placed the materials in contact with the solvent for a period not exceeding a quarter of an hour, the liquid is passed from A into B, by means of a vacuum. The water coming from the flowers is decanted by means of I. The tube, E', permits an easy separation of the various liquids. Communication is established between B and C, and also with the refrigerator or condenser, F. In the course of the distillation the temperature of evaporation is at that of the atmosphere, which is accomplished by a current of water. All the solvents are rapidly evaporated in C, and condensed in F, leaving the perfume in C. The solvent which was condensed is run into the receptacle, R. If the distillation has been made at a temperature sufficiently low, the liquid solvent will not retain any appreciable trace of the odor, and can be used again for different perfumes. The perfume mixed with the waxy substances of flowers and leaves must be dissolved by the preceding method. The wax is dissolved by ether. A quantity of alcohol contained in S is brought up by a vacuum. After a digestion of two hours, the liquid is thrown into the vessel, S, which precipitates the wax, while the perfume remains dissolved in the alcohol. The product is then filtered. In this process the liquid never comes into contact with the air.

**Purification of Essences.**—The raw essence cannot be employed without purification. Two cases come before the distiller, one in which the raw essences are dealt with and the other when they have become rancid. The first case is remedied in three ways:

1. The separation of essence by alcoholic vapors.
2. Congelation, which permits of separation by means of the different degrees of solidification.
3. Oxidation of essences by the use of the proper chemicals, as water, oxygen, permanganate of potassium, etc.

M. Duplais has indicated the proper manner of restoring essential oils when they have become rancid. The volatile rancid oil is placed in a still along with a large quantity of the recent plant and a sufficient quantity of water. The still is then started. The volatile oil is saturated anew with the perfume, and passes over with the fresh volatile oil from the plants. When a volatile oil is not entirely changed, but has commenced to lose color and limpidity, it is sufficient, in order to restore it, to pour it into a small glass retort placed in a sand bath on a furnace. The receiver is attached and distillation is proceeded with at a moderate heat, about equal to that of boiling water. The volatile oil which passes over is limpid and almost without color. The distillation is stopped when the drops begin to be colored. What remains in the retort is thick and has the appearance of a resin.

**TABLE OF THE PRINCIPAL ESSENCES.**

The following gives a synoptic view of the principal essences, according to M. Basset. The French names are also given, and the order of M. De Brevans is retained.

**Essences Lighter than Water.**

**Absinthe (Large). Grande Absinthe.**

The entire plant, used fresh, dark green, odor pronounced, grows darker with age.

**Absinthe (Small). Petite Absinthe.**

Entire plant, used fresh, lighter green, odor weaker than the Grande Absinthe.

**Anise. Aneth.**

Dry seeds, no color, pronounced odor of anise.

**Anise (Green). Anis vert.**

Dry seeds, no color, odor of the seed, crystallizes at +12° C., easily decomposed.

**Angelica. Angelique.**

Fresh plant, no color, odor of the plant, darkens with age.

**Elecampane. Avene.**

Dry roots, yellow, odor of camphor, white when old.

**Anise (Chinese). Badiane.**

Dry seed, colorless; odor resembles that of anise a little; crystallizes at +15° C., turns yellow with age.

**Basilic.**

Entire plant, golden yellow, odor of the plant, darkens with age.

**Bergamot. Bergamote.**

Fresh skins, by distillation, colorless, odor of the fruit.

**Birch. Bouleau.**

Bark, colorless, very agreeable odor, resinifies when old.

**Calamint. Calament.**

Flower of the fresh plant, weak odor of mint.
Calamus. 
Fresh roots, yellow, weak odor of camphor.
Camomile. 
Fresh flowers, blue, little odor.
Cardamom (Large). Grand Cardamome. 
Dry seed, light yellow, odor of musk.
Cardamom (Small). Petit Cardamome. 
Dry seeds, light yellow, pronounced odor of musk.
Caraway. Carvi. 
Dry seeds, light yellow, odor of the seed.
Cascarilla. 
Dry bark, light yellow, odor of musk, bitter taste.
Cedrat. (Kind of Lemon.) 
Fresh skins, by distillation, almost colorless, odor of the fruit.
Lemon. Citron. 
Fresh skins, by distillation, almost colorless, odor of the fruit, becomes thick and resinifies with age.
Coriander. Coriandre. 
Dry seed, yellowish, odor of the seed.
Cumin. 
Dry seeds, yellowish, odor of the seed, sour, acid taste.
Curacao. 
Dried skin of Seville oranges, yellowish, odor of the fruit, taste bitter, thickens with age.
Fennel. Fenouil. 
Dry seeds, clear yellow, odor of the seeds, crystalizes at +6°C.
Juniper. Gentiane. 
Fresh berries, colorless, trace of the odor of vanilla.
Ginger. Gingembre. 
Dried root, yellowish green, odor of the root, burning taste.
Heliotrope. 
Fresh flowers, weak odor of vanilla.
Hyssop. 
Top of flowers, yellowish, agreeable odor.
Lavender. 
Top of the fresh flowers, yellowish green, strong odor of the plant, darkens with age.
Marjoram. Marjolaine. 
Fresh plants in flower, clear yellow, agreeable odor of camphor.

