

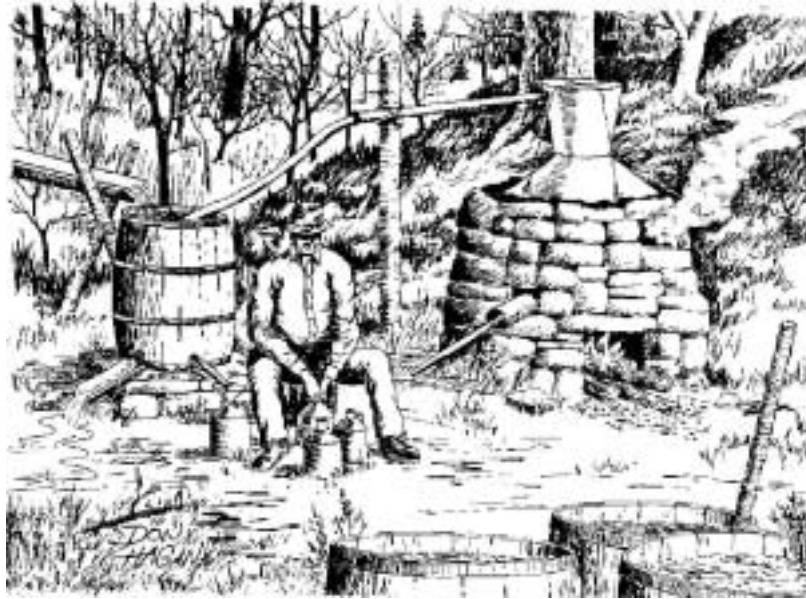
MAKING PURE CORN WHISKEY

*A Professional Guide for
Amateur- and Micro-Distillers*



by Ian Smiley BSc

FOREWORD



Making distilled spirits at home is as satisfying and rewarding as any hobby for those who live in countries where it is legal to do so. Homebrewers and winemakers would find it particularly interesting because it is a logical extension to their present hobbies. There are the same mashing and fermentation stages as in brewing, but instead of drinking the brew, it is subjected to a purification process. The process is distillation, a process as fascinating as mashing and fermentation are.

This is not a hobby for everyone, but no hobby is. In the first place you would only wish to become involved if you particularly liked the beverages it produces. Secondly, you should enjoy the challenge of constructing a scientific apparatus that involves a little plumbing and a little electrical work.

The satisfactions you receive will include the knowledge that you are restoring an art that was such a pervasive part of early Americana, and yet is all but completely lost on modern society. And finally, there will be the pleasure derived from making a beverage, pure corn whiskey, which is in every way as excellent and respectable a spirit as the finest whiskies and brandies well known to the connoisseurs of today.

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DEDICATION

I dedicate this book to my wife Eleanor, whose help and support were invaluable to its completion.

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INTRODUCTION

Numerous books have been written on homebrewing and home winemaking, and some have even been written on home distillation to produce pure ethanol for making: gin; vodka; and essence-based spirits, but very few have been written on distillation for making whiskey on the small scale required by hobbyists. This book has been written in an attempt to rectify this situation, and to accommodate the recent advent of micro-distilleries and distillery pubs that are reintroducing the art of making corn whiskey and other grain whiskies made famous by the early frontier folk.

This book should appeal to readers who have no experience with brewing or fermentation, as well as readers who do. A basic knowledge of the simplest forms of all-grain brewing is definitely an asset, but not a necessity. All the mashing, fermentation, and distillation principles are explained in sufficient detail for the novice to learn everything they need to know to produce the finest pure corn whiskey.

Also, this book gives a brief history of corn whiskey and how it was the pivotal industry that sustained the early settlers who opened up the American frontier. The history not only serves to remind the reader of corn whiskey, but of the rich culture, strong principles, and self reliance that are at the foundation of American society, of which corn whiskey was such an important part.

