sugar—the burned sugar, the infusion of ginger, then add to every gallon of the water, two ounces each of tartaric acid and super-carbonate of soda. To make this very brisk, double the quantity of the soda and acid. These two articles must be inclosed in sugar the same as for soda water.

RULES TO BE OBSERVED IN THE MANUFACTURE OF FERMENTED BEVERAGES.

Fermentation.—Under favorable circumstances, among which may be enumerated a uniform and proper heat, a sufficiency of fermentable matter, as yeast, saccharine matter, &c., the necessary amount of fermentation may be effected in a space of time varying from twelve to seventy-two hours. When fermentation sets in, it will be indicated by a frothy, foamy matter floating on the surface of the liquid. Usually, this froth is skimmed off, and when it discontinues rising, the fermentation is checked by the formation of alcohol. When the fermentation has reached this point, a sufficiency of carbonic acid has been generated in the liquid for the purposes of a beverage. The liquid will have a lively, sparkling, frothy appearance, and will be of a pleasantly biting and acid taste. At this point, it should be drawn into a fresh cask or bottle, and when the liquid is to be kept for any
length of time, it should have from five to fifteen per cent. of proof spirit added, which prevents the farther progress of fermentation.

**Honey, Sugar, Molasses, and Liquorice Root.**

The advantages resulting from the use of honey in fermented beverages, are to be found in its feebly aromatic taste, and a peculiar quality that honey possesses when suspended in water, of commencing and sustaining a rapid fermentation, and hence a beverage that is to be formed or fermented immediately, should be composed of water, honey, yeast, &c.

*Refined sugar* is most generally used when the liquid is to be colored. The sugar contains no impurities that are liable to dissolve and render the liquid cloudy and heavy, which would be the case if brown sugar or liquorice root were made use of.

*Brown sugar* should be used in liquids that are to be of a brown or dark color, as ale, &c.

*Liquorice root* should be used when a sweet after-taste is required, that is, a sense of sweetness remains after a liquid containing liquorice root has been swallowed. This taste is one of the peculiarities of the different preparations of sarsaparilla, porter, ale, and some cordials.

*Molasses* will only suit for manufacturing ale and
porter, and also for any fermented beverage that is made without regard to color, as liquids fermented from this source will be of a muddy color.

**FALSE STRENGTH FOR BEER, &c.**

Besides checking fermentation, spirit in the form of alcohol, neutral spirit, or whiskey in small quantities, gives to fermented liquids a desirable taste and an excellent body, i.e. a spirituous body.

When cheap liquids are to be formed as a substitute for spirit, grains of paradise are made use of. They should be ground and infused in the liquid during fermentation, or the infusion may be obtained by digesting the grains in whiskey. It must not be understood that the grains will check fermentation; their infusion only leaves impressions on the palate after being drunk, that are analogous to alcohol or spirit. Thus a beverage may be formed that will exhibit all of the sensible properties of alcohol to the palate, without any of its intoxicating influence.

**Pellitory** is sometimes combined with the grains, but the tingling, disagreeable impressions left in the throat and mouth after the liquid has been swallowed, render the use of this acrimonious substance objectionable.

**Ground mustard or horseradish** are both used for
the same purpose as the articles just mentioned. The properties of mustard and horseradish are identical—these properties are destroyed by heat—as boiling water, &c.

The use of Bitters in Ale and Porter.—Ale and porter are considered to be the healthiest of all of the fermented beverages, owing to the tonic and nutritive properties that these liquids derive from the presence of starch, and the bitter principle of the hops.

To avoid the costly price of the hops, the small dealers and bottlers of ale and porter, as a substitute for the bitter of the hop, make use of quassia, nux-vomica or strychnin, aloes, catechu, pellitory, long pepper, wormwood, gentian; and for a false strength, similar to alcohol, cocculus indicus, copperas, and grains of paradise.

Clarification can be effected by filtration through sand and charcoal. These consist of alternate layers or beds of sand and powdered charcoal; each bed or layer is six to eight inches deep, and may consist of five or six layers of each, and can be packed in a wine pipe or other convenient vessel. The fragments of charcoal for this purpose should be of the size of a garden pea.
COLORING.

