THE MANUFACTURE

OF

LIQUORS, WINES, AND CORDIALS,

WITHOUT THE AID OF DISTILLATION.

Also the Manufacture of

EFFERVESCING BEVERAGES AND SYRUPS,

VINEGAR, AND BITTERS.

PREPARED AND ARRANGED EXPRESSLY FOR THE TRADE.

BY

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PREFACE.

All subjects affecting the interests of society generally have been discussed and examined, and all questions within the range of importance, have been adequately illustrated; and whence the neglect of a matter of as much importance as the following pages, it is difficult to conceive.

Thousands have acquired wealth from a knowledge of this business; and have passed from the stage of action, without leaving to the world the marks of their progress and improvements; and all previous works upon the Manufacture of Liquors were vague and unsatisfactory, furnishing no reliable information to warrant a speculative investment; for persons possessing really valuable information upon this subject, have found a greater remuneration in manufacturing than in publishing.

But few of the dram-drinking masses are acquainted with the modus operandi of a business, which affects, to no inconsiderable extent, both health and wealth, and that their own ignorance has often tested the strength of their constitutions, through the medium of "A pure old Article," or, "A choice old Brand;" and hence, the obvious necessity of a work upon this subject will not be denied, thus removing many popular errors regarding the production of liquors; and the dissemination of such knowledge would crush the cupidity of manufacturers, and articles of spirit so often found in commerce, containing deleterious adulterations,
would disappear, which would strip intemperance of many of its attendant calamities.

It will be observed that the recipes throughout this work are those only that comprehend the manufacture of liquors, &c., that are usually met with in commerce, and the reader comes at once to the process and its productions; these formulas have been employed by all of the most extensive manufacturing establishments in Europe; and added to these recipes, are all of the recent improvements that have been suggested by chemistry.

It will be seen that the articles used in the formation of liquors, &c., mentioned in this work, are powerful stimulants to the digestive organs, constituting medicated drams that invigorate the whole system.

It will be noticed that the work contains numerous extemporaneous recipes, and in view of their non-availability under all circumstances the apparatus will be found both economical and simple.

The Author.

New Orleans, October 1st, 1853.
CONTENTS.

I.—Process of Manufacturing Liquors without Distillation, ........................................... 9

II.—Articles Employed in the Manufacture of Wines, Cordials, Liquors, &c., &c. ............... 15

III.—Articles used for Flavoring Wines, Liquors, and Cordials, ....................................... 50

IV.—Manufacture of Domestic Liquors by concealing the Odor of the Grain Oil, ............... 88

V.—Directions for Preparing the most choice Liquors in quantities of Five Gallons, ............ 118

VI.—Manufacture of Low-Proof Spirita, ................................................................. 132

VII.—Description of Beads for Liquors, ................................................................. 146

VIII.—On Barrelling Liquors, &c. ................................................................. 167

IX.—On the Uses of Sugar, Molasses, and Honey, in the Manufacture of Wines and Liquors, 173

X.—The Process of the Manufacture of Sulphuric Acid, ............................................ 187

XI.—Tobacco, Caustic Potassa, Red Pepper, Aquafortis, and Oil of Vitriol ......................... 198
<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XII.—Wines</td>
<td>203</td>
</tr>
<tr>
<td>XIII.—Cordials</td>
<td>227</td>
</tr>
<tr>
<td>XIV.—On the Manufacture of Soda, Mineral, and other Carbonated Waters, &amp;c.</td>
<td>239</td>
</tr>
<tr>
<td>XV.—Manufacture of Vinegar in Twenty-four hours, &amp;c.</td>
<td>265</td>
</tr>
<tr>
<td>XVI.—Bitters</td>
<td>283</td>
</tr>
<tr>
<td>XVII.—Syrups</td>
<td>294</td>
</tr>
<tr>
<td>Index</td>
<td>309</td>
</tr>
</tbody>
</table>
I.

THE PROCESS OF

MANUFACTURING

LIQUORS WITHOUT DISTILLATION.

