TANNIN.

barrel can be used for the same purpose. (For further particulars see Filtering Apparatus.)

Boiled Milk possesses decolorizing properties, and is very useful in wines. A pint of boiled milk added while warm to a pipe of red wine, will discharge the color completely, rendering it transparent. The action of the milk is mechanical; the particles of milk, combining with the minute particles that constitute the coloring, fall to the bottom or subside.

TANNIN.

As tannin is extensively used in one form or another, viz. as tanning oak bark, catechu, and terra japonica, for the bitter and astringent principle and coloring matter that it yields, which is well adapted to brandies, whiskey, and some wines—it requires that it should have more than a passing notice. The term tannin was originally applied to a principle existing in many vegetables having a very astringent taste, and the property of producing a white, flocculent precipitate, with a solution of gelatine and black precipitate, with the salts of the sesquioxide of iron. As obtained, however, from different plants, it was found to exhibit some difference of properties, and chemists have recognised two kinds; one exist
ing in oak bark, galls, &c., and the other in Peruvian bark, catechu, &c. One striking peculiarity of the tannin of galls is its facility of conversion into gallic acid, which is wanting in the other varieties.

Pure tannic acid is solid, uncrystallizable, white or slightly yellowish, inodorous, strongly astringent to the taste, without bitterness; soluble in water, much less in alcohol and ether, and insoluble in the fixed and volatile oils. It can be kept unchanged in the solid form, but its aqueous solution, when exposed to the air, gradually becomes turbid, and deposits a crystalline matter, consisting chiefly of gallic acid. Tannic acid precipitates solutions of starch, albumen, and gluten, and forms with gelatin an insoluble compound which is the basis of leather.

Tannin, in the form of oak bark and catechu, or terra japonica, is the form best suited to the purposes of the manufacturer of liquors. A spirit formed by filtration, that is, a liquor that has had a body given to it by starch, &c., will receive but little assistance from tannin, and an excess of tannin would precipitate the starch. Tannin generally enters into extemporaneous formulas for liquors—and some manufacturers use oak bark for coloring domestic brandies, which adds considerably to the taste.

Where tannin or catechu would be incompatible with a liquid, alum should be substituted. Catechu
SUGAR OF MILK.

is suited to brandies, whiskeys, Port wine, &c. Alum to the astringent wines, as the water the wine contains will hold the alum in solution. The quantities and proportions of tannin necessary in the manufacture of liquors, will be mentioned in the various receipts throughout this work.

The operator will recollect that, where a transparent liquor requires an astringent property, alum will be the best suited for the purpose, as the color of the tannin would render it objectionable. The alum should be first dissolved in water before adding it to the spirit.

SUGAR OF MILK.

Sugar of milk, or lactin, is found only in milk, of which it forms about five per cent. It is manufactured largely in Switzerland, as an article of food. In preparing it, milk is first coagulated, by the addition of sulphuric acid, and the resulting whey is evaporated to a syrupy consistence, and set aside in a cool place for several weeks, to allow a deposit of crystals. The crystals are then decolorized by animal charcoal.

Sugar of milk is a hard, somewhat gritty, white substance, possessing a somewhat sweet taste. In commerce it sometimes occurs in cylindrical masses,
in the axis of which is a core, around which the crystals have been deposited. It dissolves slowly in six parts of cold, and three of boiling water, without forming a syrup; it is but slightly soluble in alcohol. Sugar of milk is not susceptible of the vinous fermentation by the direct influence of yeast; but after the action of dilute acids, which first convert it into grape sugar, it is capable of furnishing a spirituous liquor by distillation. It is well known that both mares' and cows' milk, after becoming sour, are capable of forming an intoxicating drink by fermentation.

Sugar of milk is used to prevent fermentation in syrups, in the proportion of thirty-two parts to one thousand. See Syrups.
X.

THE PROCESS

OF THE

MANUFACTURE OF SULPHURIC ACID.

There is scarcely any article that is used for such a different variety of purposes, and one, too, that is so highly useful, of which there is so little known of its production, as oil of vitriol. Although it may not belong to the peculiar province of the manufacturer of liquors to manufacture this acid, yet a knowledge of its formation and general properties is necessary to a complete practical knowledge of the manufacture of wines, liquors, &c.