The most convenient plan for clarifying, is by the aid of finings, such as eggs, milk, and isinglass. The milk should be added while it is boiling, and the isinglass should be bruised to shreds before adding. The use of eggs will be mentioned under the head of Coloring.

COLORING.

No fluid can be successfully colored that is not perfectly clear and colorless of itself; and when it is charged with coloring matter, the fluid will always retain its transparency. The first step then towards coloring these beverages, will be to clarify the water while it is boiling, with the articles that are usually added; to every three gallons of water add one egg, whisked to a froth.

The coloring substances, which are most commonly used, are red, yellow, and brown. The red is obtained by infusing bruised cochineal, sanders wood, or logwood; the yellow from gamboge, or saffron, and the brown from burned sugar, and a purple from turnsole. The necessary coloring substance should be added to the water while it is boiling, and should remain in the liquor until it has yielded the necessary quantity of coloring, or the coloring substances can be digested in proof spirit, and added to the liquor until the required shade has been produced.
Molasses and brown sugar should not be used in the formation of liquors that are to be colored. Effervescing liquors that have a dull, heavy appearance, after being colored, will be rendered quite transparent by passing them through a filter, composed of alternate layers of charcoal and sand.

BOTTLING FERMENTED LIQUIDS.

The two most important objects to be effected in bottling these fluids, will be to prevent them from passing into the acetic fermentation, and for them to open briskly. The fermentation spoken of can be checked by the addition of from five to fifteen per cent. of alcohol. And to cause it to open briskly, add to each bottle one tea-spoonful of yeast, and a table-spoonful of honey, or a lump of white sugar of the size of a nutmeg. In filling the bottles, leave a space of one or two inches in the neck of the bottle, i.e. never fill the bottle to the cork.

When fluids that are rendered effervescent from acids and alkalies are to be bottled, the alkali should be coated with sugar to prevent its too rapid dissolution, and the consequent effervescence; the sugar coating is performed by dropping the alkali in melted sugar.
BOTTLING FERMENTED LIQUIDS.

_Sarsaparilla Beer, for Bottling._—Infuse six ounces of bruised ginger, half a pound of bruised liquorice root, in five gallons of boiling water until cold, strain through flannel, then dissolve in the liquor six pounds of brown sugar, then add half a pint of yeast and three ounces of cream of tartar; in cold weather this should be kept near the fire, so as to excite brisk fermentation; as soon as this subsides rack off the clear liquor, return it into the cask previously washed out, and allow it to work for two days longer. Then add oil of sassafras, twenty-five drops; oil of aniseed, ten drops; oil of wintergreen, twenty-five drops; these oils should be rubbed up well with a handful of dry sugar before adding, then add half a pint of brandy coloring, or burned sugar, then bottle it; this will open very fine.

_Effervescent Spirit of Pineapples, for Bottling._—Infuse three ounces of bruised ginger, one drachm cochineal, one drachm gamboge, in five gallons of boiling water, until cold; then dissolve in the liquor five pounds of refined sugar, and add half a pint of yeast, and three ounces of cream of tartar; as soon as brisk fermentation has set in, drain off, and strain the liquor through flannel; it should be allowed to work for two days longer. It is then ready for bottling; previous to which add, the moment before

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filling each bottle, one table-spoonful of butyric ether, or in the absence of this, the same quantity of acetic ether may be substituted, and two table-spoonfuls of honey to every bottle.

To manage this receipt successfully, the water made use of should be perfectly clear, the sugar refined, and when prepared for commerce, it should be bottled in clear glass, and appropriately labelled.

_Effervescent Spirit of Oranges, for Bottling._—Infuse eight ounces of sweet orange peeling in five gallons of boiling water, until cool, then add half a pint of yeast, three ounces of cream of tartar, and five pounds of loaf sugar; ferment in a warm place for three days, then strain through flannel; then add one drachm of oil of orange, well rubbed up in a couple of ounces of sugar, tincture of gamboge or saffron (see the preparation of these colors), until the liquid has assumed an orange color. Sometimes a small portion of cochineal will heighten this color, then bottle and label.