ALCOHOL,

In the chemical sense, is a liquid generated for the most part in vegetable juices and infusions by a peculiar fermentation called the vinous or alcoholic. The liquids which have undergone it, are called vinous liquors, and are of various kinds. Thus, the fermented juice of the grape is called wine; of the apple, cider; and the fermented infusion of malt, beer. With regard to the nature of the liquids susceptible of the vinous fermentation, one general character prevails, however various they may be in other respects; that, namely, of containing sugar in some form or other. It is found further, that after they have undergone the vinous fermentation, the sugar they contain has either wholly or in part disappear-
ed, and that the only new products are alcohol, which remains in the liquid, and carbonic acid which escapes during the process, and these when taken together, are found to be equal in weight to the sugar lost; it is hence inferred that sugar is the subject matter of the changes that occur during the vinous fermentation, and that it is resolved into alcohol and carbonic acid. Sugar will not undergo the vinous fermentation of itself, but requires to be dissolved in water, subjected to the influence of a ferment, and kept at a certain temperature.

Accordingly, sugar, water, and the presence of a ferment and the maintenance of an adequate temperature, may be deemed the pre-requisites of the vinous fermentation. The water acts by giving fluidity, and the ferment and temperature operate by commencing and maintaining the chemical changes. The precise manner in which the ferment operates in commencing the reaction is not known, but the fermentative change seems to be intimately connected with the multiplication of a microscopic vegetable, in the form of diaphanous globules contained in the ferment, and called "torula cervisia." The ferment is generally considered to contain a peculiar nitrogenous principle having a close analogy to albumen and casein.

Certain vegetable infusions, as those of potatoes and rice, though consisting almost entirely of starch,
ALCOHOL.

are nevertheless capable of undergoing the vinous fermentation, and form seeming exceptions to the rule that sugar is the only substance susceptible of this fermentation. The apparent exception is explained by the circumstance that starch is susceptible of a spontaneous change which converts it into sugar. How this change takes place is not well known, but it is designated by some authors as the saccharine fermentation. It has been proved that if a mixture of gluten from flour, and starch from potatoes, be put into hot water, the starch will be converted into sugar. When, therefore, starch is apparently converted into alcohol by fermentation, it is supposed that during the change it passes through the intermediate state of sugar. Alcohol being the product of the vinous fermentation, necessarily exists in all vinous liquors, and may be obtained from them by distillation. Formerly it was supposed that these liquors did not contain alcohol, but were merely capable of furnishing it in consequence of a new arrangement of their ultimate constituents—the result of the heat applied. This idea has been disproved by showing that alcohol may be obtained from all vinous liquors without the application of heat, and, therefore, must pre-exist in them. The method consists in precipitating the acid and coloring matter from each vinous liquor, by subacetate of
LEAD, and separating the water by carbonate of potassa.

In vinous liquors, the alcohol is largely diluted with water, and associated with coloring matter, volatile oil, extractive, and various acids and salts. In purifying it, we take advantage of volatility, which enables us to separate it by distillation, combined with some of the principles of the vinous liquor employed, and more or less water. The distilled product of vinous liquors forms the different ardent spirits of commerce. When obtained from wine, it is called brandy; from fermented molasses, rum; from cider or peaches, it is called apple or peach brandy; from malted barley, rye, or corn, it is known as whiskey; from malted barley and rye meal, with hops, and rectified from juniper berries, it is known as Holland gin; from malted barley, rye, or potatoes, and rectified from turpentine, it is called common gin; and from fermented rice, arrack. The spirits are of different strengths, that is, contain different proportions of alcohol, and have various peculiarities by which they are distinguished by the taste. Their strength is accurately judged of by the specific gravity, which is always less in proportion as their concentration is greater. When they have the sp. gr. 0.920, they are designated in commerce as proof spirit; if lighter than this, they are said to be above proof;
if heavier, below proof; and the percentage of water or of spirit of 0.825 necessary to be added to any sample of spirit to bring it to the standard of proof spirit, indicates the number of degrees the given sample is above or below proof: thus, if 100 volumes of spirit require 10 volumes of water to reduce it to proof, it is said to be "10 over proof." On the other hand, if 100 volumes of spirit require 10 volumes of a spirit of 0.825 to raise it to proof, the sample is said to be 10 under proof.

Thus, for instance, these marks will be observed on the heads of rectified whiskey barrels, the initials "A. B. P.," signifying above proof, and "B. P.," below proof. This whiskey should contain about 40 per cent. of alcohol, of the strength of 92 per cent.; thus it will be seen that a barrel of forty gallons of whiskey is composed, as far as the fluid measure extends, of sixteen gallons of alcohol and twenty-four gallons of water; this is called "rectified proof spirit," or "proof spirit." Should the spirit contain above forty per cent. of alcohol, it will be denoted on the head of the barrel by the initials, "A. B. P.", with the figures denoting the per centage. And if the spirit contains less than forty per cent. of alcohol, it will be known by the initials "B. P.,” or below proof, with the less per centage indicated by figures.
LIQUORS WITHOUT DISTILLATION.

