

Holland enjoys a large trade in the exportation of its gin. Its home consumption, which is considerable, consists of a gin at 45 to 49 centesimal degrees. The large factories of this product are at Scheidam (Schnaps). This town contains more than two hundred gin distilleries.

In Sweden and Norway, a sort of gin is prepared by simply digesting the juniper berries for some days in spirits at 50 or 55 degrees. This process is very objectionable, because it communicates to the liquor a very disagreeable sharpness. It is preferable to employ the process described hereafter, which consists in distilling the berries after sufficient maceration with alcohol at 85 or 90 degrees, and to reduce the product of the operation to 49 degrees.

The gin, which is consumed in the North of France and Belgium, is often nothing more than whiskey from rye and barley, or rather from potatoes and barley, and the taste which characterizes it is that of grain. This gin has an odor which is by no means agreeable, and far from being delicate, yet it is very much preferred by those who like this kind of spirits.

CHAPTER IX.

THE MANUFACTURE OF SWISS ABSINTHE.

SWISS absinthe at the present time constitutes the object of considerable trade and a special manufacture. Portarlier, Montpellier, and Lyons, are cities in which it is manufactured in very great quantities. We shall describe the article as produced in each locality, assuming that the quantity of Swiss absinthe to be made is one hectolitre.

Absinthe of Portarlier.

Larger absinthe, dried and ground,	2 kilogrs., 500 grms.
Green anise	5 "
Fennel	5 "
Alcohol at 85°	95 litres.

Digest these ingredients for at least twelve hours in a water bath, add 45 litres of water when ready to distil, close the apparatus, and distil off 95 litres of perfumed spirit. Continue the operation until all the phlegm is drawn off, and set it aside for another operation.

The green color is given by the following process:—

Small absinthe, dried and picked	1 kilogr.
Hyssop (tops and flowers),	1 "
Lemon balm, dried and picked	500 "
Perfumed spirits, from the preceding operation,	40 litres.

Divide or cut up the small absinthe, reduce the hyssop and balm to a powder in a mortar, put the whole into a water-bath with the perfumed spirits, lute immediately, then heat gently, so as to produce a very moderate and gradual heat, and, so soon as the hand cannot be placed on the cap, withdraw the fire quickly from beneath the apparatus, in order to prevent the liquid from being distilled. Allow it to cool entirely before withdrawing the still from the water-bath, then pass the colored liquor through a hair cloth to drain the plants; add this product to the 55 litres of perfumed spirits that are reserved, and reduce to 74 degrees by adding five litres of water, which will bring the quantity up to 100 litres.

Absinthe of Montpellier.

Large absinthe dried	2½ kilogrammes.
Green anise	6 "
Florentine fennel	4 "
Coriander	1 "
Angelica seed	500 grammes.
Alcohol at 85°	95 litres.

Distil as in the preceding case. The color is made also in the same way with the following ingredients:

Dried hyssop, (herb and flowers),	750 grammes.
Dried balm of Moldavia	750 "
Small absinthe	1 kilogr.

Absinthe of Lyons.

Large absinthe, dried	3 kilogrammes.
Green anise	8 "
Fennel	4 "
Angelica seed	500 grammes.
Alcohol at 85°	95 litres.

Coloring.

Dried and selected lemon balm	1 kilogramme.
Small absinthe dried.	1 "
Hyssop tops and flowers dried	500 grammes.
Dried veronica	500 "

Absinthe of Fougérolles. (For 600 Litres.)

Green anise	45 kilogrammes.
Fennel	25 "
Larger absinthe	16 "
Alcohol at 85°	570 litres.
Water	300 "

Digest for at least twelve hours with the alcohol in a proper apparatus, add the water at the time of distilling, draw off 570 litres of perfumed spirits. When this quantity has been obtained continue the distillation until all the phlegm has been distilled off and set aside for another operation.

Coloring.

Lemon balm	4½ kilogrammes.
Hyssop	3½ "
Lesser absinthe	4 "
Veronica	4 "

Treat as for that first described and reduce the mixed spirits to 74° by the addition of enough water to bring the quantity up to 600 litres.

Absinthe of Besançon. (For 600 Litres.)

Great absinthe	24 kilogrammes.
Green anise	30 "
Fennel	40 "
Coriander	4 "
Alcohol at 85°	570 litres.
Water	300 "

To be treated as above.

Coloring.

Balm	3 kilogrammes.
Less absinthe	6 "
Hyssop	5½ "
Treat as the last.	

Absinthe of Nimes. (For 600 Litres.)

