capillaire of Montpellier, the amount of the capillaire must be increased by one-third.

Cherry Sirup. *Sirup de Cerises.*

Refined sugar 5 k.
Conserve of cherries..... 2 l. 600 c. c.

Put the filtered conserve in a basin, heat quickly and remove as soon as it boils. Remove from the fire, allow it to rest and skim. Pass through a blanket or filter.

When the sirup is made in the cherry season the con-

FIG. 41.—CANADIAN CAPILLAIRE.

serve is dispensed with and the operation is as follows: Well ripened cherries are stoned and pressed. The juice is allowed to stand 24 hours, then decant and filter. Then the operation is performed as above.

Lemon. *Bichof Froid.*

Infuse the skin of a lemon in a glass of kirsch. When it has absorbed the perfume remove it and pour the kirsch into 2 l. of white or red wine in which a pound of sugar has been melted.

Raspberry. *Sirup de Framboises.*

White sugar 5 k.
Conserve of raspberries 2 l. 600 c. c.

Same operations as in making currant sirup.

Another Receipt.

Sugar 5 k.
Ripe raspberries 5 k.

Put the fruits in a copper basin with the sugar and boil until the desired degree of thickness is obtained. Pass through a linen bag.

Sirup of Raspberry Vinegar. *Sirup de Vinaigre Framboise.*

White sugar 1 k.
Raspberry vinegar..... 500 grm.

Put the sugar in an earthenware vessel, add the sugar, stop up the vessel tight and heat gently over a water bath; when the sugar is dissolved remove it from the bath, cool off the sirup and bottle.

Raspberry Vinegar.

Fill a jug or crock with ripe raspberries and cover with vinegar. At the end of two months decant the clear liquid and preserve in bottles.

Currant. *Sirup de Groseilles Framboise.*

Refined sugar 5 k.
Conserve of currants..... 2 l. 600 c. c.

Put the sugar in a basin, put on the conserve, heat quickly, stirring constantly. Remove the sirup from the fire and allow it to repose for an instant; skim if necessary. Pass through a filtering bag. Sirup of wild cherry is prepared in the same manner.

Marshmallow. *Sirup de Guimauve.*

Refined sugar 5 k.
Dry powdered marshmallow root. 500 grm.

Melt the sugar on a water bath with gentle heat; keep covered; when the sugar is entirely dissolved cease the heating and filter, after which the sirup is cooled.

Lemon. *Sirup de Limon.*

Refined sugar..... 5 k.
Concentrated essence of lemon... 50 c. c.
Citric acid..... 40 grm.
Water 2 l. 600 c. c.
Whites of four eggs.

Cook and clarify the simple sirup, pass through a filtering bag, then add the essence of lemon and the citric acid dissolved in 1 l. of water. Stir briskly, mix, and when cool bottle.

Mulberry. *Mâres.*

The black mulberry (Fig. 42) is a tree 25 to 45 feet high, fruit round and plump, red and black.

White sugar..... 5 k.
Mulberries..... 5 k.

Take fruit which is not quite ripe, put in a basin with sugar. Carry the mixture to the boiling point

FIG. 42.—BLACK MULBERRY.

or until the sirup is concentrated enough, then pass through a filter.

Walnuts. *Sirup de Noix.*

Walnuts..... 120 k.
Brandy..... 10 l.

Infuse the green nuts gathered at the end of July in the brandy. Throw in 5 grm. each of cloves, cinnamon, musk and coriander. In December filter the infusion and mix with a sirup prepared with 3 k. 750 grm. of sugar. Leave the mixture for fourteen days, filter and bottle.

Orange Flower. *Sirup de Fleurs d'Oranger.*

Refined sugar..... 5 k.
Orange flower water..... 500 c. c.
Water 2 l. 100 c. c.
Whites of four eggs.

Dissolve the sugar with 1 l. of pure water and 600 c. c. of albumenized water and clarify; strain, add the orange flower water, mix and cover. Sirup of roses is prepared in the same manner.

Ratafia of Orange Flowers. *Ratafia de Fleurs d'Oranger.*

Prepare a bed of orange flowers on a deep plate, then add a layer of fine sugar, then a layer of flowers, and so on, leaving a layer of sugar at the top. Cover and leave in a cool place for 12 hours. Wash the mixture with water and add the alcohol. Leave the liquor for a month, then filter.

To prepare the ratafia the following proportions should be used:

Petals of orange flowers..... 100 grm.
Sugar 750 grm.
Alcohol (85°)..... 600 c. c.
Water..... 400 c. c.

In the same manner the ratafias of rose, jasmine, etc., are prepared. For the ratafia of acacia flowers it is necessary to employ 1,500 grammes of clean flowers.

Sirup of Orange. *Sirup d'Oranges.*

Refined sugar..... 5 k.
Concentrated essence of orange.. 50 c. c.
Tartaric acid..... 80 grm.
Water..... 2 l.
Whites of four eggs.