Proof spirit is far from being pure, as it contains a considerable quantity of grain oil and other foreign matters; it may be further purified and strengthened by distillation, or the impurities may be driven off by filtration through charcoal. Alcohol thus purified, is known in commerce as neutral spirits, and is used in the manufacture of the imitation of foreign liquors, cordials, syrups, aromatic waters, essences, perfumes, &c., &c.
II.

ARTICLES USUALLY EMPLOYED

IN THE MANUFACTURE OF

WINES, CORDIALS, LIQUORS, &c., &c.

ALCOHOL

Can be obtained by distillation, from any article that is capable of undergoing fermentation.

The alcohol that is commonly found in commerce, is obtained from corn or potatoes, and contains an essential oil which is removed by rectification or filtration with charcoal (see Filtration); and when alcohol is thus cleansed of grain oil, it is then suited for the purposes of the manufacturer, and is known under the name of Neutral Spirit.

This spirit, when flavored, and the various articles added to give a vinous, mucilaginous, oily, or dry taste, are called Imitation Liquors, by virtue of their possessing some of the leading characteristics of the distilled spirit which they are supposed to represent.
ACIDS.

Tartaric, Citric, and Sulphuric, are used for imparting acidulous vinous taste to liquors.

Of these acids, that of Tartaric is made from or extracted from tartar, a peculiar substance which forms on the inside of wine casks, being deposited there during the fermentation of the wine; by some manufacturers, cream of tartar is preferred to any other acid.

Citric Acid is the peculiar acid to which limes and lemons owe their acidity; it is present also in the juice of other fruits, such as the cranberry, the red whortleberry, red gooseberry, currant, strawberry, raspberry, etc., etc. Citric acid is prepared from the juice of the lime or lemon.

Sulphuric Acid.—From the low price of this acid, it is used extensively for adulterating vinegar, and also in any form that an acid may be required for wines, cordials, &c. This acid is made from the combustion of sulphur—this acid should be kept excluded from the atmosphere, in well stopped vessels—this acid is used in forming the beading mixture, for giving a bead to the low proof liquors; for this formula, look under the head of Beads for Liquors.

Alum is manufactured occasionally from earths
AMYLIC ALCOHOL.

which contain it ready formed, but most generally from minerals, which, from the fact of their containing most or all of its constituents, are called alum ores. The principal alum ores are the alum stone, which is a native mixture of sub-sulphate alumina and sulphate of potassa.

The alum stone is manufactured into alum by calcination, and subsequent exposure to the air for three months; the mineral being frequently sprinkled with water, in order that it may be brought to a soft mass; this is lixiviated and the solution obtained, crystallized by evaporation.

Several varieties of alum are known in commerce. Roche alum, so called from its having come originally from Roccha, in Syria, is a sort that occurs in fragments of the size of an almond, and having a pale rose color, which is given to it by bole or rose pink. Roman alum also occurs in small fragments covered with a rose-colored efflorescence, derived from a slight covering of oxide of iron.

Alum is used for fining liquors; it is first finely powdered, from 3 to 5 ounces to 40 gallons of liquid, and it is used for imparting roughness to wines. The astrinency of alum is preferable to catechu in the light wines.
AMYLIC ALCOHOL,

Or fusel oil, grain oil, corn spirit oil. This oil is distinguished by a strong disagreeable odor that is perceptible in corn whiskey, and is vulgarly known as Rot-gut. Spirit distilled from grain, contains it in the proportion of one part in five hundred by measure. It is a colorless liquid, of a strong acrid burning taste—it is an artificial source of apple oil.