_Effervescent Spirit of Strawberries._—Infuse three ounces of green tea in five gallons of boiling water, along with two drachms cochineal, and six ounces of logwood chips, four ounces of hops, until cold, then stir in five pints of honey, four ounces of cream
BOTTLING FERMENTED LIQUORS.

of tartar, and half a pint of yeast; ferment in a warm place for three days, then strain through flannel; allow it to work two days longer, and then bottle; add to each bottle, before filling, one tablespoonful of acetic ether.

**Effervescent Spirit of Vanilla, for Bottling.**—Infuse two ounces each of bruised ginger, liquorice root, and six ounces of hops, in four gallons of boiling water, along with three ounces of vanilla, cut small, until cold; then add five pounds of refined sugar, half a pint of yeast, three ounces of cream of tartar, ferment for four days, and then strain through flannel, and bottle; add to each bottle a tablespoonful of the essence of vanilla. See Essences.

**Effervescent Peach Juice, for Bottling.**—Infuse five pounds of mashed raisins, two ounces of bitter almonds, in five gallons of boiling water, until cold; then add five pounds of refined sugar, three ounces of cream of tartar, one pint of yeast, and half an ounce of gamboge; ferment in a warm place for four days; strain through flannel, then allow it to work one day longer; then add spirit of orange flowers, a pound and a half; oil of bitter almonds, fifteen drops; oil of lemon peel, one drachm, being first
dissolved in half a pint of alcohol. The color of this should, when bottled, be of a bright yellow either from the gamboge, or from English saffron.

**Effervescent Grape Juice.**—Infuse five pounds of mashed raisins, three ounces of green tea, in five gallons of boiling water, till cold; then dissolve six pounds of refined sugar in the liquor, and one and a half pounds of logwood chips, four ounces of cream of tartar, and one pint of yeast; ferment for four days in a warm place, and strain through flannel; then add nitric ether, three ounces, in which ten drops of oil of wintergreen has been dissolved (the ether dissolves the oil immediately), and five pints of proof spirit (whiskey), in which four ounces of bruised nutmegs have been infused for four days; the nutmegs should be separated from the spirit by straining. This should be bottled as soon as the ether has been added to it, to prevent the too rapid evaporation of the ether; this is improved by age.

**Effervescent Spirit of Aromatics, for Bottling.**—Infuse three ounces of bruised ginger, one ounce of bruised cloves, in five gallons of boiling water, till cold, and strain; dissolve in the liquor four pounds of sugar, half a pint of yeast, keep in a warm place for five days, and add oil of sassafras, twenty drops:
oil of lemon, fifty drops; oil of bergamot, twelve drops; these oils should be well rubbed up in dry sugar before adding. This can be colored to suit fancy.

_Effervescent Spirit of Roses, for Bottling._—Boil for twenty minutes two drachms of cochineal, two ounces of hops, and two pounds of mashed raisins, in four gallons of clear rain water; when nearly cold stir in four pints of honey, half a pint of yeast, and set the vessel in a warm position, and ferment for five or six days, and then strain through flannel; at the moment of bottling, add to each bottle one tablespoonful of white sugar, and the same of essence of rose, or rub up well in the sugar five drops oil of lemon, and half a grain of ambergris for each bottle. When this spirit is prepared on a large scale, the sugar should be quite dry, and should be worked with the oil of lemon and ambergris, in a mortar.

_Ginger Beer._—Ginger sliced, one ounce; dried orange peel, half an ounce; tie these in a bag, and boil in two gallons of water, and strain; add three fourths of an ounce of tartaric acid, twenty-five drops of essence of lemon, and two pounds of refined sugar; when near cool add a tea-cupful of yeast; let it work for twelve hours, and bottle.
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2. Ginger sliced, one ounce; essence of lemon (rubbed with sugar), thirty drops; sugar, one pound; boiling water, one gallon; infuse till cold, and strain; then three tablespoonfuls of yeast; ferment four or five days, and then bottle.