A chapter will be devoted to the question of legality since it is highly important for everyone to know exactly where they stand and to be comfortable with what they are doing. It is hoped that legislators and law enforcement agencies will read this chapter and, with its perspective, be prepared to be receptive when law reformers come knocking at their doors.

The temperatures in this text are quoted in °C followed by °F in brackets (e.g. 65.5°C (150°F)). Often the °C temperature will be expressed to one place of decimal. This is not done as a matter of precision but because most of the °C temperatures quoted are translated from °F, so in order to remain equivalent to the °F temperatures some will need to be expressed to one place of decimal.

Also, the temperatures quoted in the procedures are the optimum temperatures and every effort should be made to adhere to them. However, variations of a degree or two either way would not result in failure of a process, but rather a slower reaction, or the production of more unfermentable sugars and less fermentable ones, etc. In other words, a slightly less than optimum result, but otherwise perfectly workable.

Before getting down to the details of mashing, fermentation, and distillation a few general observations will be made in the next chapter on the subject of what pure corn whiskey is and of alcoholic beverages in general.

PURE CORN WHISKEY

All alcoholic beverages are made by fermenting a sugar solution (a.k.a. a fermentable substrate) with yeast, a process that converts the sugar ($C_6H_{12}O_6$) to ethanol (C_2H_5OH) and carbon dioxide (CO_2). Usually, one does not start with a pure sugar and water substrate, but with fruit juices for wine, mashed grains for whiskey, molasses for rum, and many others. Regardless of the sugar source the alcohol is the same.

In addition to the variations imposed by the source of sugar, the yeasts themselves and the conditions under which they are used also make their contribution to the character of the final product. This is because yeasts produce small quantities of other substances known as “congeners” in addition to the main product, ethanol. It is no wonder, therefore, that the flavour, colour, aroma, and general quality of fermented beverages vary so widely.

No alcoholic beverage (with the possible exception of vodka) consists simply of alcohol and water with no other constituent present. If it did, it would be colourless, odorless, and tasteless. The colour, aroma, and flavour of beers, wines, and spirits are due to the congeners present.

Beer and Wine

Alcoholic beverages can be divided into two broad categories according to whether or not there is a distillation stage following fermentation. Beer and wine fall into the non-distilled category whereas whiskey, rum, brandy, gin, etc. have all been distilled. The latter are often referred to as “spirits” or “hard liquor”.

Wine and beer are produced by fermenting their respective substrates (i.e. fruit juices for wine, grain mash for beer) with yeast, then clearing, aging, and packaging the fermented substrate as the finished wine or beer.

Distillation – what is it?

Distillation is simply the heating of a liquid to the boiling point followed by condensing the vapours on a cold surface back into a liquid. To remove the hardness from water it can be boiled in a kettle and the steam that is produced condensed against a cold surface to give pure water free of minerals and dissolved ions. The calcium and magnesium salts that constitute the hardness remain behind in the kettle. Nature carries out Her own distillation in the form of rain. The sun evaporates water from the surface of lakes and oceans leaving salt and impurities behind. Clouds form, condense, and a close approximation to pure water falls to Earth.

So distillation is not a mysterious subject, nor is it threatening. It is as commonplace as a rain-shower or a teakettle boiling and causing condensation on a nearby window.

As you can imagine, the actual practice of distillation as a controlled procedure is a little more complicated than this and later chapters will provide an exact description of how to build the equipment required and the procedures involved in operating it.

There are actually two different types of still, the choice of which to use depending on the level of purity required in the product. Traditionally, whiskey is made in one type, a pot still. It's rather simple in design because only a moderate level of purity is required. Gin and vodka production on the other hand requires a more sophisticated type of still called a fractionating still because a very high level of purity is desired. A detailed description of the two types will be provided in the chapter on Distillation because it is quite important for the reader to appreciate the differences.

However, in this text the high-separation type of still is chosen over the traditional pot still for making whiskey because of the exacting control it affords over the level of separation. High-separation stills can be operated in a manner whereby they give much less than maximum separation, which is exactly how they are very efficiently used to make whiskey. This is covered in detail in the Distillation chapter.