Melissa (Balm Mint). Mélisse or Citronella. 
Flowering plant, almost colorless, odor of lemon, acid taste.
Peppermint. Menthe Poivrée. 
Top of the flowering plants, colorless, odor of the plant, crystallizes between +1° and +22°C, turns brownish red with age, taste fresh and sharp.
Nutmeg. Muscade. 
Dried fruit, yellow; the essence has a slight odor of musk.
Orange Tree. Oranges. 
Fresh flowers, yellow, odor of the flower, color changes to brownish red with time.
Oranges. 
Fresh fruit, skins, by distillation or expression, light yellow, odor of the skin.
Rosewood. Bois de Rhôdes. 
Dry wood, yellow, odor of the rose, bitter taste, reddens and resinifies with age.
Rosemary. Romarin. 
Fresh flowering plant, greenish yellow, odor of the plant, with a trace of camphor, burning taste.
Rose. 
Fresh petals, almost colorless, agreeable odor of the rose, crystallizes below +10°C.
Sage. Sauge. 
Fresh plant, yellow to green, odor of camphor and of the plant, turns dark with age.
Tansy. Tanaisie. 
Fresh flowering plant, yellowish green, odor and taste of anise and fennel.
Thyme. Serpolet. 
Fresh flowering plant, greenish yellow, odor of the plant, turns brown with age.

Essences Heavier than Water.
Bitter Almond. Amandes Arères. 
Pressed oil cakes, pale yellow, odor of the kernel, changes with time, and oxidizes, poisons.
Cinnamon (Ceylon). Cannelle de Ceylan. 
Dried bark, yellow, odor of cinnamon.
Dried bark, yellow, odor of cinnamon, less agreeable than the preceding.
Celery. Celeri. 
Dried seeds, reddish brown, strong, sharp odor of the plant.
Clove. *Girofle.*
Dry fruit, yellow, pronounced odor of cloves, sharp taste.

Mace. *Macis.*
Golden yellow, odor of thyme, peppery taste.

Nutmeg. *Muscade.*
Odor of nutmeg very pronounced when the essence is separated from the lighter portion.

Parsley. *Persil.*
Dry seeds, yellow to green, odor of the plant, bitter taste.

Saffron. *Safran.*
Yellow, odor of the plant, decomposes and resinifies with time.

Sassafras.
Dried root, reddish yellow, odor of the root, turns red with age.

Zedoary (Wild Ginger). *Zédoaire.*
Dried roots, pale yellow, odor of camphor, darkens in color with age.

As the result of many experiments, the following has been found to be product of essence for each 10 kilogrammes of materials used:

<table>
<thead>
<tr>
<th>Essence</th>
<th>Grammes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absinthe, large</td>
<td>18</td>
</tr>
<tr>
<td>Absinthe, small</td>
<td>4.5</td>
</tr>
<tr>
<td>Almonds, bitter</td>
<td>18</td>
</tr>
<tr>
<td>Angelica</td>
<td>28</td>
</tr>
<tr>
<td>Anise, green</td>
<td>118</td>
</tr>
<tr>
<td>Anise, Chinese</td>
<td>113</td>
</tr>
<tr>
<td>Camomile</td>
<td>8.4</td>
</tr>
<tr>
<td>Caraway</td>
<td>350</td>
</tr>
<tr>
<td>Cardamom, small</td>
<td>200</td>
</tr>
<tr>
<td>Cascarilla</td>
<td>62.5</td>
</tr>
<tr>
<td>Cinnamon, Ceylon</td>
<td>75</td>
</tr>
<tr>
<td>Cinnamon, China</td>
<td>22</td>
</tr>
<tr>
<td>Coriander</td>
<td>13</td>
</tr>
<tr>
<td>Fennel</td>
<td>21</td>
</tr>
<tr>
<td>Juniper</td>
<td>48</td>
</tr>
<tr>
<td>Laurel</td>
<td>32</td>
</tr>
<tr>
<td>Mace</td>
<td>12</td>
</tr>
<tr>
<td>Nutmeg, butter</td>
<td>350</td>
</tr>
<tr>
<td>Orange</td>
<td>5</td>
</tr>
<tr>
<td>Peppermint</td>
<td>70</td>
</tr>
<tr>
<td>Rose</td>
<td>0.4</td>
</tr>
<tr>
<td>Sassafras</td>
<td>6.4</td>
</tr>
<tr>
<td>Tansy</td>
<td>30</td>
</tr>
</tbody>
</table>

and essence will be used throughout this section instead of spirit (French *esprit*).

Essences are of two kinds, simple and compound.

Simple Essences.—The apparatus for making aromatic essences is generally heated by a water bath or by steam (Fig. 35). This last method is admirably...
adapted for large works. To prepare simple essences, the substances, which have been previously cut, confused, or pulverized, as the case may be, are placed in the still. The necessary alcohol is then introduced, and after twenty-four hours of maceration, a certain quantity of water is added, and the distillation is started, and is only stopped when all the alcohol has passed over. The product should have an equal bulk as the alcohol which was put in, plus the amount of water added.

In general, the preparation of essences is as follows—the proportion of materials being about as follows:

Raw material .......................................... 1 k.
Alcohol, at 85° ......................................... 5 l.

After maceration, 2 l. 500 c. c. of water are put in and distilled, so as to obtain 5 l. of essence. This is mixed with 2 l. 500 c. c. and rectified so as to allow a product of 4 l.

The backings, or phlegm, which form the last products of distillation and rectification, are placed aside for another operation. The abbreviations for the metric system adopted are as follows:

Grm. = gramme or grammes; k. = kilogrammes; c. c. = cubic centimeters; l = liters. For tables for converting metric into United States standard measures, see the Appendix. Both the English and French names will be given where they differ.

Essence of Absinthe (large or small).

Leaves and dry tops of the large or small absinthe .......... 9 k. 500 grm.
Alcohol (85°) .................. 10 l. 500 c. c.
Water ........................................ 5 l.
Product : 10 l.

