Preliminary Observations.

too, which at that time was circulated, of making three gallons of spirit from a bushel of grain, when the price of one gallon of gin was nearly equal to that of a bushel of grain; presented the prospect of such a rapid accumulation of wealth, as to cause a very considerable increase of distilleries. For, whatever opinion may be entertained of a manufactory, by those who only view it at a distance, so soon as it is found to be very profitable, it will also be sufficiently respectable, for the attention of the most fastidious. Accordingly, we find men of science, men of capital, lawyers, doctors, and merchants abandoning professional pursuits, and the hazardous speculations of the counting house, to learn the art of extracting spirit from grain; and to such men are we indebted for improvements, both in the quantity and quality of the spirit; on the last mentioned particular depends its taking the place of foreign spirits. Let distillers then pay the utmost attention to the flavour and proof, and as these improve, the price will rise, and grain spirits, whether gin or whiskey, will become fashionable, and valued according to their quality.

The very name of whiskey is nauseous to some men; and when they taste some of that which is offered for sale in our cities, the reality is found to be ten times worse than the idea, and they are completely disgusted. Offer to the same persons whiskey which has been double distilled,* and carefully at-

* It should be observed, that neither age or double distillation, will render good, whiskey originally bad; or that has received an improper flavour during the fermentation.
tended to in every part of the operation, having also the advantage of twelve months age, they will drink it without being able to say what it is, and may finally prefer it to French brandy.

I have sold many gallons of such as had been made in this manner for the private use of gentlemen, at one dollar per gallon; it has been highly esteemed, and generally preferred to any liquor generally sold under the name of French brandy.

The rapidity of improvements in the western parts of the United States, is a matter of some consideration to the distillers of the Atlantic states. They have already made considerable progress in the art of distillation, and the vast quantities of grain which are produced by their fertile lands, beyond the necessary consumption, cannot be so well disposed of in any way as in pork and whiskey. Hence we already find Tennessee and Kentucky whiskey in our sea ports, and it is generally preferred to that made nearer home; this by the way, is a powerful argument against the common prejudice against using corn, as the western whiskey is chiefly made of that grain; the distillers here, however, without examining into the real quality of this whiskey, are satisfied with attributing this preference to the prejudice generally entertained in favour of things procured with some difficulty. Kentucky hams have also been brought hither and sold at at very good prices.
Preliminary Observations.

Although the western distillers may not take more pains, or have a more complete knowledge of the art of distillation than others, there are several causes why their whiskey in general is better than ours; setting aside, however, the superior quality of their grain, which is certainly of importance, and some local advantages, it may be merely necessary to observe, that in order to save the expense of transportation and casks, their whiskey is made fourth proof, so that they offer for sale nothing but the pure spirit; whereas our distillers have a vile practice of running feints in their spirits to reduce them, thereby giving the bad flavour of which complaints have so justly been made. As they depend upon the rise of the rivers to send their whiskey to market, it acquires some age: this also, and the motion of travelling, has considerable effect in improving it. This whiskey has been sold, frequently, from one dollar twenty-five cents, to one dollar fifty cents, per gallon.

The increasing importance of this business is evident, from the quantity of domestic distilled spirits which it appears are made in the United States. Of the twenty-four millions which are annually distilled, it is probable there are twenty millions made from grain: and with the increase of population, and extension of agriculture, distillation will also be augmented.

To the superficial reader of the following pages, and to him who examines but one side of the question, it will appear to be a very profitable business, and he
will be surprised that any one engaged in distilling grain should fail of accumulating wealth rapidly. But it may be proper to remark, that although there is no enterprize in which a small capital will yield so large a profit if well understood, and properly attended to, in all its parts, neither is there any which will tend more rapidly to ruin the owner than a distillery, conducted without an adequate knowledge of the business, in all its details.