Sulphuric acid is obtained by burning sulphur, mixed with one eighth of its weight of nitre, over a stratum of water, contained in a chamber lined with sheet lead; if the sulphur was burned by itself, the product would be sulphurous acid, which contains only two thirds as much oxygen as sulphuric acid;
the object of the nitre is to furnish, by its decomposi-
tion, the requisite additional of oxygen.

The leaden chambers vary in size, but are gene-
really from thirty to thirty-two feet square, and from
sixteen to twenty feet in height; the floor is slightly
inclined to facilitate the drawing off of the acid,
and covered to the depth of several inches with
water. There are several modes of burning the
mixture of sulphur and nitre, and otherwise conduct-
ing the process, but that pursued in France is as fol-
lows: near one of the sides of the chamber, and
about a foot from its bottom, a cast iron tray is
placed over a furnace, resting on the ground, its
mouth opening externally, and its chimney having
no communication with the chamber; on this tray
the mixture is placed, being introduced by a square
opening, which may be shut by means of a sliding
door, and the lower side of which is level with the
surface of the tray; the door being shut, the fire is
gradually raised in the furnace, whereby the sulphur
is inflamed, and the products already spoken of are
generated. When the combustion is over, the door
is raised, and the sulphate of potassa removed; a
fresh portion of the mixture is then placed on the
tray, and the air of the chamber is renewed by open-
ing a door and valve situated at its opposite side;
next, the several openings are closed, and the fire is
renewed. These operations are repeated, with fresh portions of the mixture, every three or four hours, until the water at the bottom of the chamber has reached the sp. gr. of about 1.5, it is then drawn off, and transferred to leaden boilers, where it is boiled down until it has attained sp. gr. 1.7. At this density it begins to act on lead, and therefore its further concentration must be conducted in large glass or platinum retorts, where it is evaporated as long as water distils over. This water is slightly acid, and is thrown back into the chamber. When the acid is fully concentrated, opaque, greyish-white vapors arise; the appearance of which indicates the completion of the process. The acid is allowed to cool, and is then transferred to large demijohns of green glass, called carboys, which, for greater security, are surrounded with straw or wicker work, and packed in square boxes, inclosing all the carboy, except the neck.

Another method of manufacturing this acid consists in spreading the mixture on iron or leaden plates, resting on stands of lead within the chamber, placed at some distance from each other, and a foot or two above the surface of the water; the sulphur is then lighted by means of a hot iron, and the doors are closed. If the sulphur and nitre be well mixed, the combustion will last for thirty or forty minutes,
and in three hours from the time of lighting, the condensation of the gases having in that interval been completed, the doors are thrown open for from fifteen to twenty minutes, to admit fresh atmospheric air, and to allow time for the residuary nitrogen to escape. Preparatory to the next burning, the operations are repeated with fresh charges of the mixture, every four hours, both night and day, until the water has attained the requisite acid-impregnation. When it is transferred to leaden boilers, and otherwise treated, as just explained, the quantity of the charge for each burning is determined by the size of the chamber, allowing one pound of the mixture for every three hundred cubic feet of atmospheric air which it may contain.

As in the manufacture of sulphuric acid, the nitre is the most expensive material. Many plans have been resorted to for the purpose of obtaining the necessary nitrous acid at a cheaper rate. One plan has been to treat molasses, or starch, with common nitric acid. In this case the manufacturer obtains oxalic acid as a collateral product, which serves to diminish his expenses.

In some manufactories of sulphuric acid nitrate of soda is substituted for nitre; the advantages of the former salt are its greater cheapness, and the cir-
cumstance of its containing a larger proportional amount of nitric acid.

A new method is now practised by some manufacturers, for making sulphuric acid; it consists in filling the leaden chamber with sulphurous acid, by the ordinary combustion of sulphur, and afterwards admitting into it nitrous acid and steam; the nitrous acid is generated from a mixture of sulphuric acid with nitrate of potassa, or nitrate of soda, placed in an iron pan, over the burning sulphur, in the sulphur furnace, where the draught serves to conduct the nitrous acid fumes into the chamber; as under these circumstances sulphurous and nitrous acid, and the vapor of water, are intermingled in the chamber, it follows, that all the conditions necessary for generating crystalline compounds, already alluded to, are present. Of course, the rationale of this new process is the same as that already given.