3. Boil two and a half ounces of bruised ginger, and three pounds of sugar, in three and a half gallons of water for twenty minutes; put into a large pan, one ounce of cream of tartar, and the juice and rind of two lemons; pour the boiling liquor over them, and stir the whole well together; when milk-warm add a tea-cupful of yeast; cover it, and let it work for three days, skimming off the froth as it may rise, then strain through flannel into a cask, add half a pint of whiskey, bung down close, and in three weeks bottle.

4. Prepare a decoction or infusion of ginger with sugar and lemon, as above, but instead of fermenting with yeast, charge it with carbonic acid gas.

5. Imperial Pop.—Cream of tartar, three ounces; ginger, one ounce, white sugar, two pounds; lemon juice, one ounce; boiling water, one gallon and a half. When near cool, add half a tea-cupful of yeast, and bottle.

*Girambine* or *Limoniated Ginger Beer.*—Boil five ounces of ginger with three gallons of water, beat
four eggs to a froth, and add them with ten pounds of sugar to the water; take nine lemons, peel them carefully, and add the rind and juice to the foregoing. Put the whole into a barrel with a tea-cupful of yeast, bung down, and in about twelve days bottle it. In fifteen days it will be fit for drinking. Age improves it.

2. To ten gallons of water add ten pounds of refined sugar, and the whites of ten eggs well beaten, and boil till the scum rises, and add six ounces of bruised ginger; boil for twenty minutes, then pour the hot liquor on the rinds of twelve lemons thinly peeled. When cold, put into a barrel the juice of twelve lemons, one ounce of isinglass cut or bruised small, a tea-cupful of whiskey, a pint of yeast, and fill the barrel with the liquor. Let this ferment six days, and bottle.

_Ginger Beer Powders.—_Fine powdered ginger, five drachms; bicarbonate of soda, three and a half ounces; refined sugar, one pound; essence of lemon, thirty drops. Mix, and divide in sixty powders (or four or five grains of ginger, twenty-eight of bicarbonate of soda, one hundred and twelve of sugar, and half a drop of the essence of lemon in each powder). In the other powder put thirty-two grains of tartaric acid, or thirty-five grains, if a more de-
cidedly acidulated beverage is required, or from thirty to thirty-three grains of citric acid.

Other formulas give the following:

Bicarbonate of soda, thirty grains; white sugar, one drachm; powdered ginger, five drachms, in each blue paper; and twenty-five grains of tartaric acid in each white paper. This is less agreeable, but perhaps more friendly to the stomach than when the acid is in excess.

Another formula is: Sugar, two drachms; sesquicarbonate of soda, two scruples; ginger, five grains; essence of lemon, two drops, in each blue paper with thirty-three grains of tartaric acid.

**Ginger Beer Powder in one bottle.**—The soda, acid, and sugar must be carefully dried separately.

Finely powdered ginger, five drachms; bicarbonate of soda, three and a half ounces; refined sugar, one pound; essence of lemon, thirty drops; tartaric acid, four and a half ounces. The acid and the soda should not be too finely powdered. Mix the powders recently dried in a warm mortar, and immediately put the mixture in to dry. Bottle and cork securely. A measure holding three drachms should accompany each bottle.

**Effervescing Lemonade.**—This is made by putting
into each soda water bottle one and a half ounces of syrup of lemons, and filling up with aerated water from a machine. The syrup of lemons is formed by dissolving thirty ounces of refined sugar in sixteen ounces of fresh lemon juice, by a gentle heat, and adding thirty drops of essence of lemon.

**Effervescent Lemonade without a Machine.**—Put into each bottle two drachms of sugar, two drops of the essence of lemon, half a drachm of bicarbonate of potash, and water to fill the bottle; then drop in thirty-five grains of citric or tartaric acid, and cork immediately. Two scruples of sesquicarbonate of soda, two drachms of sugar, four drops of the essence of lemon, and half a pint of water; lastly, a drachm of tartaric acid. Care must be taken to avoid accidents from the bursting of these bottles. They should be kept in a cool place.

