THE

DISTILLER.

CONTAINING

1. Full and particular directions for mashing and distilling all kinds of Grain, and imitating Holland Gin and Irish Whiskey.

2. A notice of the different kinds of Stills in use in the United States, and of the Scotch Stills which may be run off 480 times in 24 hours.

3. A Treatise on Fermentation, containing the latest discoveries on the subject.

4. Directions for making Yeast, and preserving it sweet for any length of time.

5. The Rev. Mr. Allison's process of Rectification, with improvements; and mode of imitating French Brandy, &c.

6. Instructions for making all kinds of Cordials, Compound Waters, &c.; also for making Cider, Beer, and various kinds of Wines, &c. &c. &c.

ADAPTED TO THE USE OF FARMERS, AND DISTILLERS.

BY HARRISON HALL.


PHILADELPHIA:
PUBLISHED BY THE AUTHOR, 133, CHESNUT-STREET.

J. BIOREN, PRINTER.

1818.
DISTRICT OF PENNSYLVANIA, TO WIT:

BE IT REMEMBERED, That on the seventh day of January, in the forty-second year of the Independence of the United States of America, A. D. 1818, Harrison Hall, of the said district, hath deposited in this office the title of a book, the right whereof he claims as Author, in the words following, to wit:

"The Distiller, containing, 1. Full and particular directions for mashing and distilling all kinds of grain, and imitating Holland Gin, and Irish Whiskey. 2. A notice of the different kinds of Stills in use in the United States; and of the Scotch Stills, which may be run off 480 times in 24 hours. 3. A Treatise on Fermentation, containing the latest discoveries on the subject. 4. Directions for making Yeast, and preserving it sweet for any length of time. 5. The Rev. Mr. Allison's process of rectification, with improvements; and mode of imitating French Brandy, &c. 6. Instructions for making all kinds of Cordials, Compound Waters, &c.; also for making Cider, Beer, and various kinds of Wines, &c. &c. &c. Adapted to the use of Farmers, and Distillers. By Harrison Hall. The Second Edition, enlarged and improved."

In conformity to the Act of the Congress of the United States, intituled, "An act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies, during the times therein mentioned."—And also to the act, entitled, "An act supplementary to an act, entitled, 'An act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies, during the times therein mentioned,' and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints."

D. CALDWELL, Clerk of the District of Pennsylvania.

Gift of The Heirs of George C. Dempsey
RECOMMENDATIONS,

"Practical men, or those engaged in the steady prosecution of any art or manufacture, so seldom favour the public with an account of their processes, that when they do write respecting them, or suggest any improvement therein, the public must gain by their labours.

"I have read Mr. Hall's work on Distilling, and feel no hesitation in saying that I consider it a valuable acquisition to those engaged in that business.

"JAMES MEASE."

---

"Mr. H. Hall,

"Dear Sir,

"I read your Treatise on Distillation, with great pleasure; it certainly contains more information than any book that I have seen in print. I shall recommend it wherever I have an opportunity of doing so.

"I am, dear Sir, yours,

"ALEX'R. ANDERSON."

---

"Dear Sir,

"In answer to your note of this morning, I reply, that I read your manuscript upon Distillation with much interest, and derived from it some practical information, which fully repaid me for the time and attention bestowed
upon it. I can with sincerity say, that some of your hints have been of use to me.

"I am, sir, with due regard,
"Your obedient servant,
"ROBERT HARE.

"Harrison Hall, Esq."

"Dear Sir,

"I thank you for the perusal of the first part of your Treatise on Distilling. I have seen no work on the subject, in this country, that contains so much practical good sense, or so likely to communicate useful knowledge on the subject.

"I heartily wish you success, and that the Second Part which I have not yet seen, may be as good as the portion you sent me.

"I am, dear Sir,
"Your Obedient Servant,
"THOMAS COOPER.

"Harrison Hall, Esq."
PREFACE.