Essence of Aloe.

Socotrine aloe ............... 600 grm.
Alcohol (85°) ............... 10 l. 500 c. c.
Water ........................................ 5 l.
Product : 10 l.
Essence of Cinnamon (Chinese).
*Esprit de Cannelle de Chine.*

Cinnamon, pulverized .......... 300 grm.
Alcohol (85°) .................. 10 l. 500 c. c.
Water ................................ 5 l.

- Prepare same as the Ceylon cinnamon.

Essence of Cardamom (large).
*Esprit de Grand Cardamome.*

Seeds of large cardamom (*Amomum cardamomum*) ........ 600 grm.
Alcohol (85°) .................. 10 l. 500 c. c.
Water ................................ 5 l.
Product: 10 l.

Essence of Cardamom (small).
*Esprit de Petit Cardamome.*

Preparation same as above.

Essence of Caraway.
*Esprit de Carvi.*

Caraway seeds .................. 1 k. 250 grm.
Alcohol (85°) .................. 10 l. 500 c. c.
Water ................................ 5 l.
Product: 10 l.

Essence of Cascarilla.

Prepared in the same way as the above.

Essence of Cedrat.
*Esprit de Cedrats.*

Fresh rinds or skins of .......... 60 cedrats.
Alcohol (85°) .................. 12 l.
Macerate for 24 hours, add 5 l. of water, and distill so as to make 11 l.; rectify with 5 l. of water.
Product: 10 l.

Essence of Celery.
*Esprit de Celere.*

Celery seed ............... 1 k. 250 grm.
Alcohol (85°) .................. 10 l. 500 c. c.
Product: 10 l.

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Essence of Lemon.
*Esprit de Citron.*

Fresh skins of .......... 80 lemons
Alcohol (85°) .................. 12 l.
Proceed in the same manner as for essence of cedrat.
Product: 10 l.

Concentrated Essence of Lemon.
*Esprit de Citron Concentré.*

Fresh skins of .......... 160 lemons
Alcohol (85°) .................. 12 l.
Same method as above.

Essence of Coriander.

Coriander seeds .......... 2 k. 500 grm.
Alcohol (85°) .................. 10 l. 500 c. c.
Water ................................ 5 l.
Product: 10 l.

Essence of Cumin Seeds.
*Esprit de Cumia.*

Cumin seeds ........ 1 k. 250 grm.
Alcohol (85°) .................. 10 l. 500 c. c.
Water ................................ 5 l.
Product: 10 l.

Essence of Curapao.

Rinds of Curapao oranges .......... 2 k.
Alcohol (85°) .................. 12 l.
Water ................................ 5 l.
Macerate for 36 hours.
Product: 10 l.

Essence of Candy Carrot.
*Esprit de Daucus.*

Seeds of candy carrot, from Crete .......... 1 k. 250 grm.
Alcohol (85°) .................. 10 l. 500 c. c.
Water ................................ 5 l.
Product: 10 l.

Essence of Fennel.
*Esprit de Fenouil.*

This is prepared in the same manner as essence of cinnamon.
Essence of Genepi.

Leaves and tops of Alpine genepi.................................................. 1 k. 250 grm.
Alcohol (85°) ................................................................. 10 l. 500 c. c.
Water.......................................................... 5 l.
Product: 10 l.

Essence of Ginger, Essence of Juniper.

Same method of preparation as essence of genepi.

Essence of Cloves.

Bruised cloves ................................................. 60 grm.
Alcohol (85°) ................................................................. 10 l. 500 c. c.
Water.......................................................... 5 l.

Product: 10 l.

Essence of Hyssop.

Dried flowering tops of hyssop........................................ 2 k. 500 grm.
Alcohol (85°) ................................................................. 10 l. 500 c. c.
Water.......................................................... 5 l.
Product: 10 l.

Essence of Lavender.

Dried flowering lavender tops........................................ 1 k. 250 grm.
Alcohol (85°) ................................................................. 10 l. 500 c. c.
Water.......................................................... 5 l.
Product: 10 l.

Essence of Mace.

Crushed mace ............................................................. 600 grm.
Alcohol (85°) ................................................................. 10 l. 500 c. c.
Water.......................................................... 5 l.
Product: 10 l.

Essence of Myrrh.

Pulverized myrrh ...................................................... 600 grm.
Alcohol (85°) ................................................................. 10 l. 500 c. c.
Water.......................................................... 5 l.
Product: 10 l.

Essence of Apricot Seeds.

Kernels of seeds of apricots crushed ........................................ 2 k. 500 grm.
Alcohol (85°) ................................................................. 10 l. 500 c. c.
Water.......................................................... 5 l.
Product: 10 l.

Essence of Nutmegs.

Nutmegs, crushed ...................................................... 600 grm.
Alcohol (85°) ................................................................. 10 l. 500 c. c.
Water.......................................................... 5 l.
Product: 10 l.
THE MANUFACTURE OF

Essence of Pinks.
*Esprit d'Oeillets.*

- Petals of pinks, cleansed... 2 k. 500 grm.
- Alcohol (85°).................... 10 l. 500 c. c.
- Water.......................... 5 l.

Product: 10 l.

Essence of Orange Flowers.
*Esprit d'Orange.*

- Orange flowers, cleansed... 2 k. 500 grm.
- Alcohol (85°).................... 10 l. 500 c. c.
- Water.......................... 5 l.

Product: 10 l.

