Having now furnished the reader with the best account I am able to give of the art of making sugar from the cane-juice, I shall proceed to a subsequent process, to which this invaluable plant hath given birth; I mean that of extracting from it, by fermentation and distillation, one of the purest, most fragrant, and salutary spirits in the world; a process of far greater curiosity than the former, and of almost equal importance in point of value, considering that the spirit procured by its means, is obtained from the very dregs and ferculencies of the plant.

The still-houses on the sugar-plantations in the British West Indies, vary greatly in point of size and expense, according to the fancy of the proprietor, or the magnitude of the property. In general, however, they are built in a substantial manner of stone, and are commonly equal in extent to both the boiling and curing-houses together. Large stills, by which I mean such as is drawn off in this practice be reboiled, it will give near 40 per cent. of sugar; so that the real loss is little more than one-fifth; but the distillery in that case will suffer for want of the melasses, and on the whole I believe that the usage of the English planters in shipping Muscovado sugar, and distilling the melasses, is more generally profitable than the system of storing.
WEST INDIES.

Contain from one to three thousand gallons, have this advantage over small ones; that they are purchased at first at a less proportionate expence. A still of two thousand gallons, with freight and charges, will cost but little more than one of one thousand five hundred gallons, and is besides worked with but little more fuel. But as it is not every proprietor that has the means of employing stills of that magnitude, I shall consider such as are fitting for a plantation making, communibus annis, two hundred hog'sheads of sugar of sixteen hundred weight, and proceed to describe, according to the best of my observation and experience, the mode of conducting such an apparatus on such a property, in making rum to the greatest advantage.

For a plantation of that description, I conceive that two copper stills, the one of one thousand two hundred, and the other of six hundred gallons, wine measure, with proportionate pewter worms, are sufficient. The size of the tanks (or tubs) for containing the cold water in which the worms are immersed, must depend on circumstances: if the advantage can be obtained of a running stream, the water may be kept abundantly cool in a vessel barely large enough to contain the worm. If the plantation has no other dependence than that of pond-water, a stone tank is infinitely superior to a tub, as being longer.
longer in heating, and if it can be made to contain from twenty to thirty thousand gallons, the worms of both the stills may be placed in the same body of water, and kept cool enough for condensing the spirit, by occasional supplies of fresh water.

For working these stills, it is necessary to provide, first, a dunder-cistern, of at least three thousand gallons; secondly, a cistern for the scumnings; lastly, twelve fermenting vats or cisterns, each of them of the contents of the largest still, viz. one thousand two hundred gallons. In Jamaica, cisterns are made of plank, fixed in clay; and are universally preferred to vats, or moveable vessels, for the purpose of fermenting. They are not so easily affected by the changes of the weather, nor so liable to leak as vats, and they last much longer. But in the British distilleries, fermenting cisterns are, I believe, unknown. To complete the apparatus, it is necessary to add two or more copper pumps for conveying the liquor from the cisterns, and pumping up the dunder, and also butts or other vessels for securing the spirit when obtained; and it is usual to build a rum-store adjoining the still-house.

The ingredients, or materials, that set the various apparatus I have described into action, consist of,

1st. Melasses, or treacle drained from the sugar, as already described.

2dly,
WEST INDIES.

2dly. Scumminggs of the hot cane-juice, from the boiling-house, or sometimes raw-cane liquor, from canes expressed for the purpose.

3dly. Lees, or, as it is called in Jamaica, dunder (m).

4thly. Water.

The use of dunder in the making of rum, answers the purpose of yeast in the fermentation of flour. It is the lees or feculencies of former distillations; and some few planters preserve it for use, from one crop to another; but this is a bad practice. Some fermented liquor, therefore, composed of sweets and water alone, ought to be distilled in the first instance, that fresh dunder may be obtained. It is a dissolvent menstruum, and certainly occasions the sweets with which it is combined, whether molasses or scumminggs, to yield a far greater proportion of spirit than can be obtained without its assistance. The water which is added, acts in some degree in the same manner by dilution.

In the Windward Islands the process, according to Colonel Martin, is conducted as follows:

Scumminggs, one-third.
Lees, or dunder, one-third.
Water, one-third.

(m) From redundar, Spanish—the same as redundans in Latin.

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HISTORY OF THE

BOOK V.

When these ingredients are well mixed in the fermenting cisterns, and are pretty cool, the fermentation will rise, in twenty-four hours, to a proper height for admitting the first charge of melasses, of which six gallons \((n)\) for every hundred gallons of the fermenting liquor, is the general proportion to be given at twice, viz. 3 per cent. at the first charge, and the other 3 per cent. a day or two afterwards, when the liquor is in a high state of fermentation; the heat of which, however, should not in general be suffered to exceed from ninety to ninety-four degrees on Fahrenheit’s thermometer \((o)\).