*Pear Oil and heavy Oil of Wine.*—For the reader to fully appreciate what chemistry has done for the manufacture of liquors, in this single instance, take, for example, 100 gallons of potato spirit, which contains a larger portion of grain oil than any other spirit. Now this spirit will be, owing to this grain oil, of a highly offensive odor, and if drunk in the usual quantities that clean spirit is, it would act as an emetic. This grain oil is separated by distillation, which leaves the spirit clean and inodorous—a neutral spirit; the grain oil is then distilled with sulphuric acid, which produces oil of wine, or its odor; if this be added to the spirit, it would, in point of flavor, possess all the essentials of pure brandy. And if the oil be subjected to further chemical decomposition, the product would be apple oil and pear oil—the former added to the spirit would yield apple
brandy, and the latter gives the appearance of age to liquors.

AMMONIA.

This is commonly obtained by the action of lime on muriate of ammonia or sal ammoniac.

Water of ammonia is used in low proof liquors, for giving in combination with ethers, essences, &c., a strong aromatic perfume; and it is used singly in a liquid that needs a strong odor, as, for instance, in a barrel of low proof whiskey, containing only twenty gallons of proof whiskey to twenty of water, will have an odor commonly called "groggy," the addition of ammonia completely "cures" this—that excess of ammonia should never be added that would indicate its own presence.

AMBERGRIS.

This substance is found floating on the sea, or thrown by the waves upon the shores of various countries, particularly in the southern hemisphere; is now generally believed to be produced in the intestines of the spermaceti whale. It is found in roundish or amorphous shaped pieces, usually small, but sometimes of considerable magnitude; and masses have been found weighing from 50 to 200 pounds.
These pieces are often composed of concentric layers; they are of various colors, usually grey, with brownish yellow and white streaks, often dark brown or blackish on the external surface. They are opaque, lighter than water, and of a consistence like that of wax, and have a peculiar aromatic agreeable odor, and are almost tasteless, and soften with the warmth of the hand. Ambergris is insoluble in water, but will dissolve in hot alcohol.

Ambergris is used as a perfume for liquors. It is never used alone, always being combined with other aromatics. The usual form of adding it to spirit, is to rub it well with sugar, which acts by minutely separating the particles of ambergris. Ambergris should be used in very small quantities, when used as a flavoring ingredient, as the odor would be easy of detection. In light-bodied liquors, one grain will often suffice. Its different applications will be found in the different formulas throughout the work.

ALMONDS.

There are two varieties of almonds, sweet and bitter.

Sweet Almonds, when blanched, which is easily done by immersing them in boiling water and rubbing them between the hands until the husk is removed.
are without smell, and have a sweet and pleasant taste.

Sweet almonds enter into the composition of various syrups, &c. They are also used for giving the appearance of age, and a nutty flavor and taste to all kinds of spirituous liquors. When this object is intended for fine brandies, &c., say for twenty gallons of the spirit, five ounces of sweet and one of bitter almonds are well worked to a paste with acetic ether in a mortar; the paste is then strained, being first diluted with a sufficiency of water; the strained product, being a milky emulsion, is added to the spirit, for wines, &c. Use in the same manner,

Bitter Almonds.—These are smaller than the preceding variety; they have the bitter taste of peach kernels, and though in their natural state inodorous, or nearly so, have when triturated with water the fragrance of the peach blossom. They contain the same ingredients as sweet almonds, and like them form a milky emulsion with water. Bitter almond meal is sometimes used in the quantities of three to five ounces to twenty gallons of spirit, for imparting a nutty taste. Much care should be used in selecting almonds that are not rancid, as they would be highly deleterious if added to a cordial or wine.

Oils of Sweet and Bitter Almonds.—The oil of sweet
almonds is of a sweet bland taste, and may be substituted for all the uses of sweet oil. This oil is sometimes dissolved in ether or alcohol, and is used for the same purposes in liquors that the almond is for; from one to two ounces of the oil, to double that quantity of alcohol or ether.

*Oil of Bitter Almonds* has a yellowish color, a bitter acrid burning taste, and the peculiar odor of the kernels in a very high degree. The purity of this oil may be known by its ready solubility in sulphuric acid, with the production of a reddish brown color. Oil of bitter almonds is used as a flavoring ingredient in cordials, wines, and liquors, but more extensively in cordials. This odor is too well known and easily detected, and should be used in small quantities.

**ALE OR PORTER**

Is sometimes used in quantities of from one to five quarts to forty gallons of spirit; it is used in cases where catechu and alum would be objectionable on account of their easy detection in rum, brandy, &c. Ale gives a mild and pleasant bitter. Four pints of porter and one ounce of sulphuric acid added to forty gallons of spirit, will give a taste similar to the decoction of peaches. Where porter is not convenient, add an infusion of hops.
ALKANET ROOT.