Same process as that used in making lemon sirup.

Sirup of Orange Peel. *Sirup d'Ecorces d'Oranges (Codex).*

Fresh orange peel..... 90 parts.
Water 100 parts.

Infuse for 24 hours. Press and dissolve in the infusion, double its weight of sugar.

Bitter Sirup of Orange Peel. *Sirup d'Ecorces d'Oranges Amères (Codex).*

Dry peel..... 100 parts.
Alcohol (60°)..... 100 parts.
Water..... 1000 parts.

Macerate for 12 hours in alcohol. Throw on all the water in a boiling state and leave the infusion for 6 hours. Press, filter, add 190 parts of sugar to each 100 parts of liquid. The operation should be conducted in a covered water bath.

Punch. *Sirup de Punch au Cognac.*

Brown sugar..... 5 k.
Cognac 3 k.
Concentrated essence of lemon... 1 c. c.
Citric acid..... 6 grm.

The sugar is clarified and cooked to 32° and filtered and put in a vessel with the cognac. The essence of lemon and the citric acid is dissolved little by little. The whole is mixed and the vessel is carefully closed and shaken anew until entirely cold.

Punch au Kirsch.

Refined sugar..... 5 k.
Kirsch..... 2 l. 50 c. c.
Alcohol (85°)..... 400 c. c.
Essence of apricot 100 c. c.
Essence of lemon 1 c. c.
Citric acid..... 6 grm.

Same method as that given above.

Rum Punch. *Sirup de Punch au Rhum.*

Refined sugar..... 5 k.
Rum..... 2 l.
Alcohol (85°)..... 1 l.
Essence of lemon..... 1 c. c.
Citric acid 6 grm.
Hyson tea..... 25 grm.

Prepare a strong infusion of tea with 400 c. c. of boiling water and add the sirup cooked to 36°. The rest of the operation is the same as before.

Four Fruits. *Sirup des Quatre Fruits.*

This name is given to equal parts of the sirups of cherry, strawberry, raspberry and currant.

Tea. *Thé.*

The tea plant of China (Fig. 43) attains a height of

FIG. 43.—CHINESE TEA PLANT.

3 to 7 feet. Leaves alternate oval, elongated, pointed and of a deep green color. Fruit green and plump. The leaf is the part utilized.

Sirup of Tea. *Sirup de Thé.*

The sirup of tea is prepared in the same manner as capillaire sirup, with the following materials:

Tea, Imperial 100 grm.
Tea, Pekao..... 25 grm.
Pure water..... 2 l. 900 c. c.
Whites of fifteen eggs.

Wash the roots with tepid water; boil them for 20 minutes with 2 l. of water. Pass through a sieve without pressing; add sugar to the infusion and clarify. To perfume add 25 c. c. of orange flower water.

Vanilla. *Sirup de Vanille.*

Vanilla..... 60 grm.
Sugar..... 500 grm.
Brandy (45°)..... 24 grm.
Water..... 310 c. c.

Cut the vanilla longitudinally, then transversely as thin as possible. Triturate in a mortar, adding alternately a little sugar and a little brandy to make a homogeneous paste. The mixture is introduced in a vessel with the remainder of the sugar and the water. Dilute the white of an egg with as little water as possible and mix. Place the vessel on a water bath and heat; at the end of 24 hours strain.

Violet. *Sirup de Violettes.*

Refined sugar..... 5 k.
Fresh flowers, crushed 525 grm.
Water..... 2 l. 600 c. c.

Contuse the violets in a mortar put in a tinned water bath. Add 1 l. of water (60° C.). Agitate some time and press the flowers. Put them back in the tin water bath; throw on the rest of the boiling water; infuse for 11 hours; pass through wet linen.

Preservation of Sirups.

Sirups change easily. They ferment or become mouldy. To prevent this loss recourse is had to various systems, of which the best, as it introduces no foreign elements into the liquor, is the Appert process. The bottles of sirup are heated over a water bath to between 60° and 70°, as has been already described for fruit juices.

(To be continued.)

DETECTION OF GOLD IN DILUTE SOLUTIONS.

By T. K. ROSE, B.Sc., Assistant Assayer to the Royal Mint.

It is well known that if large quantities of boiling water are poured into a solution of stannous chloride, a yellowish white gelatinous precipitate of tin hydrate is obtained. If the water contains a little chloride of gold, the precipitate is colored red (purple of Cassius). A solution of one part of gold per million parts of wa-

ter treated in this way gives a bright rose-colored precipitate almost instantaneously in a small test tube. One in four millions gives a paler color easily detected in a test tube, if comparison is made with the precipitate caused by distilled water. For more dilute solutions a greater bulk of liquid is required, and the precipitation is best effected in beakers.