Great absinthe	22½ kilogrammes.
Green anise	22½ "
Fennel	15 "
Coriander	2½ "
Roots of the black alder	1½ "
Angelica root	1½ "
Alcohol at 85°	570 litres.
Water	300 "
Treat as above.	

Coloring.

Less absinthe	5 kilogrammes.
Hyssop	4½ "
Balm	1½ "
Veronica	2½ "
Mint	2½ "
Treat as before.	

It is always optional to diminish or increase the quantities of the ingredients in the foregoing recipes according to the taste of the manufacturer, or the price of the article he wishes to produce; but this fact must be borne in mind, that it is only age that will give to absinthe that softness so much prized by consumers.

Remarks.—The greatest pains should be taken in the selection of the materials, especially the plants intended for the coloring; these should be very green and dry, and free from black and mouldy leaves. The seeds should be powdered in a mortar, and the great absinthe picked over and ground.

The distillation of absinthe should be effected in a Turk's-head still, in a water-bath, or, what is better, by steam, in order that the essential oils may rise with more facility, especially towards the close of the operation; because the phlegm is employed in another operation.

tion, in which it is most useful, by adding to the perfume through the large proportions of essential oils it contains.

The coloring is of the highest importance. The plants are finely divided, or reduced to powder, and covered with perfumed spirits; then heated gently, in order to extract the chlorophylle or coloring principle. After cooling, the colored spirit is drawn off clear, and the plants are drained. They may still, after this operation, serve for coloring a smaller quantity of absinthe. They are then subjected to distillation, to collect and save the small quantity of alcohol still adhering to them.

In the large factories, the extract of absinthe is colored in tinned copper vessels, containing about twenty hectolitres—they are called *colorers*. These vessels, hermetically closed, are heated to 60 degrees by means of steam.

The coloring may be made in the cold way, but the operation requires many days, and a large quantity of plants, which considerably increase the acidity of absinthe.

When the coloring and perfumed spirit, held in reserve, have been mixed, the alcoholic strength is tested and reduced to 74°, although absinthe is never sold above 72°; but, by rest and time, there is always some loss which must be provided against.

The green color of absinthe becomes yellowish by age, and then has a dead-leaf tinge. The green tint may be preserved by adding, after the mixture, fifteen grammes of *alum*, dissolved in a glass of water; but consumers generally prefer the yellow tint. By age, absinthe improves in quality, by losing its sharp and empyreumatic taste, which is communicated by the distillation and coloring.

It is to be remarked that it is not the great variety of substances introduced into the manufacture that constitutes the great merit of absinthe, but rather the rational combination of a small number having peculiar virtues: thus, the anise serves to produce the whiteness; the fennel corrects the piquant and sugary taste of the

anise, at the same time adding something to the flavor; the hyssop fulfils the same end, while it yields a beautiful green color, which the balm increases still more. Finally, the lesser absinthe, by its slightly yellowish tinge, modifies the excessive brilliancy of the green color, while its slight bitterness and aroma, added to those of the great absinthe, impart to this liquor the characteristics peculiar to a well-made product.

Absinthe is considered as being of good quality when, on being diluted with water, it becomes white, and exhibits the colors of the opal, which is due to the essential oils from the seeds, and the resinous and coloring matters of the plants, which, under these circumstances, are set at liberty, and form, with water, the milky compound so highly prized. In this state, it should be pleasant, agreeable, odorous, and sweetish. Sharpness and tastelessness are always signs of a recent manufacture.

Absinthes of inferior quality are often met with in the market. Some are manufactured without distillation, essences being used to replace the seeds and plants; some are distilled with *trois-six* from beets, &c., which leaves much to be desired in flavor; some are prepared with old or damaged materials, while, finally, there are others which, after the distillation have had added to them aromatic resins, such as benzoin, guaiacum, &c., in order to increase the opalescence.

White Absinthe.

Greater absinthe, selected	. . .	2 kilogrs., 750 grms.
Less absinthe	. . .	1 kilogr., 125 "
Hyssop flowers	. . .	1 " 100 "
Veronica	. . .	550 grammes
Genepi	. . .	550 "
Roman chamomile	. . .	225 "
Green anise	. . .	5 kilogrs., 250 grms.
Fennel	. . .	5 " 250 "
Coriander	. . .	1 kilogr.
Angelica seeds	. . .	550 grms.
Alcohol at 85°	. . .	96 litres.

Conduct the maceration and distilling in the same way as for green absinthe; then rectify the product, and reduce to 74°.