Failures in distilleries are generally attributed to these causes: 1. The situation. 2. The kind of stills, 3. The water. 4. Want of knowledge in the owner to direct, or of a suitable person to conduct, the internal affairs of the establishment. The three first of these causes may be avoided by close attention to the directions in the ensuing pages; and so far as this kind of instruction can be effectual, the author has endeavoured to point out the remedy for the two last.

But there is another difficulty to which many distillers are liable, and which is proper to be mentioned here; this is, the want of a suitable agent to dispose of the gin or whiskey when it is in the market.—For it has come within the knowledge of the author, that a distillery may be perfectly well conducted, and apparently yielding great profits, yet ruined by the ignorance, folly, or dishonesty of the agents: while, on the other hand, there are distilleries from which the liquor and bacon have been highly extolled, and have sold at all times very high, merely from the attention of their
agents. Let this point be well attended to then, by any one who is obliged to employ an agent.

On the manufacture of gin, some observations will be found under the proper head. This article, however, at best, is but an imitation of a foreign spirit. We are indebted to a foreign country for the ingredients which imparts the peculiar flavour of that liquor, and even in those we are liable to be greatly deceived. It should therefore become the particular aim of the American distiller to make a spirit purely American; entirely the produce of our own country; and if the pure, unadulterated grain spirit cannot be rendered sufficiently palatable to those tastes, that are vitiated by the use of French brandy or Jamaica rum, let us search our own woods for an article to give it taste sufficiently pleasant for these depraved appetites.

The French sip brandy; the Hollanders swallow gin; the Irish glory in their whiskey; surely John Bull finds "meat and drink" in his porter—and why should not our countrymen have a national beverage?
PART I.

CHAPTER I.

Concerning the proper situation for a Grain Distillery.

The first object for the consideration of a man about to enter into the business of a grain distillery, is to procure a proper situation for his works.

This is of greater importance, and requires much more examination and deliberation than is generally supposed, or is usually given to the subject.

The first question that presents itself, is whether a situation contiguous to, or at a distance from a city is to be preferred, and the advantages and disadvantages of each must be considered with reference to the capital to be employed.

In the first case, grain, fuel, labour, and grinding, will be high; rent will also be an object; and it will frequently be difficult to obtain hogs. On the other hand, being at the market, the distiller can take advantage of any sudden rise. He saves storage, commissions, &c. by making his own sales, and may obtain a regular set of customers. Hands too
are always to be obtained, and a coppersmith is near in case of accidents.

At a distance from a city, materials will be procured at lower prices, and by attaching a farm to the establishment, a supply of hogs may be raised at little expense. But here, except it be near a turnpike road, or on navigable water, the manufacturer will find it difficult to get his produce to market;—and he will be obliged to use new casks, which however may be made suitable by care in seasoning the staves properly. In case of accidents, he will want a coppersmith, this also may be remedied by keeping a double set of stirrers, and every thing necessary to repair trifling accidents, and there will seldom be wanting an ingenious person to supply the place of the coppersmith.

The most particular enquiries should be made as to the situation of the country with respect to grain and fuel, the quantity and price of each; the number and contiguity of mills; the price of labour; the facility of getting labourers; the habits and manners of the people, as well labourers as others; and the expense and manner of forwarding his produce to market.

The necessary information on these points being obtained, the suitableness of the situation may be determined from the estimate of expenses given in the fourth chapter of this work.

Remote situations will be found very troublesome
to the owner of a distillery, unless he gets amongst an active, industrious, trading people. With such he may probably obtain a constant supply of grain and wood, and for this reason, I represent the habits and manners of the people to be an object worthy of consideration.

These observations are more particularly intended for a person who is at perfect liberty to settle anywhere, but they may be of importance to others, so far as to satisfy them, that it is better not to build a distillery, than to place it in an improper situation.

There are other advantages attending particular situations, which will occur to persons of observation, a detail of which is unnecessary. It will merely be observed, that a place commanding more than one market, is vastly preferable to that which is confined to one: and a neighbourhood where rye whiskey is usually drank, is to be preferred to that which has apple whiskey or peach brandy in abundance.
CHAPTER II.