When the fermentation falls by easy degrees from the fifth to the seventh or eighth day \((p)\), so as then to grow fine, and throw up slowly a few clear beads or air globules, it is ripe for distillation; and the liquor or wash being conveyed into the largest still, which must not be filled higher than within eight or ten inches of the brim, left the head should fly, a steady and regular fire must be kept up until it boils, after

\((n)\) This quantity of melasses, added to a third of scumnings, gives \(11 \frac{1}{2}\) per cent. of sweets, six gallons of scumnings being reckoned equal to one gallon of melasses.

\((o)\) The infusion of hot water will rise, and of cold water abate the fermentation.

\((p)\) When the liquor is first set at the beginning of the crop (the house being cold, and the cisterns not saturated) it will not be fit for distillation under ten or twelve days.

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which a little fuel will serve. In about two hours the vapour or spirit being condensed by the ambient fluid, will force its way through the worm in the shape of a stream, as clear and transparent as crystal; and it is suffered to run until it is no longer inflammable.

The spirit which is thus obtained goes by the appellation of *low-wines*. To make it rum of the Jamaica proof, it undergoes a second distillation, of which I shall presently speak; but previously thereto, I shall point out some little variation between the practice of the Jamaica distillers and those of the Windward Islands, observable in the first process. This consists chiefly in a more copious use of dunder (*q*). The following

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(*q*) As the use of dunder is to dissolve the tenacity of the saccharine matter, it should be proportioned not only to the quantity, but also to the nature of the sweets. Thus, when the sweets in the fermenting cistern consist of molasses alone, as generally happens after the business of sugar-boiling is finished, when no scummings are to be had, a greater proportion of dunder is necessary; because molasses is a body of greater tenacity than cane-liquor, and is rendered so vicious and indurated by the action of the fire, as to be unfit for fermentation without the most powerful saline and acid stimulators. For the same reason, at the beginning of the crop, when no molasses is to be had, and the sweets consist of cane-juice or scummings alone, very little dunder is necessary. In such case I should not recommend above 20 per cent. at the utmost. Dunder, in a large quantity, certainly injures the flavour, although it may encrease the quantity of the spirit. We are informed by Dr. Shaw, that the distillers in England add
add many things to the fermenting liquor, or wash, in order to augment the vinosity of the spirit, or give it a particular flavour. He observes, that a little tartar, nitre, or common salt, is sometimes thrown in at the beginning of the operation, or in their stead a little of the vegetable or finer mineral acid. These are thought to be of great use in the fermenting of solutions of treacle, honey, and the like sweet and rich vegetable juices, which contain a small proportion of acid. I have heard, that a similar practice prevails among the distillers in St. Christopher's; some of whom consider an addition of sea-water to the fermenting liquor (in what proportion I cannot say) as a real and great improvement. Shaw recommends the juice of Seville oranges, lemons, and tamarinds, or other very acid fruits, and, above all other things, an aqueous solution of tartar; but I conceive that dunder alone answers every purpose. He likewise recommends to the distiller to introduce into the fermenting cistern a few gallons of the rectified spirit, which he says will come back, with a large addition to the quantity of spirit that would otherwise have arisen from the distillation.—As I have tried none of these experiments, I can say nothing in their favour of my own knowledge; but I believe that a small quantity of vegetable ashes, thrown into the rum-still, will be found serviceable. The alkaline salts are supposed to attenuate the spirit and keep back the gross and fetid oil, which the distillers call the faints; but if used in too great a quantity, they may keep back also a proportion of the fine essential oil, on which the flavour of the rum wholly depends. Perhaps the most important object of attention, in the making rum of a good flavour, is cleanliness; for all adventitious or foreign substiances destroy or change the peculiar flavour of the spirit. In truth, it should be a constant rule with the manager or distiller to see that
WEST INDIES.

Dunder one half, or 50 gallons
Melasses 6 gallons
Sweet 12 Scumings 36 gallons
per cent. (equal to 6 gallons more of melasses)
Water 8 gallons

100 gallons.

Of this mixture (or wash, as it is sometimes called) one thousand two hundred gallons ought to produce three hundred gallons of low-wines; and the still may be twice charged and drawn off in one day. The method of adding all the melasses at once, which is done soon after the fermentation commences, renders the process safe and expeditious; whereas by charging the melasses at different times, the fermentation is checked, and the process delayed.