An advantage that falls out of this is that the high-separation still can also be used to produce pure ethanol for making gin and vodka. For a well-written text on how to do this read, John Stone *Making Gin and Vodka*, www.gin-vodka.com. The high-separation still design described in this text can be used to make gin and vodka exactly as described in that book.

Simple Distillation

As mentioned before, the fermentation of sugars derived from grapes, barley, corn, potatoes, molasses, milk or any other source produces a wide variety of chemicals, the major one being ethyl alcohol (ethanol). Minor constituents will be propyl, butyl, and amyl alcohols. These minor constituents are collectively called "fusel alcohols" (in the past they were called "fusel oils", but they're not oils they're higher alcohols). They are responsible for the unpleasant side effects of drinking such as headaches and hangovers.

When such a mixture is distilled, the first vapours to come over will be rich in the more volatile components such as methanol and acetone. This first fraction is referred to as the "foreshots". There is no sharp separation so, long before the foreshots are completely exhausted, the ethanol begins to appear but is collected into a "heads" phase to buffer the transition between the foreshots and the beverage alcohol. Later, when the ethanol phase is tapering off, the "tails" begin to emerge. These are the least volatile components of the mixture. At first, come the less volatile esters, and then the propyl, butyl, and amyl alcohols known as fusel alcohols. Thus, in a simple distillation using a pot still there are four main fractions: the foreshots; the heads; the middle run; and the tails. The middle run is mainly ethanol with trace amounts of heads and tails, the amount of each depending on where the cut-offs are made.

Fractional Distillation

As mentioned above, simple distillation of a mixture of liquids does not produce a clear-cut separation of the various components. If such a separation is required it is necessary to resort to the use of a fractionating column. The theory and practice of this will be described in detail in a later chapter but a few words will be said about it here. The procedure involves the use of a vertical column attached to the top of the boiler. The column is packed with inert particles such as short lengths of glass tubing known as Rashig rings, ceramic “saddles”, wire gauze, or in fact any non-reactive material with a large surface area.

The vapours from the boiling liquid pass up the column, are condensed to a liquid at the top, and run back down through the packing in the column. This counter-current flow of vapour up and liquid down has the effect of producing a series of mini distillations at the surface of each piece of glass or metal in the column. It is equivalent to carrying out a simple distillation in a pot still and then redistilling the product over and over again. The final result is an almost perfect separation of the mixture into its various components, allowing each one to be drawn off in sequence from the top of the column in the order of its boiling point. Thus, the most highly volatile components emerge first while the least volatile components emerge last.

Whiskey, Brandy, Rum, etc.

The distillation of these products is done using a pot still or a special-purpose fractionating still, and this effects only a crude separation of the fermented substrate into foreshots, heads, middle-run, and tails. The skill in making a palatable whiskey consists of: mashing the grains into fermentable sugars; fermenting the mash under conditions that give rise to a certain mixture of chemicals; and, distilling the mixture and discarding a portion of the heads and a portion of the tails.

The middle fraction, consisting chiefly of ethanol, will also contain the retained portion of heads and tails (i.e. the congeners). It is these congeners that impart the characteristic flavour and aroma. At this point there is no colour. Colour is imparted by storing the spirits in oak barrels for a number of years, a process that also modifies the chemical make-up of the whiskey to give unique characteristics of a particular distiller.

Pure Corn Whiskey

Corn whiskey is the whiskey produced by mashing corn (i.e. using malt enzymes to convert its starches to sugars), fermenting the corn mash with yeast, and distilling the fermented mash. The mashed corn produces a particular profile of congeners that characterizes the flavour of corn whiskey.