On the choice of a proper Site.

HAVING settled the question which was the subject of the last chapter, the choice of a proper site or seat for a distillery, comes next into view.

Much has been said in favour of creek or river water for fermentation; but so long as pure spring water free from mineral impregnation, can be obtained, in such a way as to be brought into a distillery over head, it will be found most advisable to use it.

To make use of river water, two extra hands are necessary to pump, or a horse must be used with a great quantity of machinery, which is constantly liable to get out of order; besides which, river water is too warm to cool off with in summer, and cold spring, or well water must be had for this purpose; and whenever water is to be pumped either by man or horse, there will generally be found a deficiency in the supply of the coolers.

Spring water therefore being most desirable, look out for a spring of soft water, that will make a good
Site for a Distillery.

lather with soap, and is clear of minerals, which are sometimes injurious to fermentation. It should have a fall of eight or ten feet within the distance of one hundred and fifty yards, and be in quantity sufficient for daily use. The spring should be enlarged and walled up so as to contain from one to two thousand gallons, (according to the quantity wanted) and conveyed under ground in bored logs to the house.

It would also be an advantage if a stream of water could be brought to the distillery sufficient to stir the stills, and pump the wash, or either. This might also be used for the coolers if the spring be not sufficient. The water from the coolers may be used to turn a wheel, to stir the stills.

It is hardly probable that all the requisites here mentioned will be found combined in one spot; the deficiency must then be supplied as well as possible. There are many situations where the machine for raising water, mentioned in this work, will be of great advantage. Montgolfeir's water raiser also may be useful in some places.

The house should if possible be protected from the northern winds, both on account of the fermentation and the situation for the hogs, with a southern exposure; the stills placed in the west end, and sufficiently elevated for the swill to run to the hogs. This will save much trouble, and the pens being placed at the west end, the hogs will be protected from the easterly storms.
Distilleries are generally built too small; as a general rule, four feet each way, for every hogshead, should be allowed for the mashing floor; except in large establishments, where less will do, and six days work will sometimes be on the floor at the same time in winter. From these data the size of the house may be calculated.

For a still with Witmer's improvement upon Anderson, to work eight hogsheads a day, the house should be twenty-four feet in breadth, forty feet in length and fronting the south, with a door near the east end to turn out dirty hogsheads to be washed on a platform raised for the purpose, and one door near the stills to carry in wood, with as little interference as possible with the mashing.

The house should be of stone, one story and a half high, the lower room well plaistered and floored, and the upper, divided for the different kinds of grain, and the accommodation of the workmen.
CHAPTER III.

Of the Apparatus for a Distillery, and Cost thereof.

FOR a distillery of the size and upon the plan mentioned in the preceding chapter, it will be necessary to procure:

1 Patent still, 125 gallons and appendages
   (cost) - - - - $190 00
Patent right to use same, - - - 50 00
1 Doubling still, 100 gallons, and pewter worm, - - - 100 00
1 Boiler, 125 gallons capacity, - - 100 00
50 Hogsheads, - - - 75 00
Wash pump and singling do. - - 25 00
2 Kegs and 2 buckets, for sings, - - 5 00
2 Spirit and 2 water buckets, - - 4 00
1 Large funnel, - - - 3 00
Iron mashing oar, - - - 2 00
Thermometer and hydrometer, - - 25 00
Troughs for cooling off and conveying wash, - 5 00

$584 00
<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount brought forward</td>
<td>$584 00</td>
</tr>
<tr>
<td>Scales and weights, broom, shovel, bags, yeast buckets, covers for hogheads,</td>
<td>100 00</td>
</tr>
<tr>
<td>lamp, besides several small articles too tedious to be enumerated, the want of</td>
<td></td>
</tr>
<tr>
<td>which will soon be discovered; say for these,</td>
<td></td>
</tr>
<tr>
<td>110 Hogs to be bought at beginning</td>
<td>440 00</td>
</tr>
</tbody>
</table>

| Total                                                                       | $1124 00 |
CHAPTER IV.