What has been said above relates to the mode of preparing common sulphuric acid; but there is another kind known on the continent of Europe by the name of the "Fuming sulphuric acid of Nordhausen," so called from its properties, and a place in Saxony, where it is largely manufactured. This acid is obtained by distilling sulphate of iron in large stone ware retorts, heated to redness, and connected with receivers of glass, or stone ware; the acid distils
over, and sesquioxide of iron is left in the form of colcothar.

The process for making sulphuric acid by the combustion of sulphur with nitre, was first mentioned by Lemry, and afterwards put in practice by an English physician, of the name of Ward. As practised by him, the combustion was conducted in very large glass vessels. About the year 1746, the great improvement of leaden chambers was introduced by Roebuck, an eminent physician of Birmingham, where the first apparatus of this kind was erected. In consequence of this improvement, the acid immediately fell to one fourth of its former price, and was employed for many purposes for which, previously, it could not be used, on account of its high cost.

Properties.—Sulphuric acid, or, as it is commonly called, "oil of vitriol," is a dense, colorless, inodorous liquid, of an oleaginous appearance, and possessing strong corrosive qualities; on the living fibre it acts as a powerful caustic. In the liquid form, it always contains water, which is essential to its existence in that form. When pure, and as highly concentrated as possible, as manufactured in the leaden chambers, its sp. gr. 1.845, a fluid ounce weighing a small fraction over fourteen drachms; when of this specific gravity, it contains about 18 per cent. of water; whenever its density exceeds this, the presence
of sulphate of lead, or some other impurity, is indicated. The commercial acid is seldom of full strength, and it generally is of the sp. gr. of only 1.8433, an contains 22 per cent. of water. This acid acts powerfully on organic bodies, whether vegetable or animal, depriving them of the elements of water, developing charcoal, and turning them black. This acid will absorb ninety-five per cent. of carbonic acid. When diluted with distilled water, it ought to remain limpid. When this acid is present in small quantities in solution, it is detected unerringly by chloride of barium, which causes a precipitate of sulphate of baryta. The most usual impurities in sulphuric acid, are the sulphates of potassa and lead; the former derived from the residue of the process, the latter from the leaden boilers in which the acid has been concentrated.

Occasionally nitre is added to render dark samples of acid colorless; this addition will give rise to the impurities of sulphate of potassa; these impurities often amount to three or four per cent. The commercial acid cannot be expected to be absolutely pure, but when properly manufactured, it ought not to contain more than one fourth of one per cent. of impurity. The fixed impurities are discoverable by evaporating a portion of the suspected acid, when they will remain. If sulphate of lead be present, the
acids will become turbid on diluting with an equal bulk of water. This impurity is not detected sulphuretted hydrogen, unless the sulphuric acid be saturated with an alkali. If only a scanty muddiness arises, the acid is of good commercial quality.

Other impurities occur in the commercial sulphuric acid. Nitrous acid is always present in a greater or less amount, and may be detected by gently pouring a solution of green vitriol over the acid, when the solution at the line of contact will acquire a deep red color due to the sesquioxidation of the iron by the nitrous acid. The commercial acid is not to be rejected on account of the indications of this test, unless it shows the presence of nitrous acid in unusual quantities. The mode of removing this impurity by the aid of sugar, consists in heating eight fluid ounces of the acid, with twelve grains of refined sugar, at a temperature not quite sufficient to boil the acid, till the dark color at first produced, shall have nearly or altogether disappeared.

The dangerous impurity of arsenic is often present in sulphuric acid, and the test is so simple and economical, that no manufacturer should make use of this acid, without first testing for arsenic.

SOLUTION OF AMMONIA—NITRATE OF SILVER.

A Test for Arsenic.—Nitrate of silver, forty-four
grains; dissolved in water, one ounce; add gradually, weak water of ammonia, till a mere trace of the undissolved nitrate of silver remains. A few drops of this added to a solution, composed of two parts of sulphuric acid and one of distilled water, or water entirely free of impurities, such, for instance, as recent rain water, and if any traces exist of arsenic, it will be indicated by a pale, yellow precipitate, or a chocolate red.