**Milk Lemonade.**—Dissolve one and a half pounds of refined sugar in a quart of boiling water, add a quarter of a pint of lemon juice, and the same of sherry; and, lastly, two thirds of a pint of cold milk. Stir together, and strain. Grate nutmeg over the surface.

**Dry Lemonade, or Acidulous Lemonade Powder.**—Citric acid, three quarters of an ounce; essence of
luna, thirty drops; refined sugar, eight ounces. The sugar should be saturated with the essence.

Effervescent Lemonade Powders.—Bicarbonate of soda, three and a half ounces; refined sugar, fourteen ounces; essence of lemon, sixty drops. Sometimes twelve or more grains of the powdered yellow rind of the lemon peel are added to color with. Mix, and divide into sixty powders, or one hundred and forty grains in each blue paper. In the white papers put thirty grains of citric acid, or the mixed alkaline powder; and the acid may be put into separate bottles furnished with measures holding the proper quantity each.

Effervescent Lemonade Powders in one bottle.—The powders must all be separately and carefully dried at a moderate temperature before mixing; and when mixed, be carefully secured from the air.

1. Bicarbonate of soda, one ounce; refined sugar, three and a half ounces; tartaric acid, one and a quarter ounces; essence of lemon, thirty drops. Mix, and put into well corked bottles.

2. Mix three and a half ounces of bicarbonate of soda, fourteen ounces of refined sugar, sixty drops of the essence of lemon, and four ounces of tartaric acid.

3. Sesquicarbonate of soda, eight ounces; tartaric
acid, eight ounces; refined sugar, two pounds; essence of lemon, one hundred drops. Mix.

Orangeade or Sherbet.—Juice of four oranges, thin peel of one orange, four ounces of lump sugar, three pints of boiling water. Mix.

2. Juice and peel of one large orange, citric acid, half a drachm; sugar, three ounces; boiling water, one quart.

Aerated Sherbet Powders in one bottle.—Double refined sugar, one pound; powdered orange peel, twelve grains; bicarbonate of soda, three and a half ounces; essence of cedrat, twelve drops; oil of orange peel, sixty drops; tartaric acid, four ounces. The powders must be carefully dried, mixed quickly, and afterwards kept dry and securely corked. A measure holding near three drachms of the powder should accompany each bottle.

Soda Powders.—Thirty or thirty-two grains of bicarbonate of soda in each blue paper, and twenty-five grains of tartaric acid in each white paper.

MEAD.

Boil three and a half gallons of honey for a moment, and add it, together with five gallons of boiling water, to twenty gallons of cold water; then
add a pint of good yeast, half an ounce of oil of nutmeg, a tea-spoonful of oil of lemon, ten drops of oil of wintergreen. Rub each one of these oils up well in separate parcels of sugar. The quantity of each parcel should be about two ounces, and add the whole. To check the fermentation, add three gallons of neutral spirits or four gallons of proof whiskey.

It is not necessary for the operator to always keep the quantity of honey mentioned in the text in view. Any quantity of honey will commence fermentation by the assistance of yeast.

Mead, as found in the shops, consists of a tumbler filled two thirds full of water, sweetened pleasantly with honey, and then filled with plain soda water from the fountain.

The length of time necessary for the fermentation of the mead, in the above recipe, will be from twelve to thirty-six hours. This must be regulated by the palate.

CHEAP PORTER AND ALE.

*Porter for bottling.*—Boil a peck of wheat bran for one hour, together with one pound of hops, in twelve gallons of water, and while warm strain through flannel, to separate the bran from the liquor. Then stir in one gallon of molasses, one fourth
of a pint of burnt sugar, one and a half pints of yeast, and one ounce of powdered aloes. Set the vessel aside in a warm place to ferment. This will be known by the froth that arises to the surface of the liquor. This should be skimmed off when the froth ceases to rise to the surface. It should be bottled.

If this is for immediate use, say within six weeks, add a lump of sugar, and a tea-spoonful of yeast to every bottle before filling.