Historically, the distillers of corn whiskey took pride in the tradition of producing whiskey and made their whiskey entirely from grain and malt. But, with the advent of the prohibition (U.S. 1921-1933) there was a surge of new distillers who had no particular attachment to whiskey making as an art or historical tradition. These new prohibition distillers became

notorious for stretching their corn mash with sugar. Some recipes were less than 10% corn, the rest being sugar and water. While using sugar to produce a “thin mash” will produce as much alcohol and with much less effort, the flavour of the finished whiskey is very harsh, thin, and insipid. This prohibition type of corn-whiskey production became so prevalent that whiskey made from pure grain (i.e. no sugar) became a rare delicacy, and was attributed the name “pure corn whiskey”. Unfortunately, when the prohibition ended these sugar recipes persisted into the subsequent generations of corn-whiskey distilling so the traditional pure corn whiskey remained a scarce commodity.

Note: Commercial whiskey producers are bound by law to use all grain in their mashes, and no spirit made with sugar can be called “whiskey”.

For a more detailed account of the history of corn whiskey during the prohibition read, Joseph E. Dabney, *Mountain Spirits*, Asheville NC, Bright Mountain Books.

THE QUESTION OF LEGALITY

This chapter is written specifically for readers who live in countries where it is presently illegal for amateurs to produce their own spirits by distillation. The rest can happily jump ahead to the chapters dealing with corn whiskey and how to make it.

The conflict between governments and “moonshiners” has been going on for centuries and the reasons are not hard to find. From the government point of view, alcohol in one form or another is in such demand that it can be heavily taxed without fear of killing the goose that lays the golden eggs. From the moonshiners’ or smugglers’ point of view, the spread between the cost of manufacture of alcohol and the cost to the consumer after tax is so great that the incentive to circumvent the law is considerable.

The dollar figures involved are informative. When alcohol is made on a large scale, as it is for the fuel-alcohol industry (gasohol) its cost of manufacture is about 25 cents per litre. This is for 100% alcohol. If diluted to 40%, as in whiskey, a litre would contain about 10 cents worth of alcohol. The retail price of a litre of whiskey will lie somewhere between \$10.00 and \$20.00 depending on the country and the level of taxation (this price range does not include specialty whiskeys that can run in excess of \$50.00 per 750 ml bottle). Some of the difference of course, is due to the scale of manufacture, packaging, marketing, aging, transportation, profit margin, etc., but even allowing for these factors the tax burden on the consumer is extremely high. Is it any wonder that an unscrupulous operator will attempt to sell his alcohol direct to the consumer, perhaps at half the normal retail price, which would still give him a very handsome profit? Or, is it any wonder that the authorities crack down hard on anyone attempting to interfere with their huge source of revenue?

The battle between illicit distillers (moonshiners) or illicit importers (smugglers) and the authorities has now become the stuff of legends. Consider the number of stories written or movies made about rumrunners and road hustlers! Or, about the battles between gangsters and police during the prohibition in the United States! Unfortunately, such stories have been taken too much to heart by the general public so that the whole idea of home distillation is now perceived as being inherently more wicked than the gentle art of beer or wine making.

It is understandable, and fully supported by the author, that a government would wish to put a stop to smuggling and moonshining for illicit commercial purposes, that is to say in order to sell the product and avoid the payment of taxes. But why would there be a complete ban on distillation by amateurs on a small scale and for their own use? Beer and wine making by amateurs is perfectly legal on the small scale for personal consumption, and total government tax revenues on beer and wine are the same or more than for distilled spirits.

Some people have suggested that improper distillation can produce poisons that cause blindness, but this is a myth. Blindness, in this context, is caused by drinking methyl alcohol (wood alcohol). People who went blind from drinking illicit liquor did so by drinking concoctions that were heavily adulterated with store-bought wood alcohol. There’s a tendency for people to think that any mention of illicit liquor is referring to a product of illicit

distillation. Many such illicit liquors are concocted by mixing ingredients from someone's garage or basement and are not produced by fermentation or distillation.

Although a trace amount of methyl alcohol is produced by fermentation, it does not occur at a concentration capable of poisoning an individual. Such trace amounts of methyl alcohol are removed from spirits by distillation, but remain in undistilled beverages like beer and wine. The truth is, there is very very little methyl alcohol produced by fermentation, so it poses no threat to consumers of beer or wine where it remains in solution, or to consumers of distilled spirits where it has been removed. And, in the event of poor distillation procedures where it may not be completely removed, it still poses no more threat than it does in beer or wine where it's not removed at all.