IT requires but little reflection on the agricultural and commercial state of this country, to shew the propriety of giving more attention to the manufacturing of domestic spirits, than has been hitherto done. Continually liable to interruptions in our trade, with those countries from which we have drawn our supplies of liquors; it would be prudent to become less dependant on them, and more industrious in improving our own capacity to provide for ourselves. These truths have been sensibly felt, since the embargo of 1807, and are every day becoming more important. Hence, the rapid increase in the number of grain distilleries in this country within that period; insomuch that foreign spirits are almost entirely excluded from common use amongst our farmers. Yet is the art of distilling an agreeable and wholesome liquor from the products of our own country, but very imperfectly understood; and yet are we without any certain guide to direct us in our operations.

His own experience and the want of a safe and systematic guide, during several years that the author of the following work was practically engaged in distilling, has induced him to believe that the result of a careful inquiry into the subject might not be unacceptable to such as desire to be informed. As his principal object is to instruct plain, unlettered men, he has laid down his rules, in the
most simple manner, and in the fewest possible words; avoiding all irrelevant matter, and doubtful theories which might tend to perplex rather than elucidate. In the course of his inquiries he has had the advantage of visiting other distilleries besides his own; and whilst he has seen the errors of careless, or ignorant pretenders, he hopes he has profited by the liberality and science of enlightened men.

Practical men we know, on all subjects, are too apt to despise books; and we are equally aware that a complete manufacturer can never be formed by reading alone. But though we acknowledge that experience will always be the sure test of truth, it cannot be denied, that books are a convenient medium to bring much valuable truth into view; to compare our opinions with those of others; and above all to bring together the excellencies and errors of the four quarters of the world, that whilst we adopt the one we may avoid the other. To the insulated savage, when he has accidentally discovered that an intoxicating liquor may be extracted from his native maple, it may be allowed to exult in his wonderful knowledge; but he who reads, will rather speak with modesty of his own attainments when he sees how far he has been surpassed by others.

But though we contend for the utility of books in the science of distillation, we can assure those who would rather depend on their own practical results that there is yet great room for the application of their ingenuity and diligence; for the science of fermentation is yet so imperfectly understood that no rules can be given for mashing and making yeast, which may not possibly disappoint an ordinary operator.

On the other hand it may perhaps be asserted with some
confidence, that a degree of success equal to his most sanguine expectations may be attained by a careful attention to the directions contained in the following work. They are the result of the author's own experience, or of communications, for the most part personal, with men on whose knowledge and veracity he could alike depend. And however humbly he may indeed be disposed to think of his labours, he cannot but flatter himself that he will be found to have contributed something though but a mite to the general stock of information.
THE uncommonly rapid sale of the first edition of this work, far from inspiring the author with overweening confidence, has induced him to review his labours with great caution. As was to have been expected, he has received a variety of communications on the subject from several gentlemen. He is not insensible to the favourable opinion that has been expressed by many, as he has endeavoured to evince, in this edition, which will be found to be greatly enlarged, and, it is hoped, improved.