2. Boil four quarts of wheat bran, four ounces of grains of paradise bruised or mashed, and one ounce of calamus, two ounces of quassia rasped, in twelve gallons of water for thirty minutes; when near cold, add three quarts of molasses, a quart of yeast, and half a pint of burnt sugar coloring. Ferment as above; then strain through flannel, and add two gallons of whiskey; and to each bottle, before filling, add a lump of sugar of the size of a nutmeg, and a tea-spoonful of yeast.

3. Boil three quarts of wheat bran, one and a half pounds of hops, eight ounces of bruised ginger, in twelve gallons of water for one hour; then strain through flannel; and while warm, add two gallons of molasses, one quart of yeast, half a pint of brandy coloring, and half a gallon of tincture of grains of paradise, which will be formed by digest
ing eight ounces of the grains in half a gallon of whiskey. The grains should be either ground or mashed.

**Pineapple Ale.**—Four pounds of brown sugar, one pound of hops, and two ounces of quassia, and twelve gallons of water. Boil for three quarters of an hour; then add one gallon of molasses, one pint of yeast, and continue the fermentation until the froth ceases to rise to the surface; then add tincture of grains of paradise, half a gallon, and strain through flannel; then add three ounces of butyric ether, and bottle immediately.

2. Boil two pounds of wheaten flour well worked into a paste, with ten pounds of brown sugar, and one pound of hops; six ounces of ground cinnamon, three ounces of bruised ginger, six ounces of grains of paradise ground, two ounces of quassia, in twelve gallons of water for forty minutes; when near cold, add one and a half pints of yeast. Ferment until it quits frothing, then strain through flannel; add eight ounces of ether, and then bottle.

It may be necessary to state for the benefit of the uninitiated reader when and how this kind of porter and ale is disposed of to form a remunerative investment.

This consists in bottling and labelling this *Fluid*...
with neatness. The labels should be obtained from
the lithographers, and should be executed in the
highest style of the art. The same articles are sold
under the names of London porter; and the ale re-
ceives all the names of the different varieties of that
article, that have acquired any celebrity in commerce,
such as Scotch ale, India pale ale, pineapple ale, &c.,
&c. The bottles are packed in barrels or boxes, and
are disposed of at auction. This ale is usually
manufactured at cost varying from four to eight cents
per gallon.

It is not an unusual occurrence to meet with in
commerce, porter (or so called), that has been made
from the fermentation of molasses, yeast, and water.
This, after becoming sufficiently acidulated from fer-
mentation, has the further progress of the fermenta-
tion checked by the addition of alcohol, and a small
portion of ground mustard seed. It is then strength-
ened with aloes, pellitory, pepper, quassia, catechu,
and burnt sugar, and has a rough, bitter, acidulous,
taste, and leaves a disagreeable after taste in the
mouth.

Flour of Corianders, for Beer and Ale.—Coriande-
seed, three pounds; quassia, two pounds; aloes, one
pound. Allow these articles, after being powdered,
to digest for five days in six gallons of whiskey. This is added to suit taste.

The following articles are for giving strength and body to beer and ale:

1st. Quassia, two pounds; gentian, bruised, two pounds; aloes, one pound; water, ten gallons, and boil to five gallons; then add copperas, one pound, and boil to four gallons. This is added to suit taste.

2nd. Quassia, rasped, two pounds; liquorice root, two lbs.; sulphate of iron, one pound; boil for two hours, in six gallons of water, or until reduced to four gallons. The quantity of this fluid necessary for imparting a false strength to beer, must be regulated by the palate.

The following recipe is the least harmless of the whole in the list:

3rd. Grains of paradise, ground, one pound; quassia, two pounds; bruised ginger, six ounces; coriander seed, two pounds; calamus, bruised, six ounces; aloes, one pound. Boil the mass in ten gallons of water, until reduced to seven gallons; then strain. This should be infused in the water a few days, before boiling.
XV.