The abuse of absinthe, even diluted with water, is most deleterious to the animal economy. Taken pure, it occasions serious disorders of the stomach and brain. It is not to the alcohol alone that these injurious effects are to be attributed, but more especially to the large quantity of essential oils of anise and fennel which it contains.

Apparatus for Manufacturing Absinthe and Perfumed Spirits.

This apparatus, Pl. VIII., consists of the following parts:—

A. Kettle inclosed in a wooden jacket, acting as a water bath inclosing another kettle, which contains the alcohol and herbs to be distilled.

B. Top or cover of the boiler (still).

C. Opening closed by a plug for charging the still.

*C*¹. Opening like the above for discharging the plants after distillation.

D. Cap of the still fastened on by a circular collar, and terminating in a neck which conducts the alcoholic vapors to the cooling coil.

E. Cooler with its coil.

*E*¹. Discharge pipe of the condensing coil.

F. Colorer, furnished like the still, with plugs through which to fill and empty it.

G. Pump firmly fastened to the wall by the collars *G*¹.

H. Piston rod.

I. Eccentric for driving the pump.

J. Pulley on which a band runs to connect with the power.

K. Bearings for pulley shaft.

L. Tank, or well of metal, sunk in the floor.

M. Suction pipe.

*M*¹. Suction pipe connected with colorer.

N. Three-way cock, attached to the suction pipe to draw any liquid from the tank to deliver it in the still, in

the colorer, or to the store-room, or to draw the finished liquor from the colorer, and deliver it in the store-room.

*N*¹. Pipe for drawing off the colored product.

O. Force or delivery pipe.

P. Three-way cock, which directs liquids at pleasure into the still or the colorer.

*P*¹. Pipe delivering the liquid into the colorer.

*P*¹¹. Pipe to convey the liquor into the still.

R. Cock and pipe for delivering the manufactured product into the store-room.

S. Funnel and pipe to convey the distilled product to the tank.

T. Main steam-pipe connected with steam boiler.

U. Steam-cock for the kettle of the still.

V. Steam-cock for the colorer.

Management of the Apparatus.—The principal advantages of this apparatus are its great simplicity and the small number of pieces constituting it. One pump, by its multiplicity of uses, is sufficient for three different transfers of liquid.

1. It fills the boiler of the still *A* with alcohol and water.

2. It fills the colorer *F* with the distilled product which flows into the tank by the funnel and pipe *S*.

3. It draws the liquid from the colorer *F*, to send it to the store cisterns by the pipe *R*.

The apparatus is set in operation as follows:—

Having filled the tank *L* with water and alcohol in the proper proportions, and having placed in the boiler of the still through the upper opening the plants necessary to the manufacture of the absinthe, the cock *PP*¹ is opened, and the pump set to work; the boiler *A* is immediately filled from the contents of the tank *L*. When the tank is empty, the motion of the pump is stopped and the cock *P* is closed. The steam is turned on by opening the cock *U*, and the product soon begins to flow from the lower extremity of the condensing coil, falls into *S*, and again fills the tank *L*; but now it is spirits perfumed by the plants that were placed in the still. The liquid is white, and possesses already a great

part of the properties peculiar to the liquor. It must now be colored. For this operation the pump performs its second office, by drawing up the liquid and sending it to the colorer *F*, which has been previously packed with the coloring plants in quantity proportioned to the perfumed spirit to be poured over them. The perfumed spirit is drawn from the tank *L* by the pump, and is transferred through the cock *P* and the pipe *P*¹ into the colorer. Finally, after this operation, which finishes the manufacture of absinthe, the pump fulfils its third office by drawing the colored product contained in *F* through the pipe *N*¹, and transfers it through cock and pipe *R* into the tanks or barrels intended for its reception.

Causes of the Pernicious Effects of Absinthe.

This so-called Swiss absinthe has attracted public attention for some time, and much credit is due to the writers of many scientific and medical essays, for indicating with so much persevering energy the abuses of this product, a horrible curse which is killing the youth of our colleges, decimating the army, and will cause the fatal debasement of the rising generation.

In order to increase the sale of this truly horrible beverage, the idea has been invented of mixing it with syrups of gum, so called, and which most generally do not contain a particle of gum, and which, on account of the vile method of the manufacture, only bring in their train an increase of the evil.

Of course these evils are not to be attributed to first-class houses, who only sell for consumption perfectly distilled absinthes that are free from all adulterations.