If 0.0000311 grm. gold (one-millionth of an oz. troy) is dissolved in 3.11 liters of water, and the solution, containing one part per hundred millions, is raised to boiling and poured suddenly into a large beaker containing 10 c. c. of a saturated solution of SnCl_2 in water acidulated by HCl so as to mix the two liquids as rapidly as possible, a bluish purple precipitate is obtained. This precipitate, when collected in a test tube, differs markedly in color from a precipitate obtained by pure water in the same way. There seems no reason why a still more dilute solution of gold should not yield a color if precautions are taken to insure the complete mixture of precipitant and solution.

Quantitative results based on comparison may also be obtained with care, as the precipitates are quite stable in water. The presence of NaCl (3 per cent.), CaSO_4 , KCl , KBr , NH_4Cl , a little free HCl , etc., or all of these, does not interfere with the reaction. The precipitate is soluble in ammonia and is reprecipitated, showing its original color, on neutralizing with HCl . Synthetically prepared sea water containing gold to the amount of one in twenty millions (three-quarters grain per ton) is equally sensitive, but the color is in this case a blackish rather than a purple violet. I am proceeding to test real sea water in the same way, though quantitative results cannot be expected, since Sonstadt states (*Chemical News*, xxvi., p. 159) that only a small portion of the gold present is precipitated by stannous chloride.

This modification of a very well-known test appears likely to be useful in chlorination mills, where it is often desirable to detect the presence of gold in liquids containing as little as 1 in 5,000,000. The most dilute solution that reacts if treated in the ordinary way by SnCl_2 is one per million (*vide* text books, *passim*), and then only after a lapse of some hours.—*Chem. News*.

DETECTION OF GASES WHEN ADMIXED WITH AIR.

THIS particular form of gas apparatus, which was brought out early this year, by Mr. N. H. Warren, is intended mainly for the detection of suspected escapes of coal gas when in confined spaces, such, for instance, as private houses, laboratories, etc. Mr. Warren, in calling attention to the device, says:

Experiments with a view of studying more closely

the condensing action of platinum when in various forms of division were the chief motives which led to the construction of the same. Thus, if asbestos, for convenience sake, in the form of yarn, be introduced into solution of platonic chloride, and, after drying, ignited in a closed crucible, the substance, as is well known, has conferred upon it the property of condensing gases upon its surface, due to the impregnation of what is known as platinum black. This method of rendering asbestos sensitive is, however, attended with several inconveniences, both on account of the disengagement of acid vapors during ignition, thus rendering the texture rotten, and, at the same time, retarding the surface action by the formation of magnesium salts. To obviate these difficulties, the writer has substituted for platonic chloride that of the oxalate, and by so doing has obtained a modified action of peculiar sensitiveness. This compound is readily procured by saturating asbestos yarn, of finest quality, with a strong solution of platonic oxalate, obtained by dissolving the hydrate of that metal in oxalic acid, and, after drying, igniting the same in a porcelain crucible. If a sample of so prepared asbestos be now introduced into a mixture of hydrogen and oxygen gases, combination at once takes place, accompanied by the usual phenomenon; but if the said mixture be now substituted by one of coal gas, no action is the result. Withdraw now the sensitive wick and heat to 80°F , and replace the same in the mixture; quite a different result is at once obtainable, the wick becoming speedily raised to incandescence, and this continues as long as the faintest trace of mixed atmosphere remains. So sensitive, in fact, is the reaction that 0.5 per cent. by volume of coal gas or other hydrocarbons, when in admixture with the atmosphere, is at once readily detected.

The subjoined illustration, representing a section of the apparatus when in use, will perhaps serve to more clearly explain the same, A serving as the base or reservoir of the lamp, and containing petroleum spirit which is employed as a fuel for the same, and surrounded by a gallery running round the upper part and pierced with two apertures at B B, intended to collect the air required, when applying the chimney, C. In using the apparatus the wick, consisting of platinized asbestos, is first inserted in its holder and a light applied to the same. The flame caused by the combustion of the petroleum spirit may be now conveniently extinguished, leaving the uppermost portion of the wick red hot, which continues to flow while any petroleum spirit remains in the reservoir. While the

wick is thus still flowing there is placed over it the copper thimble, D, which is perforated with numerous small holes, and containing a further coil of platinized asbestos, E, in close proximity.

The reaction may thus be minutely explained: The heated asbestos, fed by the petroleum spirit, naturally produces sufficient heat to maintain the second coil, E, at the required temperature of which has already been stated. If the so prepared lamp be now introduced into a room where an explosive atmosphere is prevailing, the glass chimney at once samples the atmosphere by causing an upward draught, which, passing over the heated coil, immediately raises the same to incandescence.—*American Gas Light Journal*.

A WRITER in the *Country Gentleman* speaks of the advantages of the hydraulic ram for forcing water in small running streams into a house. He says that the ram will throw water 10 feet for every foot of fall. A small pipe only is required. Where there is a very small running stream a ram may be used to advantage, for it is self-acting, works day and night, and rarely gets out of order.

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