In attempting to find the reason for governments to ban home distillation, the first thing that comes to mind is the potential loss of revenue. After all, if everyone started making his or her own spirits at home the loss of revenue could be considerable. But this cannot be the real reason because the home production of beer and wine for one's own use is legal, and both are taxable when sold commercially. So, evidently the authorities are not concerned about the loss of revenue from home beer and wine making. And further thought, makes it very unlikely that amateur production of spirits would have any appreciable effect on commercial sales. For one thing, the process is considerably more technical and equipment intensive than beer or winemaking, so it's very unlikely the practice would become any more widespread than beer and wine making. So, if distillation were legalized for amateurs, it would probably become nothing more than an interesting hobby like making beer or wine, and offer little competition to commercial spirit production.

So, why is the home production of distilled alcoholic beverages illegal, where the home production of non-distilled alcoholic beverages is not? The drug involved is ethyl alcohol, an acknowledged mood-modifier, but ethyl alcohol itself is not singled out by governments as the bad actor. The alcohol in beer, wine, and whiskey are identical, and imbibed in similar quantities will have identical effects in terms of mood modification. No, apparently distillation per se is perceived as evil, to the point where even owning the equipment is illegal.

A few attempts have been made to ascertain the reasons behind the official attitude to distillation but nothing has yielded a logical explanation. Perhaps, the laws regarding home distillation are simply outmoded and are nothing more than a residual from a previous social paradigm, and since the appeal of distillation up until now has been confined to a comparatively small and esoteric group of people, there hasn't been a sufficient protest from the public to challenge the laws.

The above discussion has been argued at some length because it is important for the reader to feel comfortable with the moral aspects of distillation, and not feel obliged to be furtive about it. Also, it's important to illustrate the difficulties that would be encountered in any attempt to change the law. There would be no point in approaching government officials who in many cases are sympathetic to the arguments but are powerless to do anything about it. It

would be necessary to first air the subject in the news media to get the public (the voters) up to speed and then work through politicians.

To paraphrase Thomas Jefferson in 1800, "...the infernal whiskey excise is hostile to the genius of a free people". Jefferson, as President of the time, repealed the whiskey excise on June 30, 1802 as one of his early objectives.

THE HISTORY OF CORN WHISKEY

This chapter, which chronicles the evolution of corn whiskey, is summarized from Joseph E. Dabney's authoritative book on the Appalachian moonshine culture, *Mountain Spirits*¹.

Mountain Spirits is highly recommended reading if you are interested in a more detailed history of corn whiskey.

To appreciate the roots of American whiskey distilling, which was born in the Appalachian frontier in the 1700s and 1800s, we must trace back to our Scottish, Irish, French, German, and English ancestors who brought the distilling art to North America over two centuries ago.

The first distillers in Western Civilization were probably the famous old Arabian and Egyptian alchemists who were trying to discover the elixir of life, which was supposed to impart long (or eternal) life, health, and youth. The first alembics (distilling pots) were built in Egypt, and the term "alcohol" is derived from the Arabian term "al-kohl", which is described as a material produced by refinement. One of the popular heroes of the subsequent distillation saga was an Arabian alchemist, Abou-Moussah-Djafar-Al-Sofi (nicknamed Geber), who lived around 700 AD and who put the distillation principles to paper. Ironically, the Arabs were prohibited by their religion from drinking alcohol.

When distillation was first discovered, it was considered by the Europeans to have been a revelation from God. Indeed, for many years after reaching Italy, Spain, and the heart of Europe, the secret of distilling was hoarded by the monks in the monasteries for those who were closest to God.