THE PROCESS

OF THE

MANUFACTURE OF VINEGAR

IN TWENTY-FOUR HOURS, BY THE CONVERSION OF
ALCOHOL INTO ACETIC ACID.

This process of manufacturing acetic acid, or pure vinegar, has superseded that of all others, both in Europe and America. This is owing to the many advantages that it presents. Among the most prominent may be noticed its rapid formation or acetification. The rationale of the conversion of whiskey and water into vinegar may be necessary to explain.

Liebig supposes that it takes place in consequence of the formation of a new substance, called aldehyd, into which the alcohol is changed by the loss of a part of its hydrogen. The alcohol, consisting of four equals of carbon, six of hydrogen, and two of oxygen, loses two equals of hydrogen through the influence
of the atmosphere, and becomes aldehyd, composed of four equals of carbon, four of hydrogen, and two of oxygen. This, by the absorption of two equals of oxygen, becomes four equals of carbon, four of hydrogen, and four of oxygen, that is, hydrated acetic acid. Thus the conversion of alcohol into acetic acid, consists in, first, the removal of two equals of hydrogen, and afterwards the addition of two equals of oxygen. Aldehyd is a colorless, very inflammable, ethereal liquid, having a pungent taste and smell. Its density is 0.79. It absorbs oxygen with avidity, and is thus converted into acetic acid, as just described. Its name alludes to its relations to alcohol—Alcohol dehydrogenated.

Having stated one of the most important considerations in the economy of the manufacture of vinegar, viz. its rapid formation, the minor considerations will be briefly noticed. And probably this could not be more effectually performed than by contrasting the two processes.

Take a well arranged vinegar manufacturing establishment of the old style, one that is capable of turning out forty barrels of vinegar daily, and from seven to ten operators will be necessary to conduct the process, to say nothing of the appurtenances, in the form of vats, tuns, cisterns, coolers, heaters, hydrometers, thermometers, kettles, boilers, furnaces, &c.,
MANUFACTURE OF VINEGAR.

...and to fully comprehend the amount of space (house room), requisite for these fixtures, to manufacture forty barrels of vinegar daily, it will be necessary to remind the reader that the vinegar that was sent into the market to-day, has been undergoing the process of manufacture, or of acetification, for several months.

By the proposed method, forty barrels of vinegar can be manufactured daily, requiring only two operatives and two large generators, or a series of small ones. The quantity of vinegar manufactured will be proportioned to the capacity of the generators. The generator that acetifies ten thousand gallons daily, is governed by and acts upon the same principle as the generator of the capacity of ten gallons,

Unlike the old process, the new is unaffected by external influences or chemical changes. Neither is its management invested in a chemical knowledge; the generators being once charged, the labor for the operatives becomes entirely mechanical.

Persons desirous of engaging in this business, and from a want of confidence in their abilities, and fearful that the directions here prescribed may be deficient in all of the details of the process—details that are necessary to success—that it would prevent them from engaging in the business; and in view of this the whole plan can be tested at a trifling cost, on a
small scale, by the use of a keg, arranged on the same principle that the generators are. This experiment will be required, as proof of favorable results, which will inspire confidence in the investment.

DIRECTIONS FOR PACKING VINEGAR GENERATORS.

This comprehends the preparation of the vessels for the production of vinegar.

Any vessel in the form of a barrel or cistern will answer for a generator. Thus tubs, kegs, whiskey or wine barrels, can be rendered available for this purpose. The operator will recollect that the more extended the surface is for the action of the fluid, the greater the benefit.

We will suppose the vessel to be packed is a wine pipe, of the capacity of one hundred and twenty gallons. It should be provided with a false bottom, composed of any kind of wood that will not yield a taste to the vinegar. This bottom should be secured about fifteen inches above the main bottom. The space thus formed is merely a reservoir for the vinegar, and its size should be controlled by the discharging capacities of the faucet, or stop cock.