January, 1818.
## INDEX.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRELIMINARY Observations</td>
<td>1</td>
</tr>
<tr>
<td>1. On the proper situation for a grain distillery</td>
<td>19</td>
</tr>
<tr>
<td>2. Choice of a proper site</td>
<td>23</td>
</tr>
<tr>
<td>3. Of the apparatus and cost</td>
<td>27</td>
</tr>
<tr>
<td>4. Of the profits and current expenses</td>
<td>29</td>
</tr>
<tr>
<td>5. Of the different plans of distilling and forms of stills</td>
<td>33</td>
</tr>
<tr>
<td>Old plan of distilling</td>
<td>34</td>
</tr>
<tr>
<td>Colonel A. Anderson's mode</td>
<td>37</td>
</tr>
<tr>
<td>Henry Witmer's</td>
<td>38</td>
</tr>
<tr>
<td>Anderson's opinion as to the quality of spirit</td>
<td>40</td>
</tr>
<tr>
<td>Nicholson's do</td>
<td>41</td>
</tr>
<tr>
<td>Curaudeau's opinion on evaporation</td>
<td>42</td>
</tr>
<tr>
<td>Mr. Kraft's stills</td>
<td>43</td>
</tr>
<tr>
<td>Comparison of Scotch stills with Anderson and Hall's</td>
<td>44</td>
</tr>
<tr>
<td>6. Distillation by steam</td>
<td>47</td>
</tr>
<tr>
<td>Issac Berard's plan</td>
<td>49</td>
</tr>
<tr>
<td>Opinion of Senator Chaptal</td>
<td>ib.</td>
</tr>
<tr>
<td>Opinion of Professor Cooper</td>
<td>50</td>
</tr>
<tr>
<td>A. Anderson's invention</td>
<td>52</td>
</tr>
<tr>
<td>Charles Wyatt's do</td>
<td>54</td>
</tr>
<tr>
<td>Extract from the report of the committee of the house of commons,</td>
<td>59</td>
</tr>
<tr>
<td>relative to the quality of spirit</td>
<td></td>
</tr>
<tr>
<td>Phares Bernard's mode</td>
<td>60</td>
</tr>
<tr>
<td>P. M. Hackley</td>
<td>ib.</td>
</tr>
<tr>
<td>Robert Gillespie</td>
<td>62</td>
</tr>
<tr>
<td>View of Gillespie's stills</td>
<td>67</td>
</tr>
<tr>
<td>Description of the apparatus of Mons. Ed. Adam</td>
<td>68</td>
</tr>
<tr>
<td>7. Of the construction of furnaces and manner of setting up stills</td>
<td>87</td>
</tr>
<tr>
<td>Mode of forming a cement</td>
<td>89</td>
</tr>
<tr>
<td>8. Of hogsheads, or vessels for mashing</td>
<td>93</td>
</tr>
<tr>
<td>Of washing hogsheads</td>
<td>94</td>
</tr>
</tbody>
</table>
9. Of a mashing machine, 97
10. Of the technical terms used in a distillery, 99
11. Observations on yeast, 101
   Of stock yeast, 103
   Mode of separating beer from yeast, and preserving yeast a long time, 106
   Composition for yeast, 108
   Substitute for do. 109
12. Observations on mashing, 120
   Experiments in mashing, 133
   Produce per bushel, 141
13. Observations on grain of different kinds, 142
   Of the weight and produce of different kinds of grain, 146
14. Observations on malt, 147
   Richardson on malting, 152
15. Directions for making malt, 158
16. To dry malt, 159
   Do. by steam, 161
   Of grinding, 161
17. Of vinous fermentation, 163
   Experiments respecting the formation of alcohol, by Mr. Brandt, 170
18. Of hops, 182
   Of the culture of the hop, 184
19. To make 2,000 gallons from the bushel, 187
20. Process by which 880 lbs. of corn yield 430 qts. of brandy, 190
21. Process of distillation in Ireland, 193
22. Of lutes, 198
23. Observations on the advantage of preparing whiskey for market of a proper strength, 200
   On the kinds of inspection in New York, Philadelphia, and Baltimore, 203
24. Of geneva origin, 204
25. Of the advantages of feeding swine and cattle, 212
   Description of a cow house at Glasgow, 219
26. Miscellaneous observations, 221
PART II.

2. Of the various products of the United States which afford spirit by distillation.
   Of apple brandy, ........................................ 236
   Peaches, ............................................... 238
   Cherries, ........................................... 239
   Fox grapes, .......................................... ib.
   Potatoes, ........................................... 240
   Beets, ............................................... 243
   Sugar from beets, .................................... 244
   Concerning persimons, ................................. 245

3. Of colouring liquors, .................................. 248

4. Of rectification, ........................................ 249

5. Of imitating foreign spirit, ........................... 255

6. Of alcohol, or spirit of wine, ......................... 258

7. Of bodies proper for distillation, and their product, 264

8. Of distilling simple waters, .......................... 266

9. Of making compound waters and cordials, ............ 269

Recipe 1. Clove water, .................................... 270
   2. Lemon water, ...................................... ib.
   3. Citron water, ..................................... ib.
   4. Orange water, .................................... ib.
   5. Lavender water, ................................... ib.
   7. Peppermint water, ................................ 272
   9. Anniseed water, ................................... ib.
   10. To make ten gallons royal usquebaugh, ........... 273
   11. To make red ratafia, ................................ ib.