The result of distillation was dubbed "aqua-vitae" (water of life), and was revered as a highly prized wonder drug dispensed by the monks, alchemists, and the apothecarists. Then from aqua-vitae we go to whiskey. The popular beliefs are that the distilling secret went from the Arabians to the Spaniards (possibly by the invading Moors in the 8th century) to Ireland where whiskey was invented. Another theory is that St. Patrick brought the secret back to Ireland from Egypt around 400 AD where he learned it from the famed alchemists.

But then, St. Pat wasn't Irish. He was a Scot Lowlander born at Dumbarton near the Firth of Clyde, where he lived until he was kidnapped by Irish Celts at age 16 and spirited away to Northern Ireland, which in a way would give the credit for whiskey to the Scots.

The question of who invented whiskey, the Scots or the Irish is disputed to this day and will probably never be settled. However, there is no doubt that Ireland and Scotland were both in the vanguard of the distilling saga and that it was in those countries that the name "whiskey" came into being. The Gaels of the old Ireland called it "usquebaugh", Gaelic for aqua-vitae.

¹ *Mountain Spirits*, published originally by Scribner and now in paperback, along with its companion volume, *More Mountain Spirits*, both published by Bright Mountain Books, Asheville, N.C.

From this it became “uisge-betha”, “uisge”, and then simple “whiskey”. The ancient Irish called their early whiskey “poteen” (pronounced put-cheen), which means, small pot.

In nearby Scotland, whiskey was highly admired and extensively manufactured as early as the late 1400s. While grain spirits were known in Scotland’s Highlands and its Lowlands to the west as “usquebaugh”, the early Scot distillers, just as the Irish, had their more familiar colloquialism, “poit du”, meaning black pot.

The Scots traditionally have spelled “whisky” without an “e”, right to this day. So do the Canadians. The Irish and Americans spell it with an “e”. Just why this is so, nobody seems to know.

This leads us into considering that hardy race of people, the “Scotch-Irish” of Ulster, or “Ulster Presbyterians”. The Scotch-Irish brought corn whiskey-making to America. More than anyone else, they popularized it, despite the mighty inroads of “rumbullion” (rum).

King James I, the first joint king of the two countries to come from Scotland, planted Scottish Protestants in the province of Ulster (the ten counties of the Catholic Northern Ireland) beginning in 1610. The intent, in part, was to make the “wild Irish” more peaceful. Just before James’ predecessor, Queen Elizabeth I, had died, her British troops had finally brought the rebellious Irish in Ulster to heel after having literally burned and starved them into submission. At that point, Ulster’s two clan chieftains, the Earl of Tyrone (Hugh O’Neill) and the Earl of Fyrconnel (Red Hugh O’Donnell), who had led the bloody rebellion with the backing of the Pope and with the help of troops from Spain, fled to France. With their departure, almost three million acres (1.2 million hectares) of land reverted to the British crown.

With the flight of the earls, King James gave his support to the expanded plantation idea, hoping “that the sea-coasts of Ulster might be possessed by Scots, who would be traders proper for his Majesty’s future advantage.” Doubtless he also envisioned the opportunity to spread the Protestant faith to Ulster. The Scottish lairds who received big land grants from James drew thousands of willing settlers from the ranks of the poor across the Lowlands, who leapt at the opportunity presented by the Ulster land. The Lowlanders could get on a 31-year “feu”, virtually a lifetime lease. Under general circumstances that were far better than those available under the caste system in Scotland. Further, social order did not operate so rigidly in Ulster. Immigrants, however lowly in station, considered themselves “royal colonists”. They could live where they pleased, could own a gun, could distill and drink their corn whiskey without interference (that is, before it was subjected to an excise), and perhaps most important of all, they could worship as and where they pleased, which meant, of course, in the Presbyterian “kirk”.

By 1640, there were 40,000 Scots in Ulster, drawn mainly by economic opportunities. Additional thousands came in succeeding years because of religious freedom.

Now, it was during the Ulster colonization that the English Parliament adopted excise laws on spirits, mainly to raise money to finance the suppression of the Civil War which broke out

in 1642. With the advent of this excise, smuggling of spirits in Britain became rampant. In addition to what they already knew, the Scotch-Irish learned everything possible of the distilling art from the renowned Irish poteen makers.