This root, as found in commerce, is usually much decayed internally; it is in pieces three or four inches long, from the thickness of a quill to that of the little finger, somewhat twisted, consisting of a dark red easily separated bark; it is reddish externally, and whitish near the centre, and composed of numerous distinct fibres, and internally of loose spongy texture. The fresh root has a faint odor and a bitter astringent taste, but when dried it is inodorous and insipid. It does not impart its color to water but to alcohol, and is used for coloring port wine and Stoughton's Bitters, &c. The red of alkanet is rendered deeper by the addition of an acid, and changed to blue by alkali.

BONE BLACK

Consists of the bones of animals, being burned and ground. The particles are porous, and are composed chiefly of lime. Bone black is used in the manufacture of liquor for removing grain oil, and as a decolorizing agent. Both of these processes are detailed in another chapter of this work.
RED BEETS

Are only used for the red coloring matter that they yield, which is obtained by slicing them and infusing in water, or fermenting them with the fermenting liquid that is desired of a red color. Five pounds will color forty gallons of liquid a light shade of pink, and ten pounds will give to the same quantity a deep-red rose color.

BRAZIL WOOD.

This wood yields to water a beautiful red color, which is used in all classes of liquors. Where a red would be desirable, three pounds of the wood to five gallons of water, and infuse for five to ten days.

BEECH WOOD.

The chips of this wood are used in the manufacture of vinegar, as described in another part of the work. The advantages that this wood presents over any other for the purpose are owing to a strong predisposition to fermentation that is manifest in this wood while in contact with any fermentive matter.
CAUSTIC POTASSA.

BALSAM OF PERU

Is viscid, like syrup or honey, of a dark, reddish-brown color, and a fragrant odor and warm bitterish taste, leaving when swallowed a warm or prickling sensation in the throat. It is used in cordials.

BLACKBERRIES,

Raspberries, mulberries, and strawberries, are all used in the manufacture of syrups. The process of depressing the fruit of its juice consists in placing it in a muslin bag and expressing the juice. One pint of the fruit is allowed to make one pint of syrup. For full directions, look under the head of Syrups.

CATECHU

Is used in all kinds of liquors where a rough astringent taste would be desirable. The dark colored catechu is the best. The usual mode of using it is to reduce it to a powder, and work it into a paste with some of the liquid, and then add it to the mass. The extremes for its use is from four to ten ounces to one hundred gallons.

CAUSTIC POTASSA

Has been proposed as an economical source for rec-
tifying alcohol. The plan consists in the saponification of the grain oil by the aid of potassa, and separating this product from the spirit by straining. With some this process has failed, owing to the fact that the potassa did not attack the oil.

CHARCOAL ("VEGETABLE")

Is used for rectifying spirit. The charcoal acts by absorbing the grain oil. Vegetable charcoal is inferior to animal charcoal. The common objection urged against the use of animal charcoal is the peculiar ammoniacal fetor that it imparts to the liquor that is filtered through it. This, it must be obvious, is owing to the animal matter not being entirely driven off by burning. As a decolorizing agent, vegetable is inferior to animal charcoal.

COCHINEAL.

Cochineal.—This insect is found wild in Mexico, and as a coloring substance it is one of the most useful that we have, and is suited for all kinds of liquors that are dependent upon red as a color. Cochineal is soluble in water and alcohol, but more so in boiling alcohol.
COTTON

Is made use of in filtration in liquors that need clarifying. The liquid is allowed to pass through the cotton, and the clarification is effected by the particles in the liquid becoming entangled in the fibres of the cotton. The cotton is sometimes placed in a funnel, or in a filtering or straining bag, and the liquid is allowed to pass through it. The sand filters will be found to be superior, more particularly where a large volume of liquid is to be clarified.

EGGS.

Every part of the egg is made use of as finings for liquors, wines, cordials, and syrups. The egg effects clarification of fluids by involving during its coagulation the undissolved particles, and rising with them to the surface or subsiding.

ETHERS

That are made use of by the liquor manufacturer, consist of acetic ether, which is obtained by the distillation of sulphuric acid, acetic acid, and alcohol, and are used in the imitation of brandies, wines, &c.
Nitric Ether is distilled from nitric acid and alcohol. This is used principally for flavoring gin.