10. Concerning wines, ...................................... 276

Recipe 1. For American wines. By Jos. Cooper, esq. N. 283
   2. Cider wine, ........................................ 284
   3. Hydromel or mead, ................................ ib.
   4. Currant wine, ...................................... 285
   5. Elder wine, ........................................ ib.
   6. Champagne wine, ................................... 286
   7. Irish nectar, ...................................... ib.
   8. Gooseberry wine, .................................. 287
   Letter from Dr. Anderson, ............................. ib.
   Recipe from do. ...................................... 292
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. To make beer,</td>
<td>295</td>
</tr>
<tr>
<td>12. Concerning cider,</td>
<td>296</td>
</tr>
<tr>
<td>13. Improvements or substitutes for the common Cider</td>
<td>304</td>
</tr>
<tr>
<td>Description of the Baron de Gedda's condenser,</td>
<td>306</td>
</tr>
<tr>
<td>14. On raising water,</td>
<td>309</td>
</tr>
<tr>
<td>Description of the screw of Archimedes,</td>
<td>310</td>
</tr>
<tr>
<td>Do. Argand's valve siphon,</td>
<td>311</td>
</tr>
<tr>
<td>Do. Mongolfer's hydraulic ram,</td>
<td>312</td>
</tr>
<tr>
<td>15. Of the thermometer,</td>
<td>318</td>
</tr>
<tr>
<td>16. Of the hydrometer,</td>
<td>321</td>
</tr>
<tr>
<td>Gilpin's tables of specific gravity,</td>
<td>324</td>
</tr>
<tr>
<td>17. Of Russian distillation,</td>
<td>325</td>
</tr>
<tr>
<td>18. On the preservation of vegetables for distillation,</td>
<td>326</td>
</tr>
<tr>
<td>19. Orrar of roses,</td>
<td>327</td>
</tr>
<tr>
<td>20. List of patents,</td>
<td>329</td>
</tr>
<tr>
<td>Advertisement of a new invented steam distillery,</td>
<td>337</td>
</tr>
</tbody>
</table>

REFERENCE TO THE PLATES.

Mr. H. Witmer's improvement on Col. A. Anderson's patent Condensing Tub, to face the Title page.

- Mr. P. M. Hackley's still,                                         60
- Mr. Gillespie's do.                                                67
- Mons. Adam's do.                                                   84
- Baron De Gedda's Condenser,                                        308
- Archimedes' Screw,                                                 312
- Hydraulic Ram,                                                     316
- Patent Steam Distillery,                                           337
- Argand' Valve Siphon,                                              368
THE DISTILLER.

PRELIMINARY OBSERVATIONS.

The time of the invention of brandy or ardent spirits, so useful in the arts, and so important an object of commerce, and which has proved so influential on the health, habits, and happiness of the human race, is involved in obscurity. That the first was made by the Arabians, from wine, and thence called vinum us- tum; that Arabian physicians first employed it in the composition of medicines, and that so late as the year 1333, the manner of preparing it was still considered by the surgeons as a secret art, appears from the writings of Arnaldus, Raymond, Lully, Theophrastus, and Paracelsus; and it is not without some reason that the invention has been ascribed to Arnold. Alexander Tassoni relates, that the Modonese were the first in Europe, who, in consequence of a superabundant vintage, made considerable quantities of this liquor. The German miners had first acquired a habit of drinking
Preliminary Observations.

it; and the consumption of, and demand for, this liquor, soon induced the Venetians to participate with the Modonese in this new art, and lucrative branch of commerce. However, it appears that brandy did not come into general use until towards the end of the 15th century, and then it was still called burnt wine. The first printed books which made mention of brandy, recommended it as a preservative against most diseases and as a means of prolonging youth and beauty. Similar encomiums have been passed upon tea and coffee; and people became so much habituated to these liquors, that they at last daily drank them merely on account of their being pleasant to the palate.