This false bottom should be pierced with quarter-inch auger holes, allowing one hole to each square inch of the heading. The stop cock or faucet should be inserted about one inch above the main bottom;
the false bottom is then to be covered with one layer of gunny bagging. This is to prevent any particles from filtering through the false bottom. About twelve inches above the false bottom, bore a one inch hole in every stave, following a horizontal line, that is, following the direction of one of the hoops round the barrel. In large generators, these holes should be four feet apart, lengthwise of the cistern. Thus a generator twenty feet high, would require five circles of these holes, each circle being four feet apart. It has just been stated that one hole should be inserted in every stave. This is not imperatively necessary; the holes are usually from four to eight inches apart.

The success of the whole process depends entirely upon the free circulation of the air throughout the generator. These holes allow a free passage for the air, which passes off at the top, in this manner: from four to eight canes of one or two inches in diameter, and from twelve to twenty inches in length; the joints should be removed from the inside, thus forming hollow tubes. These canes are intended to establish a current of air from the holes on the side, to these canes at the top of the generator. The canes project one inch above the false head, while the other extremity penetrates the contents of the generator.
Glass tubes are employed, instead of the canes just alluded to, but they are rarely found, and the cane ones will answer every purpose.

The next process consists in packing or charging the generators; and this consists in simply filling the generator to within four or six inches of the top, with beech chips and shavings. These two articles are to be of no peculiar shape; as they fall from the axe and plane, under ordinary circumstances, are the kind that are made use of. The chips and shavings should not be packed too solid or densely, as this would prevent the free circulation of the air; neither should the chips be packed too solid, in the vicinity of the holes in the sides of the generator.

The generator being filled as described, a head is to be fitted, and is to rest on the chips. This head is to be made in the same manner as the false bottom, viz. in having one hole to every square inch of the head. Each one of these holes is to have a piece of packthread, two or three inches in length, unravelled at one end, and with a knot tied on the other end. This knot prevents the packthread from slipping, or being forced through the holes, and the other end being unravelled, assists in a degree in minutely separating the particles that form the liquid that is to be acetified. The liquid by falling on this head spreads uniformly throughout the mass of chips.
PACKING VINEGAR GENERATORS.

The next step in the process consists in acetifying the chips, &c. This consists in passing pure vinegar through the generator, until every chip and shaving is perfectly saturated with vinegar. This object will be fully obtained by pouring and repouring the vinegar as fast as it runs through, some eight or ten times.

It is highly essential that the vinegar used in acetifying the chips, should be pure, or free, at least, from the mineral acids. The most common adulteration of sulphuric acid can be detected by saturating strips of glazed writing paper with the vinegar. If when the paper becomes dry and is of a purplish color, it will denote sulphuric acid. For the detection of the usual adulterations of vinegar, look under the proper head.

The last step in the process consists in preparing the liquid that is to be converted into vinegar. To forty gallons of rain water, add twelve gallons of proof whiskey, and one and a half pints of honey. This mixture is allowed to fall from a cock in the barrel that contains it on to the head of the generator, and by the aid of the holes in the head, this liquid becomes uniformly divided over and throughout the chips.

The particles of fluid becoming so minutely divided, is the cause of the rapid acetification.
This liquid escapes at the cock at the bottom of the generator. The liquid will have to be passed through the generator several times, before the aceticification will be complete, which will occupy from twenty-four to thirty-six hours. After the generator has been in use for a short time, the use of the honey may be dispensed with in the alcoholic solution.

It would be difficult to explain why beech wood chips are required in the process. The chips of oak, ash, &c., have been used, but with indifferent success. Beech wood can be found in the form of "billetts of wood," or plank, in every city of the Union. They need no other preparation but being cut to the ordinary size of common chips.

If the vinegar should pass from the generator not perfectly clear or transparent, this will be effected by placing a bed of white sand on the false bottom, to the depth of fifteen inches. This sand will of course have to be packed in before the chips are, in the following order: first, to prevent the sand from falling through the holes in the false bottom, cover it with a layer of gunny bagging, then lay on a bed of sand to the depth of five inches, then cover this with two layers of gunny bagging, and this with five inches of sand, and so on until the whole of the sand is laid in. The sand thus packed, will admit of a free passage for the vinegar.