it is inferior. Its greatest value is as a source of seed for rootstocks.

Ponderosa.—The fruit is large and pear-shaped, and it is possible that it contains pomelo strain. The rind is rough, and there are 12 distinct sections and coarse grained greyish flesh. It is generally considered by commercial citrus growers to be a valueless novelty fruit.

Sicily.—This variety is seldom seen, but is oblong in form with short abrupt nipple. There are 12 regular sections, fine grained, greyish yellow flesh, small pith, and generally 12 seeds.

Limes

A fruit that is sometimes confused with the lemon is the lime. The lime is not at present grown commercially in New Zealand, but occasional trees are found. Externally, the fruit resembles a fine-textured, small lemon, but the flavour of the fruit is distinct. The leaf is smaller than that of the lemon, and has a small winged petiole. The commonest varieties are the Mexican and Tahiti lime.

The Mexican lime grows as a shrubby bush 10 to 15 ft. high, and has many small sharp spines. The fruit rind is smooth and very thin, with short pointed nipple, 10 sections, light greyish green flesh, open pith, and lime flavour.

The Tahiti lime is a round-topped tree with drooping branches. In shape the fruit is larger than the Mexican, with a broad-based nipple, 10 sections, greenish flesh, open pith, and lime flavour. The Persian lime is probably identical with Tahiti.

Another citrus tree often called a lime is the Rangpur. It is sometimes used as a rootstock. The tree has the habit of the lime, but the fruit is roundish and the nipple, if present, is short. The fruit is orange red in colour, and the rind is inclined to be rough and separates from the pulp. It has seven sections, which readily separate. The flesh is slightly orange coloured, and the flavour of the juice is unlike the lime.

(To be continued.)

—A. W. M. GREIG, Citriculturist, Auckland.

Viticulture

Points in Making Cider

Determination of Soil Acidity

A SAMPLE of 25 c.c. of the cider is heated to the start of ebullition to expel any carbon dioxide gas, and titrated while hot with decinormal (N/10) sodium hydroxide, using 5 per cent. phenolphthalein as indicator. The results are expressed in terms of malic acid—1 c.c. of N/10 alkali = 0.0067 grams of malic. If the cider has definitely no gas in it, it is not necessary to heat the sample.

Equipment Required

(1) 1 x 50 c.c. burette, graduated in tenths of a cubic centimetre. The burette is fitted either with a glass top or a rubber jet and clip. (2) 1 burette stand, either of wood or iron. (3) 1 x 25 c.c. pipette. (4) 1 x 200 c.c. glass beaker. (5) 1 x 4 ozs. of 5 per cent. solution of phenolphthalein. (6) 1 glass stirring rod.

All the above equipment is obtainable from wholesale druggists and scientific instrument dealers.

Method.—By means of the pipette, place 25 c.c. of the sample to be tested in the beaker and heat to near boiling (175 deg. F.) to drive off any gas. Allow it to cool slightly, add 2 drops of the 5 per cent. phenolphthalein, and place under burette which has been filled to the zero mark with the N/10 solution. Allow the solution to drip slowly into the cider, stirring well all the time with the glass rod. As soon as a pink tinge persisting for at least 30 seconds appears, close burette tap and read off the volume of N/10 solution used. Every 1 c.c. of N/10 solution used = 0.0067 grams of malic acid.

Determination of Alcoholic Content

The alcoholic content is determined by the ebullioscope, which consists of the following parts:—

(1) The boiler into which the distilled water or the cider is introduced. (2) The condenser, which screws on to the boiler. (3) A thermometer which registers the temperature in 1/10ths of a degree Centigrade, but enables it to be estimated to within 1/100th of a degree. (4) A spirit burner. (5) A sliding scale by which the alcoholic strength of the cider is ascertained. (6) A doubly-marked test tube. The larger volume (50 c.c.) gives the quantity of cider to be used for each test, the smaller volume (15 c.c.) the quantity of distilled water in which the boiling point is determined.

Rinse the boiler with distilled water before use. Close the lower stopcock and introduce 15 c.c. of distilled water into the boiler. Screw on the top condenser and fix the thermometer in place. **Do not at this stage put any water in the condenser.** Place the lighted lamp so that the flame is **directly under the chimney.**

As soon as the temperature on the thermometer remains constant, it is noted and the sliding scale adjusted so that the temperature at which the water boils (given on the middle portion of the scale) is exactly **opposite zero** on the outer side of the scale. Turn the screw on the scale to keep it locked in position. The boiling point of the water need not be determined for every test; it is sufficient to do this once in the morning and once in the afternoon, provided, of course, that

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