If a few drops of the test yield no color, an additional quantity should be added, and then examine closely for traces of arsenic.

Sulphuric acid is largely employed in adulterating vinegar; for giving to it the necessary sharpness or acidity. Vinegars prepared upon a cheap scale for auctions, in all large commercial cities, will exhibit, upon analysis, an astonishing amount of free sulphuric acid—a small volume of acetic acid being added to conceal a taste peculiar to the sulphuric acid when in solution—and also to furnish the necessary odor of vinegar. This acid is also used in the manufacture of lemon syrup, and the acidulated syrups generally, cherry brandy and cherry bounce, in the different brands of bitters, to prevent the fermentation that would otherwise ensue, owing to a deficiency of alcohol in these bitters when prepared upon a cheap scale.
PURE CONCENTRATED ACETIC ETHER.

Take a long glass case, or arrange any kind of a box that admits the heat and light, and arrange shelves in it a few inches apart, one above the other; on them place plates, or flat earthenware, or wooden dishes—taking care that the dishes are not glazed with red lead—then fill these dishes with alcohol, and suspend over each dish a portion of platina black; then hang strips of porous paper in the case, with their bottom edges immersed in the spirit to promote evaporation. Set the apparatus in a light place, at a temperature of from 68° to 86° Fahr., for which purpose the heat of the sun will be found convenient. In a short time, the fermentation of vinegar will commence, and the condensed acid vapors will be seen trickling down the sides of the glass, and collecting at the bottom. We shall find, during this process, produced by the mutual action of the platina and the vapor of alcohol, there will be an increase of temperature which will continue till all the oxygen contained in the air inclosed in the case is consumed, when the acetification will stop. The case must be open for a short time, to admit of a fresh supply of air, before the operation will re-commence.

With a case of twelve cubic feet content, and six ounces of platina powder, one pound and one eighth
of absolute acetic acid can be produced from one pound of alcohol; and if we estimate the product by the strength of vinegar, the product will be great. From twenty-five pounds of platina powder, and three hundred pounds of alcohol, three hundred and fifty pounds of the pure acid may be produced daily.

The platina powder does not waste, and the most inferior spirit may be employed.
XI.

TOBACCO, CAUSTIC POTASSA,

RED PEPPER,

AQUA FORTIS, AND OIL OF VITRIOL.

A popular error of the day has it that the above-mentioned articles are used in the manufacture of liquors for giving an artificial strength, &c., &c.

An examination of the properties of the articles in question will exhibit to what slight grounds popular opinion is attached for its expressions of opinions on this subject.

TOBACCO.

The quantity of this article necessary to give a strong and cutting taste to the throat would be detected instantly by the palate. It should be recollected that it is only a few grains that are required for an emetic; but assuming that the tobacco was
only added in minute quantities, that the palate alone would be able to distinguish a slight acridness, nausea must ensue. The acridness belonging to tobacco differs materially from the peculiar acridness that belongs to alcohol; and whence arises the necessity of using an ingredient that is in every form incompatible with the interests of the dealer, and that, too, in view of numerous articles that are in every manner better suited to the purpose, and articles, too, in their action on the palate that are analogous to alcohol.

CAUSTIC POTASSA

Is manufactured from potash and lime, and possesses the quality of combining with alcohol. Its action on animal matter is that of a powerful caustic, quickly destroying the parts that it is applied to; and hence the supposition that caustic potassa would produce a biting and stinging sensation in and on the throat and palate when held in solution by alcohol.

Upon testing this experiment it will be found that the spirit containing potassa is nothing more than a miserable tasted alkalized liquor; the potassa, when added in minute quantities, is not perceptible to the taste; and if a spirit contained a vinous taste this
alkali would destroy it, owing to the vinosity originating in an acid.

RED PEPPER, ETC.

The insurmountable objection to the use of red pepper is that every person is familiar with its properties (its effects on the mouth and throat); and if added in the most minute portions, it will be perceptible in the throat and palate for several minutes after the spirit has been drunk.

As to the use of acids in liquors, they do not add strength to liquor—they only yield vinosity; and the excessive use of an acid will produce an acidulated spirit unsuited to any purpose.