Of the Profits of a Distillery, and current expenses in different situations.

IN estimating the profits of an establishment capable of working twelve bushels a day, we will make our calculation upon the amount necessary to carry on the work for three months, by which time the proceeds will probably come in so as to make further advances unnecessary. Suppose for round numbers 1000 bushels are worked, to wit:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Price per Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 bushels corn, at 50 cts.</td>
<td></td>
<td></td>
<td>$300 00</td>
</tr>
<tr>
<td>300 do. rye, 60</td>
<td></td>
<td></td>
<td>180 00</td>
</tr>
<tr>
<td>100 do. malt, 60</td>
<td></td>
<td></td>
<td>60 00</td>
</tr>
<tr>
<td>500 pounds juniper berries</td>
<td></td>
<td></td>
<td>100 00</td>
</tr>
<tr>
<td>Hops,</td>
<td></td>
<td></td>
<td>2 40</td>
</tr>
<tr>
<td>100 barrels</td>
<td></td>
<td></td>
<td>100 00</td>
</tr>
<tr>
<td>Transportation of 3000 gallons at 6 cts.</td>
<td></td>
<td></td>
<td>180 00</td>
</tr>
</tbody>
</table>

$922 40

CR.

By 3000 gallons, at 55 cts.                  |          |                | 1650 00|

Nett proceeds in three months,               |          |                | $727 60|
From these estimates it results, that less than twenty-five hundred dollars will be sufficient to furnish and carry on a distillery for one year; and if the quotation of prices be correct, the profits will be nearly three thousand dollars.

This calculation is predicated upon the supposition, that the profit on the hogs will pay the current expenses of manufacturing the grain, which will generally be found to be the case; but taking in these, and reducing the calculation to the greater nicety, we have this statement.

Amount as above, $922 40
33 cords of wood, say at 2 dollars, 66 00
Grinding 1000 bushels, at 5 cents, 50 00
Wages 2500 gallons, at 5 cents, 125 00

1163 40

Commissions on sales, leakage, interest on capital, wear of stills, &c. say for even numbers, 139 20

1302 60

Now, supposing the produce to be 10 quarts per bushel, we have 2500 gallons at 55 cents, 1375 00
Gain upon 110 hogs 84 days, say 546 pounds, at 6 cents per pound, 327 60

1702 60

$400 00
Nett profits in three months, $400 00
If however the produce were equal to 3 gallons per bushel, as in the other calculation, we have to add, 275 00
Making the whole amount Dr. $675 00
Which is nearly the same as the preceding.

As the prices of wood and grain vary in different places, the following data are furnished, to enable any person to make the necessary calculations for any situation where the cost of these articles are known.

That 1 cord of good oak wood is sufficient for working 30 bushels of grain.

That 1 ½ cords of pine or 14 bushels Virginia stone coal are equal to one cord of oak wood.

That one man may work 10 bushels grain per day.

That wages may be calculated at one dollar per day for the best hands, but for large establishments some of the hands may be hired much lower.

Or a distiller may be hired for 5 cents per gallon on the quantity distilled, or in some places 4 cents.

Grinding is usually 5 cents per bushel, but as there is a small loss, should be calculated at 6 cents.

Every bushel worked will feed 8 or 9 hogs, and the
gain of each hog may be fairly set down at six tenths of a pound a day.

Transportation by tide water may be put down at 1 cent per gallon; distance not material.

Transportation by land varies very much in different places, but will generally be about 6 cents per gallon on any distance between 60 and 100 miles.

The preceding estimates are made for a still upon Mr. Anderson's plan.

It is stated, that by using steam stills, there is a considerable saving of fuel and labour. The use of the mashing machine will also save labour in a large establishment, as two men can easily attend to the mashing of 60 or 100 bushels a day.
CHAPTER V.

The different methods, or plans of distilling, and proper form of stills considered.