We have no intention, by what has just been said, to advise the use of this liquor, however well it may be made, but to set forth the fact that, in many localities, sufficient care is not taken in the selection of the plants, and in conducting the distillation. This results from the fact that most persons who undertake this work are ignorant of the first principles of distillation. So much is this the case, that, if allowed to express an opinion on so serious a question, we should advise the authorities—

1. To require that all liquor distillers who manufacture absinthe, or any other spirituous liquors, should have some knowledge of chemistry and botany, should be of good character, and be possessed of organs of taste and smell accurate enough to be of use in estimating the quality of the materials passing through their hands.

2. That a certificate or diploma as a distiller should be conferred on him only after his having proved, by a satisfactory official examination, that he is possessed of a competent knowledge of the theoretical principles of the trade he wishes to pursue.

3. Finally, that he should serve for at least one year as an apprentice, in order that he may, on entering into the business, add also practical knowledge to the theoretical which he should possess. By following this plan, we would have good and true distillers. While at the present time a large proportion of the young men, who set up in this business, have very little knowledge, they very often leave trades having little or no connection with distilling, and at the end of a few months' apprenticeship, sometimes under a man more ignorant than themselves, they present themselves as master workmen at the distillery or the brewery. Why, then, should it be cause for astonishment if badly manufactured products of distillation enter into our daily consumption?

We cannot close this article without giving some advice on the distillation of absinthe.

The plants should be picked over, as only the tops are distilled, and the flow phlegm should never be pushed to the end of the distillation. It may be objected that the liquor will be less penetrating, and will have less bouquet; we answer, so much the better for the consumer. They may rejoin that the price will be much higher: we reply, what is the difference? it will sell all the better for that.

We cannot omit to recommend the use of *calamus aromaticus*, and angelica root in the proportion of 125 grammes to the hundred litres of the product, with balm, hyssop, and the small absinthe for the coloring, which should always be made hot.

But why are absinthes so bad in Paris? It is because the greater proportion of absinthes sold are not distilled, but made from essences, which, as is well known are highly charged with empyreumatic essential oils. Now, if the proportion of these essences is too great, as is almost always the case, they are not completely dissolved, and the absinthe so manufactured, after being swallowed, leaves an acrid taste, and a lasting and painful sense of heat and discomfort in the mouth, throat, stomach, and even in the urinary organs in persons who use it habitually.

In conclusion, absinthe, as a medicine, like most other plants, has some useful properties; but as a favorite and daily drink it has its dangers and becomes very often fatal. But it is certain that if this liquor was always of good quality and properly prepared, it would not play such sad havoc, and would spare many useful men to the country.

CHAPTER X.

ALCOHOLOMETRY.

SPIRITUOUS liquors, known in commerce as brandy, whiskey, spirits, etc., as we have already said, are mixtures of alcohol and water in variable proportions. Their marketable value generally depends on the actual quantity of alcohol which each of them contains.

Alcoholometry is the determination of the alcoholic strength of spirituous liquors, that is to say, the valuation of the proportions of water and pure alcohol that a mixture of these two liquids may contain. This is effected by the combined use of a thermometer and an areometer. As for the valuation of the proportion of pure alcohol contained in a wine, or any liquid whatever, it is made by the assistance of small test stills. Before examining the latter, we shall first explain the method of determining

the proportion of alcohol contained in a mixture of pure water and spirit, and describe some of the instruments necessary to the solution of this problem.

Thermometers.

Thermometers are philosophical instruments made use of to determine the temperature of the atmosphere and of different substances with which they may be brought in contact. These instruments are graduated glass tubes hermetically closed, which contain a certain quantity of mercury or alcohol. The construction of the thermometer depends on the property common to all substances by which they expand under the influence of heat, and contract under the influence of cold.

The thermometers used in France are *Reaumur's* and the *Centigrade*. The latter is the official thermometer, and is coming more and more into use. In Germany, England, and the United States *Fahrenheit's* thermometer is used.

In order to compare two thermometers one with the other, it is necessary to have two fixed and invariable points of reference; the temperature of melting ice has been chosen for one, that of water in a state of ebullition at the level of the sea for the other; because these two terms are the same everywhere, and are easily found.

The three thermometers named have not the same divisions, but are as follows:—

Reaumur, the freezing of water	0°	boiling water	80°
Centigrade,	"	"	100°
Fahrenheit,	"	"	212°

In Russia, the thermometer of *Delisle* is used; the scale is the reverse of the above; the boiling point of water is zero, and the freezing point is marked 150°.

Mercurial thermometers cannot be constructed to indicate a temperature, above 350°, because that liquid boils at this temperature, nor below 34° below zero, because when so near its freezing point its rates of expansion and contraction are irregular.