Essence of Orange.
*Esprit d'Oranger.*

- Fresh peel of 100 oranges.
- Alcohol (85°).................... 12 l.
- Water.......................... 5 l.

Product: 10 l.

Fresh peel of 200 oranges.
Operation same as above.

Essence of Rosewood.
*Esprit de Bois de Rhodes.*

- Shavings of rosewood... 600 grm.
- Alcohol (85°).................... 10 l. 500 c. c.
- Water.......................... 5 l.

Product: 10 l.

Essence of Roses.
*Esprit de Roses.*

- Fresh rose leaves.............. 5 k.
- Alcohol (85°).................... 10 l. 500 c. c.
- Water.......................... 5 l.

Product: 10 l.

Essence of Saffron.
*Esprit de Saffran.*

- Saffron (du Gatinais) 1st quality 300 grm.
- Alcohol (85°).................... 10 l. 500 c. c.

Product: 10 l.

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Essence of Sandal Wood.
*Esprit de Santal.*

- Sandal wood broken up (lemon colored)... 600 grm.
- Alcohol (85°).................... 10 l. 500 c. c.
- Water.......................... 5 l.

Product: 10 l.

Essence of Sassafras.

Sassafras root cut fine, 600 grm. Same method of procedure as for sandal wood.

Essence of Tea.
*Esprit de Thé.*

- Tea (Pekao)...................... 100 grm.
- " (Hyson)...................... 100 grm.
- " (Imperial)................. 200 grm.
- Alcohol (85°).................... 10 l. 500 c. c.
- Water.......................... 5 l.

Make an infusion in boiling water and let it stand in a closed vessel for two hours; add the alcohol, distill and rectify.

Product: 10 l.

Essence of Tolu.
*Esprit de Tolu.*

- Balsam of tolu................. 600 grm.
- Alcohol (85°).................... 10 l. 50 c. c.
- Water.......................... 5 l.

Compound Essences.

Compound essences are numerous. They are prepared in the same manner as simple essences.

Compound Essence of Absinth.
*Esprit d'Absinthe Composé.*

- Absinthe, cleaned............. 1000 grm.
- Juniper, crushed.............. 125 grm.
- Cinnamon (Ceylon)........... 30 grm.
- Angelica root............... 8 grm.
- Alcohol (85°).................... 5 l.

Macerate for twelve days and distill. Draw off 3 l. 50 c. c. of the product. Redistill slowly to obtain 3 l. of product.
Compound Essence of Anisette (Ordinary).
*Esprit d’Anisette Ordinaire.*

- Green anise: 600 grm.
- Chinese (star) anise: 600 grm.
- Fennel: 200 grm.
- Coriander: 200 grm.
- Alcohol (97°): 10 l. 500 c. c.

Mix the dry bruised materials, macerate for 36 hours. Put on 5 l. of water and distill so as to obtain 10 l. 500 c. c. To this product add 5 l. of water and rectify to obtain 10 l.

Essence of Bordeaux Anisette.
*Esprit d’Anisette de Bordeaux.*

- Green anise: 400 grm.
- Chinese anise: 100 grm.
- Fennel: 100 grm.
- Coriander: 100 grm.
- Sassafras: 100 grm.
- Amber seed (ambrette): 25 grm.
- Tea (Imperial): 5 grm.
- Alcohol (97°): 10 l. 500 c. c.

Essence or Elixir of Garum.
*Esprit de Garus (Codex).*

- Alcohol (90°): 6 l.
- Socotrine aloes: 5 grm.
- Saffron: 5 grm.
- Myrrh: 2 grm.
- Cinnamon: 20 grm.
- Cloves: 5 grm.
- Nutmegs: 18 grm.

Mix the bruised materials and macerate for four days in alcohol, filter, put in 1 l. of water and distill so as to draw off the spirituous portion.

Compound Essence of Juniper.
*Esprit de Genièvre Composé.*

- Juniper: 500 grm.
- Caraway: 60 grm.
- Fennel: 60 grm.
- Alcohol (15°): 4 l. 500 c. c.

Bruise the materials, macerate for 24 hours in alcohol, add 1 l. of water and distill to obtain 4 l. 500 c. c. Rectify to obtain 4 l.

SECTION IV.—ALCOHOLIC TINCTURES.

Under the name of tinctures are included substances which are obtained by the maceration of aromatic plants in alcohol. They are of two kinds—true alcoholic tinctures, prepared from the dry materials, and spirits (Fr. alcoolatures), prepared from fresh materials.

Tinctures are divided into two classes, simple and compound. Maceration is accomplished by leaving the materials
for a greater or less time in contact with the solvent by means of digestors or extractors (Fig. 36). The plants are placed in the cylinder of digestion, a quantity of alcohol is introduced and the apparatus is heated. The alcohol distilled is condensed in the neck of the still and is returned and the process is repeated continuously. By this operation the alcohol is constantly brought into contact with the materials until it has dissolved as much as possible of the principles of the plant.

Tincture of Absinthe.

Teinture d’Absinthe.

Dry leaves and tops of absinthe (small)......................... 260 grm.
Alcohol (85°)........................................ 1 l.
Macerate for 14 days. Agitate daily and filter.

Tincture of Aloes.

Teinture d’Aloès.

Cape aloes............................................ 200 grm.
Alcohol (80°)................................. 1 l.
Macerate for 8 hours and filter.

Tincture Bitter Almonds.

Teinture d’Amandes Amères.

Shells of bitter almonds......................... 500 grm.
Alcohol (85°)................................. 1 l.

Pile the shells up and macerate for a month at least in alcohol, agitating daily, and filter.

Tincture of Ambergris.