Let us now complete the process according to the Jamaica method. The low-wines obtained as above, are drawn off into a butt or vessel, and, as opportunity serves, are conveyed into the second still of six hundred gallons, to undergo a further distillation. The steam begins to run in about one hour and a half, and will give, in the course of the day, two hundred and twenty gal-

that the cisterns are scalded, and even cleansed with strong lime-water, each time they are used; not merely on account of the rum, but also because it has frequently happened that the vapour of a foul cistern has instantly killed the first person that has entered it without due precaution.
HISTORY OF THE

Book V.

Tons, or two puncheons, of oil-proof rum, i.e. of spirit in which olive oil will sink; and thus the manufacture, if it may be so called, is complete. There will remain in the still a considerable quantity of weaker spirit, commonly about seventy gallons, which is returned to the low-wine butt. Thus two hundred and twenty gallons of proof rum are, in fact, made from five hundred and thirty gallons of low-wines; or about one hundred and thirteen of rum from one thousand two hundred of wash (r).

By means of the apparatus and processes which I have thus described, the Jamaica distiller may fill weekly, working only by day-light (a necessary precaution in this employment) and at a small expense of labour and fuel, twelve puncheons of rum, containing each one hundred and ten gallons of the Jamaica standard. The proportion of the whole rum to the crop of sugar, is commonly estimated in Jamaica as three to four. Thus a plantation of the above description is supposed to supply annually one hundred and fifty puncheons of rum of one hundred and

(r) Proof spirit of any kind weighs seven pounds twelve ounces per gallon. According to the English hydrostatical table, the cubic inch of proof spirit weighs 9 p. wt. 19.73 gr. troy, or 8.62 dr. avoirdupois. But it has been found that a cubic inch of good brandy is 10 grains heavier in winter than in summer, and that 32 gallons of spirits in winter will make 33 in summer.
ten gallons each; or eighty-two gallons of Jamaica proof to each hogshead of sugar;—and this return I do believe is sometimes fairly made from canes planted in rich and moist lands; but on a general estimate, I think it too great an allowance, and that two hundred gallons of rum to three hogsheads of sugar, which is in the proportion of about two-thirds rum to the crop of sugar, is nearer the truth (s).

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(s) This will be better understood by attending to the following particulars:—The general supply of scumings to the still-house is seven gallons out of every 100 gallons of cane-liquor. Supposing, therefore, that 2,000 gallons of cane-juice is required for each hogshead of sugar of 16 cwt. the scumings, on a plantation making 200 hogsheads per annum, will be 28,000 gallons, equal to 4,666 gallons of melasses.

Add the melasses from the curing-house, which, if the sugar is of a good quality, will seldom exceed sixty gallons per hogshead, and

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\begin{align*}
\text{Total of sweets} & = 16,666 \text{ gallons.} \\
\text{This, distilled at and after the rate of 12 per cent. sweets in the fermenting cistern, will give 34,120 gallons of low-wines, which ought to produce 14,412 gallons of good proof rum, or 131 puncheons of 110 gallons each. When a greater proportion than this is made, one or other of these circumstances must exist, either the sugar discharges an unusual quantity of melasses, or the boiling-house is defrauded of the cane-liquor by improper scumming. This latter circumstance frequently happens.} \\
\text{It should also be observed, that it is the practice of late, with many planters, to raise the proof of rum; thus gaining in strength}
\end{align*}
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The reader will please to recollect, that in this, and the preceding chapter, the observations which I have made, both concerning the cultivation of the sugar-cane in the field, and the subsequent processes of the boiling house and distillery, have been drawn chiefly from the practice of Jamaica. Some selection was necessary, and I could refer to no mode of conducting a sugar plantation, with such propriety as to that with which I am myself practically acquainted.—My next enquiries will relate to the particulars of the first cost of this species of property, to the current expences attending it, and to the returns which may be reasonably expected from a capital thus employed; and here again my estimates will refer chiefly to Jamaica. That there is a considerable variation in some of the Windward Islands, I have no doubt. In St. Christopher's, for instance, some of the lands are certainly more valuable than the very best in Jamaica; but, on the other hand, Jamaica is exempted from the duty of 4½ per cent. and has other advantages, which probably make the scale even.

Strength of spirit, what is lost in quantity: and there are managers who make it a rule to return the scumings to the clarifiers, instead of sending them to the still-house. This last-mentioned practice reduces the crop of rum more than one-third; but is supposed to yield in sugar more than is lost in rum; and if the price of sugar is very high, and that of rum very low, it may be prudent to adopt this method.