YEAST,

Used as a ferment in wines, &c., is made in various ways. It is made of mealy potatoes boiled thoroughly soft. They are then skinned and mashed as smooth as possible, when as much hot water should be put on them as will make a mash of the consistency of good beer yeast. Add to every pound of potatoes two ounces of molasses, and when just warm stir in two large spoonfuls of yeast for every pound of potatoes. Keep it warm till it has done fermenting, and in twenty-four hours it will be fit for use. A pound of potatoes will make near a quart of
yeast. Another kind of yeast is made as follows:—Take half a pound of fine flour, the same quantity of brown sugar, and a quarter of a peck of bruised malt, boil these over a fire for a quarter of an hour in a half gallon of water, then strain this liquid into a jug, and when cool add one pint of artificial yeast or sour dough. The mixture will soon begin to ferment. It should be kept in a warm place, and when ebullition ceases the yeast will sink to the bottom; pour off the clear liquor, and the yeast will be fit for use.

*Artificial Yeast.*—Honey, five ounces; cream of tartar, one ounce; malt, sixteen ounces; water at 122° F., three pints; stir together, and when the temperature falls to 65° cover it up, and keep it at that temperature till yeast is formed.

*Patent Yeast* is made by taking half a pound of hops and two pailfuls of water, mix and boil until reduced to one pailful, and strain the decoction into the seasoning tub, and when sufficiently cool add half a peck of malt; in the meantime put the hops strained off again into two pailfuls of water, and boil to one gallon as before, and then straining the liquor while hot. When the liquor has cooled to about blood heat, strain off the malt, and add to the liquor two quarts. This yeast can be made in about eight hours.
202  TOBACCO, CAUSTIC POTASSA, RED PEPPER, &c.

2. Boil one pound of good flour, two ounces of brown sugar, and half a tea-spoonful of salt in one gallon of water, for half an hour, and when milk-warm bottle and cork it. It will be fit for use in thirty-six hours.

3. A pint of milk-warm water made to the consistency of a batter with wheat flour; to this add a pinch of salt, a tea-spoonful of sugar. Allow it to stand near the fire, or in a sunny position with a piece of glass over the top of the cup. Let it stand thus for nine hours.
WINE is the fermented juice of the grape. The juice of sweet grapes consists of a considerable quantity of grape sugar, a peculiar matter of the nature of ferment or yeast, and a small portion of extractive tannic acid, bitartrate of potassa, tartrate of lime, common salt, and sulphate of potassa, the whole dissolved or suspended in a large quantity of water. This grape juice contains all the essentials to the production of vinous fermentation, and requires only the influence of the atmosphere and a proper temperature to convert it into wine.

Preparation of Wine.—When the grapes are ripe they are gathered and trodden under foot, in wooden vessels with perforated bottoms, through which the juice, called the must, runs into a vat placed beneath. The temperature of the air being about 60°, the fermentation gradually takes place in the must, and
becomes fully established after a longer or shorter period. In the meantime the must becomes sensibly warmer and emits a large quantity of carbonic acid, which causes the more solid parts to be thrown to the surface in a mass of froth, called the head; the liquor from being sweet becomes vinous, and assumes a deep red color, if the product of red grapes. After a while the fermentation slackens, when it becomes necessary to accelerate it by thoroughly mixing the contents of the vat. When the liquor has acquired a strong vinous taste, and becomes perfectly clear, the wine is considered formed, and is racked off into casks; but even at this stage of the process the fermentation continues for several months. During this period a frothy matter is formed, which, for the first few days, collects round the bung, but afterwards precipitates along with coloring matter and tartar, forming a deposit which constitutes the wine lees.

Division and Nomenclature.—Wines, according to their color, are divided into white and red, and according to their taste and other qualities are either spirituous, sweet, dry, light, sparkling, rough, or acidulous.