Teinture d’Ambre.

Gray ambergris.......................... 16 grm.
Alcohol (85°)................................. 1 l.
Macerate for 14 days with gentle heat (25 to 30° C.) and agitate from time to time.

Tincture of Angelica.

Teinture d’Angelique.

Roots of angelica, crushed...................... 200 grm.
Alcohol (85°)................................. 50 c. c.
Macerate at 25° C. or thereabout and decant the product. Macerate again for five days and repeat with

LIQUORS AND PRESERVES.

a half liter of 85 per cent. alcohol. Extract tincture with the aid of pressure, unite the two parts and filter.

Tincture of Anise.

Teinture d’Anis.

Green anise crushed......................... 290 grm.
Alcohol (85°)................................. 1 l.
Macerate for 10 days and filter.

Tincture of Benzoin.

Teinture de Benjoin.

Benzoin in tears, pulverized.................. 125 grm.
Alcohol (85°)................................. 1 l.
Same method of preparation as that used in making tincture of ambergris.
Tinctures of tolu, storax and cachou are prepared in the same manner.

Tincture of Cinnamon.

Teinture de Cannelle.

Crushed cinnamon.......................... 100 grm.
Alcohol (85°)................................. 1 l.
Macerate the cinnamon in the alcohol for eight days at a temperature of 25 to 30°.
In the same manner are prepared the tincture of cardamom, cascarailla, coriander, mace, musk, etc.

Tincture of Curacao.

Teinture de Curacao.

Peel of curacao (of Holland).............. 500 grm.
Alcohol (85°)................................. 1 l.
Macerate, stir daily and filter.

Tincture of Galangal.

Teinture de Galanga.

Bruised roots of galangal.................... 750 grm.
Alcohol (85°)................................. 1 l.
Macerate after 14 days, filter.

Tincture of Hyssop.

Teinture d’Hysope.

Dried flowering tops of hyssop............... 250 grm.
Alcohol (85°)................................. 1 l.
Macerate in the alcohol for 14 days, shaking frequently, then filter.
### Compound Tincture of Absinthe

**Teinture d’Absinthe Composée.**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absinthe (large) dry</td>
<td>60 grm.</td>
</tr>
<tr>
<td>Absinthe (small) dry</td>
<td>60 grm.</td>
</tr>
<tr>
<td>Cloves</td>
<td>6 grm.</td>
</tr>
<tr>
<td>Sugar</td>
<td>30 grm.</td>
</tr>
<tr>
<td>Alcohol (60°)</td>
<td>1 l.</td>
</tr>
</tbody>
</table>

Bruise the cloves and the herbs. Macerate for 8 hours and filter.

### Compound Tincture of Cinnamon

**Teinture de Cannelle Composée.**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cinnamon</td>
<td>30 grm.</td>
</tr>
<tr>
<td>Cardamom</td>
<td>15 grm.</td>
</tr>
<tr>
<td>Ginger</td>
<td>10 grm.</td>
</tr>
<tr>
<td>Pepper</td>
<td>10 grm.</td>
</tr>
<tr>
<td>Alcohol (60°)</td>
<td>5 l. 25 c. c.</td>
</tr>
</tbody>
</table>

Macerate the confused materials for 8 days in alcohol, press and filter.

### Compound Tinctures

Preparations of this kind are seldom prepared by liquor manufacturers, as it is easier to mix the simple tinctures, but the product is not as good.

### Compound Tincture of Absinthe

**Teinture d’Absinthe.**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
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<tbody>
<tr>
<td>Absinthe (large) dry</td>
<td>60 grm.</td>
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</tr>
<tr>
<td>Cloves</td>
<td>6 grm.</td>
</tr>
<tr>
<td>Sugar</td>
<td>30 grm.</td>
</tr>
<tr>
<td>Alcohol (60°)</td>
<td>1 l.</td>
</tr>
</tbody>
</table>

Bruise the cloves and the herbs. Macerate for 8 hours and filter.

### Compound Tincture of Cinnamon

**Teinture de Cannelle Composée.**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cinnamon</td>
<td>30 grm.</td>
</tr>
<tr>
<td>Cardamom</td>
<td>15 grm.</td>
</tr>
<tr>
<td>Ginger</td>
<td>10 grm.</td>
</tr>
<tr>
<td>Pepper</td>
<td>10 grm.</td>
</tr>
<tr>
<td>Alcohol (60°)</td>
<td>5 l. 25 c. c.</td>
</tr>
</tbody>
</table>

Macerate the confused materials for 8 days in alcohol, press and filter.

### Section V. - Spirits

Under the name of spirits our author includes tinctures prepared from fresh plants. The general method of preparation is as follows: The confused materials are saturated with 90° alcohol. Macerate for 8 days, after which decant the liquid. Filtration is necessary.

#### Spirit of Angelica

**Alcoolature d’Angelique.**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh angelica roots, stems</td>
<td>350 grm.</td>
</tr>
<tr>
<td>Alcohol (85°)</td>
<td>2 l.</td>
</tr>
</tbody>
</table>

Cut the plant up fine, macerate for 6 days with a little alcohol. Pass through fine linen, press the residue lightly with the remainder of the alcohol and allow it to stand for five or six days. Unite the two infusions and filter.

#### Spirit of Walnut Shells

**Alcoolature de Bruy de Nota.**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuts, not quite ripe</td>
<td>1 k.</td>
</tr>
<tr>
<td>Alcohol (85°)</td>
<td>1 l. 25 c. c.</td>
</tr>
</tbody>
</table>

Cut the plant up fine, macerate for 6 days with a little alcohol. Pass through fine linen, press the residue lightly with the remainder of the alcohol and allow it to stand for five or six days. Unite the two infusions and filter.
Spirit of Currants.
Alcoolature de Cassis.