In the early operations of the grain distillery, much fuel, labour, and time, was employed, in effecting comparatively a small quantity of work. The object of the improvements and machinery adapted by different persons, has been to lessen the expenditures of one or more of these. To the professed distiller, who calculates upon an extensive establishment, every saving, even the most minute, in his daily expenses deserves his attention; but to the man who works a distillery for a few months, or upon a small scale, it becomes a question, whether the original simple plan a little improved, is not better than the expensive machinery proper for large works.

At one time there was no alternative for the distiller, be applied to a coppersmith who gave him such stills as were most profitable to the maker, consequently many distillers have been unsuccessful merely for want of proper stills; the necessity of attention, therefore to this point will be obvious, and the more so, when we consider the variety of patent plans of distilling which have been offered to the public notice of late days,
each of which has had advocates who have considered it superior to all others. It would be both tedious and unnecessary to mention all their plans, as it is to be presumed that no person will adopt any one until he first sees it in operation, or is well satisfied of its superiority. It will be sufficient here to notice some of the most usual, with their alleged advantages and disadvantages; and the reasons for my preference of one. However well grounded these reasons may be, in my own opinion, yet as I cannot possibly be acquainted with all plans and situations, I should wish every one to judge for himself, by comparing the expenses of working according to this plan, with such others as he may prefer; he may then decide without difficulty.

The old way of distilling is generally pursued only by such as work upon a small scale, or are unwilling to be at the expense of a patent right. There are however some distillers upon a larger scale, who prefer the old way, because, they say

1. It is less liable to accidents, there being no apparatus as in the patent still.*

2. The spirit is purer, the head of the still being taken off and washed every charge, and the surface of copper acted upon by the steam being less than in the patent still.

* To avoid repetition, and by way of general explanation, it may be proper to observe that by patent still I allude to Mr. Witmer's improvement upon colonel Anderson's condenser, more particularly explained hereafter.
3. A common still of 220 gallons costs no more than a patent one of half the size, and will do nearly the same work in twenty-four hours.

In answer to the first observation it may be remarked, that very little attention is necessary to keep the apparatus in order, and that a common still is much the more likely to run foul and consequently requires much more attention than the other to prevent the worm from being choked.

To the second, if the head and globe of a patent still are washed every week, which may be easily done the spirit will be as pure as that obtained by any other still; the head of a common still being necessarily much larger than that of the patent, it is probable that the surface of copper acted upon by the steam will be greater in a common still of 220 gallons than in a patent one of half the size; a patent still being almost constantly running is always hot, the condensing power of the charge in the tub prevents any heat from getting to the worm; this even temperature prevents the formation of verdigris; but, the acid of a cold charge in the old way operating upon the hot copper will certainly cause the formation of verdigris, the worm too is considerably heated and as it cools between the different charges verdigris will be formed, hence one of the reasons of the impurity of whiskey.

The third observation is indefinite, but it will be very evident that to work the same number of gallons
of wash a greater number of hands will be requisite, and three times the quantity of fuel will be used in the old way, that is necessary for a patent still.

According to this old way of distilling, (as originally performed, and even now in many places) the charge is put into the still quite cold, and consequently requires a long time to be made to boil, during which time it is necessary to keep the wash in constant agitation to prevent empyreuma, or adhering to the bottom and sides of the still and burning. This is done by a man with a broom or paddle, and keeps him very busily employed till the wash arrives at the boiling point, when the head is luted on and no further attention is necessary than to regulate the fire and keep up a constant supply of water to the worm tub. The difficulty of ascertaining the proper time for putting on the head is great, and is a matter of much inconvenience and sometimes loss, for if it be done too soon, an empyreuma almost certainly takes place, and if it be delayed until the wash actually boils, it is evident that a portion of the strongest spirit will be lost.

Many expedients have been proposed to remedy this great inconvenience, but without effect, if we except the stirrers adapted to colonel Anderson's patent still.

The great quantity of water necessary for the worm tub, probably first suggested the idea of applying the steam in its passage to the worm to heating a charge