Red wines are derived from the must of black grapes, white wines from white grapes, or from the
juice of black grapes fermented apart from their husks. The other qualities of wine above enumerated depend on the relative proportions of the constituents of the must, and on the mode in which the fermentation is conducted. The essential ingredients of the must as a fermentable liquid are water and sugar, and a ferment. If the juice be very saccharine and contain sufficient ferment to sustain the fermentation, the conversion of the sugar into alcohol will proceed until checked by the production of a certain amount of the latter, and there will be formed a spirituous or generous wine; if, while the juice is highly saccharine, the ferment be deficient in quantity, the production of alcohol will be less, and the redundancy of sugar proportionally greater, and a sweet wine will be formed. When the sugar and ferment are in considerable quantities, and in proper relative proportions for mutual decomposition, the wine will be strong-bodied and sound without any sweetness or acidity, and of the kind called dry; a small proportion of sugar can give rise to only a small proportion of alcohol; and, consequently, the less saccharine grapes will generate a comparatively weak or light wine, which will be sound and stable in its constitution, in case the ferment is not in excess, but otherwise liable to pass into the acetous fermentation and become acescent. In case the wine
is bottled before the fermentation is fully completed, the process will proceed slowly in the bottles, and carbonic acid generated, not having vent, will impregnate the wine, and render it effervescing and sparkling.

The rough, or astringent wines, owe their flavor to a portion of tannic acid derived from the husk of the grape, and the acidulous wines to the presence of carbonic acid, or an unusual proportion of tartar. Several of the above qualities often co-exist; thus a wine may be spirituous and sweet, spirituous and rough, rough and sweet, light and sparkling, &c.

Wines are known in commerce by various names, according to their sources; thus Portugal produces Port and Lisbon; Spain, Sherry, St. Lucar, Malaga, and Tent; France, Champagne, Burgundy, Hermitage, Vin le Grave, Sauterne, and Claret; Germany, Hock and Moselle; Hungary, Tokay; Sicily, Sicily Madeira and Lissa; the Cape of Good Hope, Constantia; Madeira and the Canaries, Madeira and Teneriffe.

Wines prepared from vinous fermentation, or wines prepared from saccharine fermentation, consist of a small portion of saccharine matter, suspended in a large quantity of water, and by the necessary requisites it is fermented, and when in this state it is a
pleasantly acidulated liquid, caused by the presence of carbonic acid and alcohol, which is the result of fermentation. The farther progress of fermentation is checked by the addition of alcohol, and the flavoring ingredients are added, which are supposed to add to the fermented liquor a taste and aroma peculiar to wine fermented from the grape. The ingredients consist of aromatics, cane and grape sugar coloring, tannin, alkali, acid, starch, mucilage, perfumes, ethers, &c., with the view to different ends; thus sugar or honey for sour wines, grape sugar for pleasantly sweet wines, aromatics and alcohol for light-bodied wines, tannin for rough wines, and starch mucilage for poor and light wines, etc., etc. The length of time necessary for fermentation, the proportions of water, saccharine, and fermentative matter, and the quantity, quality, and effects of the aromatics, &c., added, are necessary in detail to the end of furnishing a comprehensive view of the manufacturing process generally.

The time of a vinous fermentation commencing is uncertain; much depends on the quality and composition of the liquid to be fermented; on its local situation, and the season or weather—the temperature should be uniform, and of about sixty to seventy degrees, and often the temperature has to be increased.
When fermentation is slow, it is facilitated by agitating or stirring the mass. The commencing of fermentation may be known by the fluid being in a higher temperature than that of the existing atmosphere, and can be distinguished by its taste, smell, and appearance. The length of time necessary for fermentation is from four to ten days. The best plan to ascertain when a fluid has fermented sufficiently, is by that infallible guide, the palate; if the fluid contains carbonic acid, it will be known by the liquid possessing that peculiar, pungent, pleasantly though slightly biting taste to the palate; the fermentation is discontinued by the addition of from five to fifteen per cent. of alcohol, though wines to keep well and prevent acidity should contain from eighteen to twenty-two per cent. of alcohol. Wines that become sour, turbid, or otherwise injured when exposed to the air, is owing to a deficiency of alcohol. Wine thus charged has a fine body, and a pleasant, heating taste to the palate. As a general rule the alcohol should be free from grain oil, as the odor is objectionable, and would tend to the destruction of any other odor that might be added. Alcohol unrectified is only suited for some of the light-bodied wines, where the odor is of no importance; in the cheaper wines, the smell of the grain oil can be concealed by the addition of aromatics.
The aromatics used to give the taste of wine are various; the most prominent are ginger, spice, cloves, calamus; horseradish, ground mustard, etc., give to wines, liquors, and cordials, a peculiar aromatic, stimulating taste, that is found in pure wine.