Currants ripe and picked from the bunch. ... 12 k.
Alcohol .................................. 12 l.
Macerate for 15 days, draw off 4 l. (first infusion), filter. Treat the residue with 4 l. of alcohol (85°), agitate and mix. At the end of 15 days of maceration, draw off anew 4 l. (second infusion) and filter. Add to the remainder 4 l. of alcohol (85°), mix and macerate for 15 days. Draw off all the liquid which constitutes the third infusion and filter. The residue, after pressing, constitutes the fourth infusion.

Spirit of Lemon.
Alcoolature de Citron.

Fresh lemon skins ....................... 500 grm.
Alcohol (85°) .......................... 1 l.
Macerate for eight days and filter.

Spirit of Strawberries.
Alcohol (85°) .......................... 1 l.
Macerate for 15 days and filter. In the same manner are prepared spirit of raspberries, pineapples, etc.

SECTION VI.—DISTILLED WATERS.

Distilled waters, called also in French hydrolats, are the result of the distillation of plants with ordinary water. They are often a by-product in the manufacture of essences by distillation. The fresh plants are used wherever possible. They are submitted to a maceration of some hours, after which they are distilled by steam or the naked fire. A sufficient quantity of water should be used to cover the materials during the entire operation, and as the essences for the most part are not volatilized completely at 100° (C.), it is often necessary to add salt to the water to raise the boiling point.

The water and the plants are placed in a still and heated gradually, so as not to overheat. If the plants have only a little odor, it is necessary to redistill the product, that is to say, to submit the product to one or more distillations with a new supply of the plants.

LIQUORS AND PRESERVES.

The principal distilled waters used in the preparation of liquors are:
1. Waters distilled from the flowers of acacia rose, Cannabina, lily, lily of the valley, orange flowers, violets, elder flowers, etc.
2. Waters distilled from the flowering tops of balm mint, hyssop, lavender, ground ivy, marjoram, melilot, origanum, parsley, rosemary, sage, thyme, etc.
3. Waters distilled from leaves of the cherry laurel, peach, tea and the odorous leaves of the plants of the Labiatae family.
4. Waters distilled from the fruits of apricots, bananas, cherries, quinces, strawberries, raspberries, peaches, prunes, cacao, coffee, cloves, musk, maize, green nuts, etc.
5. Waters distilled from the rinds of oranges, lemons, bergamot, etc.
6. Waters distilled from the kernels of apricots, bitter almonds, cherries, peaches, prunes, etc.
7. Waters distilled from the grain and seeds of anise, angelica, Chinese anise, cardamom, caraway, coriander, fennel, juniper, parsley, etc.
8. Waters distilled from the bark or skin of the cinnamon, cascarilla, sassafras, etc.
9. Waters distilled from sandal wood, lignum vitæ, etc.
10. Waters distilled from calamus, angelica, ginger root, etc.

The general method of preparation is as follows:
The flowering tops are cut up; the fruits pulped, with their seeds or kernels; the skins or rinds are contused in a mortar; the roots, seeds, etc., are crushed; the wood and tough roots are rasped. The materials which have been thus treated are macerated with 2-5 per cent. of salt and four times their weight of cold water for twenty-four hours. After this time the mass is thrown into a still and submitted to distillation.

The following are examples of distilled waters:

Absinthe Water.
Eau Distillée d'Absinthe.
Top leaves and stems of the absinthe 1 k.
Salt .................................. 25 grm.
Distill .................................. 1 l.

In the same manner the balm mint, marjoram, origanum and the rose are distilled.
Acacia Rose Water.

*Eau Distillée d'Acacia Rose.*

- Fresh flowers of the acacia rose: 1 k.
- Salt: 25 grms.
- Water: 4 l.

Product: 2 l.

In the same manner the following distilled waters are produced:
- Violet, lily, and lily of the valley, fresh flowering tops of the hyssop, lavender, ivy, melilot, balm mint, sage, thyme, etc.
- Also the following: Orange, bitter almond, apricot, cherries, peaches, prunes, anise, Chinese anise, caraway, fennel, juniper, etc.

Anise Water.

*Eau Distillée d'Aneth.*

- Dry anise seeds: 1 k.
- Salt: 50 grms.
- Water: 8 l.

Product: 4 l.

In the same manner are prepared the distilled waters of:
- Angelica, coriander, parsley, etc.
- Coffee Water.

*Eau Distillée de Café.*

- Browined coffee: 1 k.
- Water: 13 l.

Cinnamon Water.

*Eau Distillée d'Ecorce de Cannelle.*

For the bark of cinnamon and for roots and woods in general: take:

- Material: 1 k.
- Salt: 400 grms.
- Water: 16 l.

Distill twice, so as to obtain 8 l.

Water of Lemon Peel.

*Eau Distillée de Zestes de Citron.*

For distilled water from the skins of lemons, oranges, bergamot, etc.: take:

- Material: 1 k.
- Salt: 100 grms.
- Water: 20 l.

Product: 10 l.

Liquors and Preserves.

Distilled Water from the Pulp of Fruits:

*Eau Distillée de Fruits Pulpeux.*

- Pulp of fruits: 1 k.
- Water: 4 l.

Product: 2 l.

Cherry Laurel Water.

*Eau Distillée de Laurier-Cerise.*

- Leaves of the cherry laurel cut fine: 1 k.
- Salt: 50 grms.
- Water: 1 l.