In the reformation of the archbishopric of Cologne, in the first quarter of the sixteenth century, there is no mention of brandy; although it must certainly have been made there, if it had already been used in Westphalia.

William II. landgrave of Hesse, about the commencement of the sixteenth century, ordered, that no vendor of brandy should suffer it to be drank in his house, and that no one should be allowed to offer it for sale before the church doors on holidays. In 1524 Philip, landgrave of Hesse totally prohibited the sale of burnt wine. But in the middle of the sixteenth century when Baccius wrote his history of wine, brandy was every where in Italy sold under the name of aqua vitis or vitae. Under king Erick it was introduced into Sweden.
For a long time this liquor was distilled only from spoiled wine, afterwards it was made from the dregs of beer, wine, &c. and when, instead of these, the distillers employed wheat, rye, and barley, it was considered as a wicked and unpardonable use of grain, it was feared that spirit made from wine would be adulterated with malt spirits; and an idea prevailed that the grains were noxious to cattle, but especially to swine; whence originated among men that loathsome disease the leprosy!

Expressly for these reasons, burnt wine was, in January, 1595, forbidden to be made in the electorate of Saxony, unless only from wine lees, and the dregs of beer.

In 1582 brandy was prohibited at Frankfort on the Main, because the surgeon barbers represented, that it was noxious in the then prevailing disorders. From the same cause the prohibition was renewed in 1605.

The love of brandy or ardent spirits in general, has spread over all parts of the world, and nations, the most uncultivated, and the most ignorant, who can neither reckon nor write, have not only comprehended or devised methods of distilling it, but even had ingenuity to prepare some kind of beverage from the vegetable kingdom of their own country.

"The miserable hordes who wander in the forests of Guayana," says one of the most valuable writers of the
Preliminary Observations.

present day,* “make as agreeable emulsions from the different palm-tree fruits as the barley water prepared in Europe. The inhabitants of Easter Island, exiled on a mass of arid rocks, without springs, besides the sea water drink the juice of the sugar-cane. The most part of civilized nations draw their drinks from the same plants which constitute the basis of their nourishment, and of which the roots or seeds contain the sugary principle united with the amylaceous substance. Rice in southern and eastern Asia, in Africa the igname root with a few arunis, and in the north of Europe cerealia, furnish fermented liquors. There are few nations who cultivate plants merely with a view to prepare beverages from them. The old continent affords us no instance of vine plantations but to the west of the Indies. In the better days of Greece this cultivation was even confined to the countries situate between the Oxus and Euphrates, to Asia Minor and western Europe. In the rest of the globe nature produces species of wild vitis, but no where else did man endeavour to collect them round him to meliorate them by cultivation.”

“But in the new continent,” he continues, “we have the example of a people who not only extracted liquors from the amylaceous and sugary substance of the maize, the manioc and bananas, or from the pulp of several species of mimosa, but who cultivated express-

ly a plant of the family of the anaimas to convert its juice into a spirituous liquor. This plant differs essentially from the common maguey."

And "A chemist," he adds, "would have some difficulty in preparing the innumerable variety of spirituous, acid, or sugary beverages, which the Indians display a particular address in making, by infusing the grain of maize, in which the sugary matter begins to develop itself by germination. These beverages are generally known by the name of chica, have some of them a resemblance to beer, and others to cider. Under the meustastic government of the Incas it was not permitted in Peru to manufacture intoxicating liquors, especially those which are called vinapu and sora. The Mexican despots were less interested in the public and private morals, and drunkenness was very common among the Indians of the times of the Aztec dynasty. But the Europeans have multiplied the enjoyments of the lower people by the introduction of the sugar-cane. At present in every elevation the Indian has his particular drinks. The plains in the vicinity of the coasts furnish him with spirit from the sugar-cane. The Chica de Mais abounds on the declivity of the Cordilleras. The central table-land is the country of Mexican vines, the agave plantations, which supply the favourite drink of the natives, the pulque de maguey. The Indian in easy circumstances adds to these productions of the American soil a liquor still dearer and rarer, grape brandy, partly furnished by European commerce, and partly distilled in the country.
Preliminary Observations.