Fresh bitter almonds, peach kernels, sweet almonds, give to wines and cordials a rich, nutty flavor. Care should be taken in selecting the fresh almonds, &c., as the rancidity would be clearly perceptible in a clean clear article of wine or cordial.

DIRECTIONS FOR THE MANUFACTURE OF WINES.

*Sherry* is of a deep amber color. The genuine has a dry, aromatic flavor, and fragrancy without any acidity. It ranks among the strongest white wines, and contains about 20 per cent., by measurement, of alcohol.

*English Sherry—pale.*—Chopped and mashed raisins, four hundred pounds; soft water, one hundred gallons; clarified sugar, forty pounds; white tartar, three pounds; cider, twenty gallons.

Let the above digest together for twenty days, in an air-tight tun or vat, frequently stirring the mass.
well, say once every twenty-four hours; then add thirty-five gallons of neutral spirit of sixty per cent.; oil of bitter almonds, dissolved in the spirit, one ounce; oil of cassia, half ounce; tincture and spirit of orris-root, one quart. Add a half dozen each of oranges and lemons, cut in slices; allow it to stand ten days, and fine with one quart of milk. Add the milk while hot.

The raisins contemplated in these formulas are unsound—such as are unmerchantable, and in the last stages of decay.

The operator will recollect that honey is superior to any kind of sugar. One gallon of honey yields ten pounds of saccharine matter, and in all instances the honey should be used in either liquors, wines, or cordials.

Honey, Sugar, Syrup, &c.—Starch mucilage gives to wines the appearance of age, a good body, and a creamy taste. The honey, &c., is added by first dissolving it in water. The starch is added by passing the liquid through a bed of starch, or adding it in the form of flour paste. The mucilaginous quality is given by infusing any vegetable that contains mucilage that is not precipitated by alcohol, as, for instance, slippery elm bark. Raisins, tarfar, grape
sugar, are added to the ferment all for the same purpose—that of imparting a vinous taste and smell to the liquid. The raisins possess the power to the greatest extent; before use they should be well bruised or mashed, the better to enable the fluid to act on them.

A good imitation of wines can be made from fermenting raisins; the taste and smell that they yield it would be difficult to obtain elsewhere, other than the wine itself.

Tannin is used in the form of catechu for roughening wines; alkali for correcting wines, and forming dry wines, in which neither acid nor sweetness predominates.

The odor is derived from essential oils, heavy oil of wine, raisin spirit, butyric and acetic ether, spirit of prunes, and Jamaica rum. The coloring is derived from burnt white sugar, cochineal, red beets, English saffron, and gamboge.

In Europe, and some parts of the United States, manufacturers ferment turnips with radishes, white sugar beets, currants, gooseberries, &c., &c. These articles can be dispensed with, as they are not always convenient or in season; and thus the manufacturer has been compelled to find substitutes, which has been done at a more economical cost.

The customary formula for using beets and tur-
nips was, three bushels of turnips, one hundred and twenty-five gallons of water, and one peck of radishes, allowed to ferment until pleasantly sour to the taste, and then charged with honey, coloring, etc. Turnips are preferable to beets, as beets leave a somewhat unpleasant taste, though sugar, aromatics, and spirit will conceal it. A very fine champagne is prepared from fermented turnips and radishes, but nothing superior to some other formulas.

2d Sherry.—Wort from pale malt of double strength, one hundred gallons; light brown sugar, sixty pounds; honey, four gallons; ferment in an open vat or cask, then rack and add fifteen gallons neutral spirit; bitter almonds, bruised, four ounces; cassia and cloves, bruised, one ounce each; four ounces orris-root; let these macerate in the wine for two weeks, then fine with a quart of boiled milk.

When this wine is to be bottled, one gallon of Lisbon is added to eight, which greatly improves its taste, &c.

3d Sherry.—Cider, ten gallons; bitter almonds, four ounces; honey, one gallon; mustard, four ounces. Boil for thirty minutes and strain, then add spirit of orris-root (see directions for Preparing Aromatic Spirits), one half pint; essence of cassia two