Product: 1 l.

In the same manner distilled waters are prepared from:
- Apricot, cherry, and peach trees.

Distilled Water of Tea.

*Eau Distillée de Thé.*

- Tea: 1 k.
- Water: 20 l.

Product: 10 l.

SECTION VII.—INFUSIONS, DECOCTIONS, AND MACERATIONS.

Infusions are prepared by throwing boiling water upon the plants or other materials to be treated, and as soon as the liquid is charged with the aromatic principle it is removed from the solid residue.

Decoctions are prepared by boiling the material to be treated for a certain time in water. Digestion is the name given to the action of the liquid which is allowed to act upon the material for a certain length of time at a temperature of from 35° to 60° C.

Maceration is an infusion made with a cold liquid. The operation is continued for the time necessary to dissolve the aromatic principles which the materials contain.

SECTION VIII.—JUICES.

The juices of fruits and vegetables are used in the manufacture of sirups and in a number of liquors which have sirups for bases. Juices are extracted from the leaves, fruits, stems, roots, and seeds of plants by a very simple process. The material is pulped in a mortar and submitted to pressure. A small hand press (Fig. 37) is usually used.
Clarification of Juices.—The juices when they come from the press must be clarified. The operation is performed in several ways, but heat is generally used.

Clarification by Fermentation.—This method of clarification is based on the transformation of sugar into alcohol by fermentation, which insures also the preservation of the juice. The juices are placed where the temperature varies from 20° to 25° C. until it is transformed into wine. Forty-eight hours is usually sufficient. When the fermentation is finished, the liquid is filtered.

Clarification by Filtration.—This process is by no means perfect, because there are a number of soluble materials which will bring about changes in the liquid later.

Clarification by Heat.—The juices are heated to about 80° or 90° C. and a solution of white of egg is added. The juice is then skimmed and filtered.

Preservation of the Juice.—The juices are preserved in heavy bottles.

1. Preservation with Sulphur.—The bottles are filled and a space equal to two fingers is left between the top of the liquid and the mouth of the bottle, and a piece of candle wick dipped in sulphur is burned in the neck of the bottle.

2. Preservation by the Appert Method.—This is the most convenient method of preserving juices. The clarified juices are bottled in stone or glass bottles and...
THE MANUFACTURE OF

corked and wired; they are then carried in a rack to a
hot water kettle (bain marie) of sufficient size to allow
the liquid to cover the bottles (Fig. 38). The water is
carried to the boiling point, and after a few seconds
the source of heat is removed and the water is allowed
to cool down, when the bottles are removed.

The following are receipts:

1. Juices of Huckleberries, Barberries, Cherries and
Grapes.—Crush the fruit and pass the pulp through a
horse hair sieve; crush the marc and unite and carry
to the cellar. After 24 hours of fermentation, filter and
preserve. The juice of cherries is better when a mix-
ture of black and red cherries is used.

2. Orange and Lemon Juice.—Remove skin and seeds,
crush the pulp and press, and mix with rye straw,
washed and cut fine, to assist the separation of the
juice. Clarify by repose, filter and preserve.

3. Quince, Apple and Pear Juice.—Peel and rasp the
fruit, taking care not to touch the seeds. Press the
pulp, mixed with rye straw, washed and cut fine.
Clarify by repose, filter and preserve. The quinces
should be fully ripe.

4. Raspberry Juice.—Crush the fruit and press the
marc. The liquid is allowed to repose for one or two
days, after which it is filtered. One-fifth the weight of
red cherries is sometimes added to the raspberries.

Pomegranate Juice.—Remove the skin and hard
partitions. Pulp with the hand and press. Let the
juice clear by repose, filter and preserve.

Gooseberry Sirup.—Squeeze the pulp through a
horse hair sieve and press. Let the juice repose for 48
hours, filter and preserve. One-fifth by weight of
cherries can be added if desired.

Peach, Apricot and Prune Juice.—Clean and pit
the fruit, crush the pulp and mix with rye straw,
washed and cut fine. Press and put in the cellar for
two days, filter and preserve.

SECTION IX.—SIMPLE SYRUPS.

Before describing the manufacture of liquors it is
necessary to describe the substances which form their
base and their process of manufacture.

Alcoholic liquors are formed essentially of alcohol,
sugar and various aromatic principles and sometimes a
coloring matter composed of various substances and
intended to render the liquor agreeable to the eye as
well as the taste.

1. Alcohol and the various aromatic principles have
already been treated.
2. Sugar [as the classification of sugar in this country is entirely different from that
of France, the section on sugar is omitted]. Only a
good quality of sugar should be used.
3. Glucose is
used only in inferior liquors.

Preparing Sugar.

The various degrees of concentration of sugar are
known under various names in French which have no
meaning when translated, so that the French names
are retained.

Sucre au Lessé.

This is a variety of boiled sugar and is made as fol-

Sucre au Perlé.

Repeat the preceding experiment, using a more con-

Sucre au Soufflé.

If the concentration is continued, when a little is
dipped up by a skimmer, shaken lightly and blown at the
same time, small bubbles will form. The sugar is
then said to be soufflé.

Sucre à la Plume.

Continue to boil, and after dipping the finger in wa-
ter and then in the sugar, and lastly in water again,
the sugar forms a feather-shaped mass.

Sucre au Caramel.

This name is used in English and French to denote
the condition when the sugar under the action of pro-
longed heat turns yellowish brown and gives off a pow-
erful odor. It is used by confectioners and liquor
manufacturers for coloring. [This classification is very
crude, and leaves much to be desired.—Ed.]