"Before the arrival of the Europeans, the Mexicans and Peruvians pressed out the juice of the maize stalk to make sugar from it."

"In the valley of Toluca, the stalk of the maize is squeezed between cylinders, and there is prepared from its fermented juice a spirituous liquor, called pulque de mahis, or traoloi, a liquor which becomes a very important object of commerce."

The various difficulties, restrictions and prohibitions which attended the more general introduction of the distillation of grain, into the different countries of Europe, would afford matter of curious investigation, but does not come within the limits of this work.

In America during the infancy of the settlement, we were under the necessity of importing spirituous liquors of different kinds, as more important cares precluded any attempts at domestic distillation. When it was attempted, it may be presumed not to have been productive of the best spirit. Thence probably arose prejudices against it when manufactured in this country, which retarded improvement in the art, until about the time of the revolution. Cut off from the usual supply of spirits, the price of those which remained, or were occasionally brought into our ports, was so high, as to place them beyond the reach of the great mass of the people. Instead then of following the bright and laudable example which was exhibited by the fair sex, in abstaining from the use of tea, the in-
Preliminary Observations.

genuity of man was stimulated to obtain a substitute for foreign spirits by the distillation of grain, and, such was the influence of patriotism, or rather, the desire of making money, that a single still put up in a shed, with a worm made of gun barrels, was all the apparatus at this time employed in many places in making whiskey. There were however, in some parts of the country well established grain distilleries upon what is called the old plan.

Although a number of patents had been granted by our government for improvements in distillation, it does not appear, that any important ones were made until the year 1794, when Col. Alexander Anderson obtained a patent for what he termed a steam still, upon which plan he had one boiler which worked two stills. Such were the prejudices in favour of the old way of distilling that very few distillers adopted the improvements of Col. Anderson until about the year 1801, when he obtained a patent for his "Condenser for heating wash or any other subject to be distilled." The advantages of this plan being great, it was getting into general use when Mr. Henry Witmer obtained a patent for an improvement upon colonel "Anderson's Condenser." This being more compact, has been gradually taking the place of the other, and is at present esteemed equal, if not superior, to any other in use in the United States.

A great number of patents have been obtained for improvements on stills and in distillation in the United
States, a list of which is published in this work, more for the information of the curious, than from any advantage to be derived from it. It is a matter of regret to the editor that he cannot distinguish by a particular description the more important, so as to render them more generally known; such however, is said to be the inefficiency of the patent laws for the security of patentees, that many are unwilling to make their discoveries public in an intelligible form, except where there is an immediate probability of selling a right, so that it is difficult to obtain correct information as to any improvement, for which a patent has been obtained but by a sight of the thing itself.

To this rapid and imperfect sketch of the history of distillation it may be only necessary at this time to add, that a still of 110 gallons with Witmer's improvement upon Anderson, can be run off with ease eight or nine times in twenty-four hours; whereas upon the old plan such a still can be run off but three times in the same number of hours.

The business of the grain distillery may be divided into two parts, first, the mashing and fermentation, by which the spirit is formed, though still united with other substances; secondly, distillation, by which the spirit is separated from those substances and obtained in a pure state. Though probably not of equal importance, each requires the particular attention of the distiller. It may seem surprising, that distilling, the less important of the two, is so well understood, and
that our knowledge of mashing and fermentation, is still so imperfect. An examination of the subject, however, will show the former to have been the natural result of the daily observations of distillers, but that the latter depended upon circumstances not within their control, or observation, and only to be completely effected by an accurate knowledge of the science of chemistry.

The making of a still is a mere mechanical operation, and the shape was formerly left entirely to the whim of the coppersmith who made it in a manner the most advantageous to himself; to wit, of narrow bottom and very deep; as however one differed from another, a little observation only was necessary to show the best. The improvements have been gradual, and we have now attained a point equally distant from the deep stills formerly in use, and the very shallow ones used in Scotland, and once recommended in this country, but which cannot be used advantageously with our thick wash.