Butyric Ether is produced by the chemical decomposition of rancid butter, and is used for imparting a flavor of pineapples.

For the full directions for quantities necessary in the formation of liquors, see another chapter, and also the formulas.

FLAXSEED.

The mucilage of this seed is obtained by boiling, and is used for giving a body to wines.

FILTERS

Are used for clarifying liquids of impurities, and are made of various forms and composed of different articles. The most usual are charcoal (animal and vegetable), sand, cotton, and muslin. The most common form, however, in arranging filters is to use any convenient sized cistern or barrel; and in this arrange one bed of charcoal (vegetable) to a depth varying from two to five feet, and the last bed consisting of sand to the depth of from twelve to forty inches, packed in alternate layers with shells, which prevents the sand from becoming too closely embedded, which would prevent free filtration. But for
ordinary purposes the sand filtration alone will remove the objectionable impurities. As the sand becomes charged with coloring matter from continued filtration, it will have to be removed from the sand by washing in clean water. It may be necessary to pass the fluid through the sand several times before it becomes perfectly clear. To obviate this, increase the quantity of sand to double. Sand is only used to give transparency to any color by separating the minute particles that tend to impart a heavy cloudiness to liquids; but when a liquid is to be rendered limpid (colorless) filtration through animal charcoal will have to be resorted to.

"FININGS"

Are used for clarifying liquids. They consist of bodies or matter that is either lighter or heavier than the fluid. The whole process of fining is mechanical, for when the article used for fining is lighter than the fluid, it floats on the surface, and acts on the principle of the attraction of particles, and these particles subside. On the other hand, when the finings are heavier than the liquid, they fall to the bottom, and carry down with them the heavier impurities. These two points are illustrated in the use of eggs, milk, flour, isinglass, &c., which are lighter
than water; and in the latter instance in the use of slum, potash, &c., which are heavier than water.

FLOUR,

Prepared from wheat and rice, is used for finings but more particularly for giving a body to wines and liquors. This process is fully described under the head of "Starch Filtration."

When flour is used for finings, it is made into a smooth paste before adding.

Liquors are sometimes prepared, on a small scale, for domestic use, by digesting from one to two pints of wheat flour, in five gallons of spirit, for a few days, agitating it daily, and then straining for use. This quantity is usually added to twenty gallons of spirit. The body and taste of liquor containing flour is equal to that given by honey.

GRAPE SUGAR

Is used in the manufacture of wines and brandies. It is formed by digesting sugar in a solution of acetic acid; and some manufacturers digest or saturate any given quantity of the sugar to the consistence of paste. With water acidulated with sulphuric acid to the strength of common vinegar, the fluid is
after digesting for two weeks, evaporated by solar or artificial heat.

This sugar is used for giving a sweetish, acidulous taste to wines, and a vinous taste to brandy. But the same ends can be obtained by the assistance of sugar and acid, without farther preparation.

GAMBOGE

Is a yellow coloring resinous substance. This gum is soluble in water, forming a yellow opaque emulsion. It is dissolved by alcohol, and a golden yellow tincture results, which is rendered opaque by the addition of water.

So intense is the color of this resin that one part communicates a perceptible yellowness to ten thousand of water.

GENTIAN

Is intensely bitter, without being nauseous, and the bitter principle is extracted by water and alcohol. Gentian enters largely into the composition of the different formulas for bitters. See Bitters.

HYDROMETER.

The specific gravity of liquids affords one of the best tests for their purity. The instrument com
monly used for this purpose is Baume's hydrometer. This consists of a glass bulb loaded at one end, and drawn out at the other into a tube on which the scale is marked. That used for alcohol is graduated by loading it until it sinks to the foot of the stem (which is marked zero), in a solution of one part of common salt in nine parts of water. It is then put into water, and the place to which it sinks is marked 10° of the scale, which is constructed from these data.

HONEY.

Owing to its peculiar, though feebly aromatic taste, honey is one of the most useful articles that can be found for giving a fine body, and the apparent virtues of both brandy and wine to the palate when used in imitating liquors or wines. When used in the finer liquors, it may sometimes need clarifying; but, generally, if it should be heated and strained, will answer all purposes. The usual impurities are earth, sand, and coloring.

INDIGO

Is only used for its coloring substance, which it yields best to a solution of sulphuric acid. The blue from indigo is only used for cordials.