During their years in Ulster, the Scots learned to drain the marshy bogs, converting former wasteland into fertile farms. The city of Belfast became a monument to Scot enterprise. The deep-water port was literally carved out of the bog, becoming Northern Ireland's centre of export and import. The Scots introduced the potato, and, with the help of newly arrived Huguenot Protestants from France, who were great industrial technologists, they developed booming woolen and linen manufacturing industries.

But all of these industries were soon in dire straits, because the English industrial and agricultural interests could not stand the competition. Parliament was persuaded to enact laws that in effect eliminated the exporting of goods and livestock from Ulster.

Of all the harsh penalties to hit the Ulstermen, "rack-renting" was the worst. The Scottish proprietors, who had benefited from the great improvements made by their tenants, "screwed up" and "racked" the rents to double and triple their previous amounts. The Scotch-Irish farmers, feeling a sense of injury, refused to accept the outrageous rack-rent. The new leases therefore went to native Irishmen. The intransigent and dispossessed farmer had an alternative of leaving the country, to either go to Scotland, or to cross to America.

As a result, America beckoned. After only five generations in Ulster, the Scotch-Irish were ready to move on. And move they did, bringing with them to this country an almost pathological thirst to own land, a strong Protestant faith, and a great tradition of whiskey making and free trading.

The first big wave of Scotch-Irish immigration began about 1717 when Lord Donegal led the way in rack-renting his Ulster tenants in County Antrim, which was followed by four other waves of immigration, and continued until 1776. It is estimated that a quarter million Scotch-Irish poured into America during the five heavy waves of the great migration. While they landed at many ports from Boston to Charleston, most of them came into Philadelphia, New Castle, and Chester, flocking into Pennsylvania and its "three lower counties" which were to become Delaware.

As pioneers, the Scotch-Irish proved their mettle. They were a new kind of settler, the real pioneer, who brought strong convictions to America, including a love of whiskey and a love of liberty.

To say that the drinking and the making of liquor came naturally with the American frontier would be an understatement. To the colonist, suspicious if not deathly afraid of the "poisonous" water of the New World and faced with the reality of the rugged frontier, strong drinks were a dire necessity. From the earliest days at Jamestown, the colonists up and down the seaboard looked on alcoholic beverages as essential for survival.

It was only natural, therefore, that brewing and distilling would command an early and important role in the New World. The Virginia Assembly in 1623 called on all newcomers to bring in malt to brew liquor to tide them over until their constitutions became accustomed to Virginia Water.

By 1625 two brew houses had begun operation in Virginia. Several years earlier, an Episcopalian missionary, Captain George Thorpe, had learned how to convert Indian maize into liquor and had set up a crude distillery at Berkeley Plantation on the banks of the James River. To a friend in London he wrote that he had found a way “to make so good a drink of Indian corn as I protest I have diverse times refused to drink good strong English beer and chosen to drink that.”

While Indian corn (i.e. the everyday North American food-grade corn) was destined to become the base for the true blue American drink, the first spirits made and consumed in volume in America came from the fruits that grew wild and from the lush orchards that soon proliferated under the hands of the early day Johnny Appleseeds.

In the years leading up to the migration of the Scotch-Irish to the American frontier in the 1700s, the early Americans began making wine from pumpkins, grapes, currants, elderberries, and parsnips. Indeed, it appeared there was no fruit or grain that was not “grist for the mill” to satisfy the colonists’ desire for fermented and/or distilled spirits. They were distilling ardent spirits from blackberries, persimmons, plums, whortleberries, sassafras bark, birch barks, corn stalks, hickory nuts, pumpkins, the pawpaw, turnips, carrots, potatoes, and small grains.