However simple the operation of mashing may appear as a mere mixture of grain and water, the mode of doing it constitutes a great difference between distillers, who cannot be successful without a knowledge of the correct process.

The mere practical distiller does his daily work with the use of a certain quantity of water, to a certain quantity of meal, without a proper attention to variation in
Preliminary Observations.

the heat of the weather, so trifling, as not to be noticed but by reference to a thermometer (which he rarely possesses) but yet sufficient to affect the process, and consequently increase or diminish the product. Of the consequences, he is sensible, but ignorant of the cause, and will say in general terms, that he *hit it or missed it*, as the case may be. If such a man, by long practice, should fall into a method of working more profitably than that of his neighbours, his success must be in a great measure the effect of accident, and cannot be called an improvement in the art, because he is unable to make his knowledge useful to others, and even must often fail for want of a certain and invariable rule to direct his operations. But it will be observed that practice makes perfect, and how else, it may be asked, but by practice can you make improvements in any manufacture? It is true, a certain kind of practice is necessary, which in this case may be more properly termed a series of experiments, in conducting which however, the ingredients must be accurately weighed and measured, and the heat of the water and weather precisely ascertained. This, with particular attention to the fermentation, and the results being carefully recorded, will enable the experimenter, not only to make improvements, but to communicate them to the world.

The dependance of this art upon chemistry and the great advantage to be derived from a knowledge of this science are so well illustrated in the introduction to Henry’s “Epitome of Chemistry,” that a short extract from his work will not be deemed improper: “but the
acquirement of experience, in other words, a talent for the accurate observation of facts, and the habit of arranging facts in the best manner," says this writer, "may be greatly facilitated by the possession of scientific principles. Indeed, it is hardly possible for any one to frame rules for the practice of a chemical art, or to profit by the rules of others, who is unacquainted with the general doctrines of the science. For, in all rules, it is implied, that the promised effect will only take place, when circumstances are precisely the same, as in case under which the rule was formed. To insure the unerring uniformity of result, the substances employed in chemical processes, must be of uniform composition and excellence; or, when it is not possible to obtain them thus unvaried, the artist should be able to judge precisely of the defect or redundancy, that he may proportion his agents according to their qualities. Were chemical knowledge more generally possessed, we should hear less of failures and disappointments in chemical operations; and the artist would commence his proceedings, not, as at present, with distrust and uncertainty, but with a well grounded expectation of success.—In the present imperfect state of his knowledge, the artist is even unable fully to avail himself of those fortunate accidents, by which improvements sometimes occur in his processes; because to the eye of common observation, he may have acted agreeably to established rules, and have varied in circumstances, which he can neither perceive or appreciate. The man of science, in these instances, sees more deeply, and, by availing himself of a minute and accidental
difference, contributes at once to the promotion of his own interest, and to the advancement of his art.” But it is the union of theory with practice that is now recommended. And “When theoretical knowledge and practical skill are happily combined in the same person, the intellectual power of man appears in its full perfection, and fits him equally to conduct, with a masterly hand, the details of ordinary business, and to contend successfully with the untried difficulties of new and perplexing situations. In conducting the former, mere experience may be a sufficient guide; but experience and speculation must be combined to prepare us for the latter.” Stewart’s Elements of Philosophy of the Human Mind, chap. IV. sect. vii.

Distillation was for a long time confined to farmers, who only carried on the work during the winter season, and men of small capital, who being obliged to make quick sales, were more attentive to the quantity, than the quality of the spirit distilled. Under the old plan it was supposed that it could not be carried to a sufficient extent to render it an object to a man of large capital, the demand for grain spirit being trifling, owing to the large quantities of New England rum to which preference was given; neither was this business then thought respectable.

This was the state of the case at the time of the very ingenious improvement made by Mr. Alexander Anderson, which shed a new light on the subject, and shewed that it could be carried to any extent; the idea