Simple Sirup.

This solution is one of the most important which the
liquor manufacturer has to prepare. The name simple
sirup is given to a solution of sugar in water concen-
trated until it has the density of 1'26 (30° Baume) when
it is boiling, and 1'32 (35° B.) when cold. This corre-
sponds to 1,000 parts of sugar and 530 parts of water.
The sirups of sugar are prepared by heat, in the fol-
lowing manner:

White sugar .................. 1 k. 700 grm.
Distilled water ................ 1 k.
Crush the sugar, put it in a basin with the prescribed
quantity of water, heat to the boiling point and filter.
Simple sirup is also prepared cold, as follows:

White sugar .................. 1 k. 800 grm.
Distilled water ................ 1 k.
Dissolve the sugar in the water and filter.

Coloring Materials.

Coloring matters are added to liquors to render them
agreeable to the eye. They are harmless if non-poison-
ous materials, such as cochineal, saffron, and caramel,
are used. The coloring matters that are considered
dangerous to health are the salts of lead, copper, aniline
derivatives and certain plants, such as aconite.

Red Colors.

Cochineal.

Boil
Water ....................... 1 1.
Cochineal, pulverized ............. 65 grm.
After boiling ten minutes, add
Pulverized alum .................. 15 grm.
Powdered cream of tartar ........... 15 grm.
Continue the boiling until the materials are com-
pletely dissolved, let it cool, and add ½ l. of alcohol
(85°). Filter through cotton, and place in bottles.

LIQUORS AND PRESERVES.

Cudbear.

Cudbear ........................ 400 grm.
Alcohol (85°) ....................... 1 l.
Macerate for five days, agitate several times a day,
decant the liquid, treat in the same manner the residue
by using a new quantity of alcohol for the same time;
unite the two liquids and filter.

Red Sandal Wood.

Wood rasped .................... 30 grm.
Alcohol ......................... 1 l.
Macerate for 24 hours, press and filter. This color-
ing matter can only be used in those liquors which are
unaltered by it.

Brazil Wood.

Bois de Brésil au Bois de Fernambouc.

Brazil wood (fine) ............... 250 grm.
Alcohol (85°) ....................... 1 l.
Macerate for four days, press and filter.

Yellow Colors.

Saffron Yellow.

Saffron, pulverized ............... 100 grm.
Water ......................... 1 l. 50 c. c.
Boil a portion of the water and pour on the saffron.
Cover and leave it to macerate until the infusion is
cold; when cold, press. On the residue throw the rest
of the water, preferably at the boiling point, then al-
low it to cool in a closed vessel; press and unite the
two liquids. Add 750 c. c. of alcohol (85°) and filter.
Persian and Avignon berries are also employed to color
liquors yellow, mixed together with or without saffron.
This produces the best color for Chartreuse.

Caramel.

Heat in a deep round basin 1 k. 400 grm. of molasses
until the point of caramelization is reached, stirring
constantly. Remove from the fire for a moment and
throw in small quantities, with stirring, into ½ l. of
water heated to 85°. Filter.
THE MANUFACTURE OF

Blue Color.

Indigo Blue.

Dissolve 10 grm. of finely pulverized indigo in 100 grm. of sulphuric acid at 66°. Place the indigo in a glass or stone vessel and add the acid, stirring until dissolved. Dilute with 3 l. of water and neutralize with 120 grm. of finely powdered chalk, stirring with care. The sulphate of indigo remains in solution, while the calcium sulphate is precipitated. After repose, decant and filter. Add to the color 80 per cent. of alcohol (85°).

Violet Color.

The violet color is seldom used. It can be made, however, by an ammoniacal solution of cochineal, or by a mixture of cudbear red and blue.

Green Color.

The green color is obtained by a mixture of blue with yellow; for example, indigo with caramel or saffron, or by means of a solution of chlorophyl in concentrated alcohol. This color is very fine, but has the grave fault of being destroyed very rapidly in liquors of less than 70°.

The plants most generally employed in the manufacture of a green color are dry lemon, balm mint (meldisse), infused for eight days in 100 grm. per l. of alcohol (86°), dry nettles and spinach. When it is necessary to prepare a fine solution of chlorophyl a certain quantity of alcohol is carried to the boiling point and it is thrown on the leaves, extracting the coloring principles. The solution can be used at once.

SECTION X.—COMPOUND SYRUPS.

Compound syrups are those which are prepared with several aromatic materials and simple syrup made from sugar.

Preparation of Compound Syrups.—All aromatic materials may serve in their preparation, no matter what their condition may be, whether in the form of juice, waters, essences, spirits, etc. The preparations which may be grouped under this head are very numerous. The following are examples:

Absinthe.

Crème d'Absinthe.

<table>
<thead>
<tr>
<th>Essence of absinthe</th>
<th>8 drops.</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot; cinnamon</td>
<td>1 drop.</td>
</tr>
<tr>
<td>&quot; rose</td>
<td>1 drop.</td>
</tr>
<tr>
<td>Sugar</td>
<td>400 grm.</td>
</tr>
<tr>
<td>Alcohol</td>
<td>500 c. c.</td>
</tr>
<tr>
<td>Water</td>
<td>500 c. c.</td>
</tr>
</tbody>
</table>

Product, 1 l.

Gum Arabic (Acacia Arabique).

Tree (Fig. 39) is 7 to 20 feet in height, roots hard, ligneous and have many ramifications. Trunk straight, brown bark, yellow sap, wood hard.

Fig. 39.—GUM ARABIC.