Towards the late 1600s, apple cider, applejack, and apple brandy became the staple alcoholic beverages of New England and south along the eastern seaboard. In every colony, breweries and distilleries sprang up, most of them on individual farms. The stillhouse, usually a windowless log cabin, became an important appurtenance on many plantations in the South and on the farmsteads of Pennsylvania, Maryland, Delaware, New Amsterdam, and New England.

One basic role of spirits in the early days of the colonies was as medicine. Settlers drank spirits to prevent malaria and to speed the recovery of anyone taken ill. Whiskey was to the pioneer what tranquilizers, stimulants, disinfectants, vitamins, rubbing alcohol, and anesthetics are to us today.

During the years leading up to the Revolutionary War, rum became *the* distilled drink of Colonial America. Rum was consumed in many forms, from straight to mixed with cider or beer to mixes with sugar, water, and nutmeg. Some rum drinkers even plunged red-hot loggerheads into their tankards of “flip”, a rum, beer, and sugar combination. By the early 1700s, the colonists were consuming twelve million gallons of rum per year.

Despite its ascendancy, rum began losing ground to the increasingly popular corn and rye whiskey coming from the American frontier. Throughout the colonies, the pioneers had been perfecting the distilling of corn.

It is about this point in time that we rejoin our friends, the Scotch-Irish from Ulster.

Down the Great Valley of Pennsylvania and Virginia, through the 1730s to the 1770s, rolled one of the greatest movements of people in American history, people who were destined to change the drinking habits of the North American continent, and more important, play an important role in opening up the western frontier and waging the War of Independence.

The majority of the Scotch-Irish immigrants headed to the wide open Southwest, the great American frontier of Virginia, the Carolinas, Tennessee, and Georgia. Between 1720 and 1775, some two to three hundred thousand Ulstermen got off ships at the Delaware River ports of Chester, New Castle, and Philadelphia, and most of them swung down the verdant Great Valley of Pennsylvania, continuing into the Valley of Virginia, today's Shenandoah Valley.

By the time of the Declaration of Independence, Virginia Valley was well populated, and North Carolina's backcountry had sixty thousand settlers. Anson, Orange, and Rowan Counties, North Carolina, which in 1746 had less than a hundred fighting men, had blossomed to at least three thousand by 1750. North Carolina Governor Tyron reported that in 1765 alone, more than a thousand immigrant wagons passed through Salisbury. Neighbouring South Carolina had eighty-three thousand people on its backwaters.

Wherever the Ulsterman went, he took his whiskey. Pennsylvania's Dr. Benjamin Rush put down some disparaging descriptions of the fellow Presbyterians he had observed on a tour of the frontier. He blamed what he felt were the Ulsterman's indolent habits on the ever-present stillhouses. Rush blamed whiskey-making for all of the Ulsterman's troubles, including his quarreling ways, his unkempt farms, and stump-filled fields. He reported that the Scotch-Irish loves spirituous liquors, and eats, drinks, and sleeps in dirt and rags in his little cabin.

What Rush did not acknowledge was that whiskey-making had a very practical purpose for the Scotch-Irish. A settler's first job on arriving in the wilderness was to clear enough land for his cabin and then get in a crop, usually corn, which was easy to produce with only a hoe. Food wasn't a problem because the forests abounded with wild game of all sorts and the rivers were full of fish. What the settler needed was a cash crop to enable him to pay his taxes and thus retain his precious property, usually a few hundred acres. This was where his whiskey-distilling became an extremely important adjunct to his farming. With their whiskey, they had "legal tender" to pay their taxes and obtain the few necessities that they could not make for themselves, such as salt, nails, and cloth. Many Scotch-Irish had brought along their copper worms and small pot stills slung under their ark-like wagons, or on their packhorses. Some, however, brought only a knowledge of how to build a rig, and some, not even that. They quickly learned from one of their neighbours.

The fact that the settler was locked within the fastness of great mountain chains was another reason why it was almost inevitable that he would turn to whiskey-distilling. For although they could produce from forty to sixty bushels of corn per acre (and sometimes more on rich bottom land), it was virtually impossible for them to get ground cornmeal or flour to markets

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