Modern Moonshine Techniques

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American Distilling Institute

MODERN MOONSHINE TECHNIQUES

34 illustrations
4 flow charts

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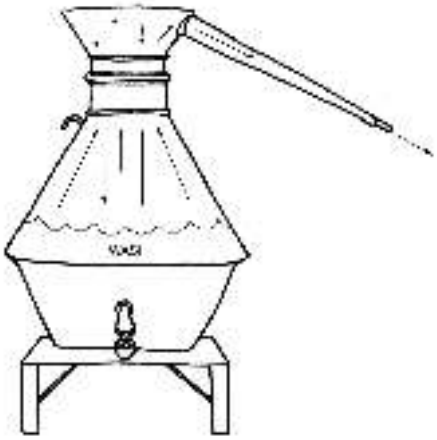


Distillation

Alcoholic distillation is the process of separating ethanol from a fermented wash by evaporatio The vapors are driven off by heat and then collected, condensed and recovered as a liquid. This liqu may also be redistilled to raise its alcohol concentration.

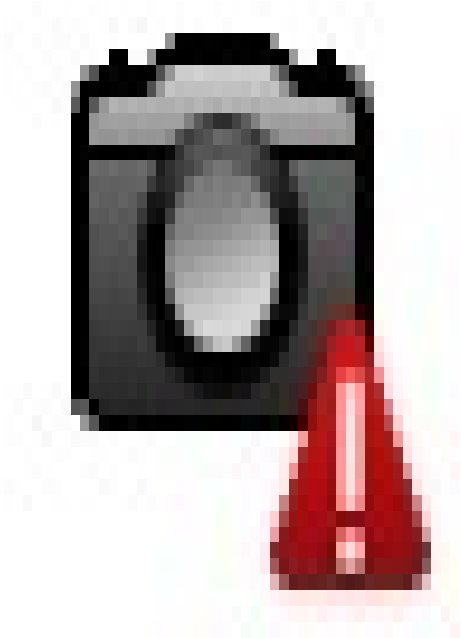


Table of Contents

Distilling Glossary

ABV Alcohol by Volume, often expressed as a percentage (e.g 60% abv).

Aldehyde A volatile impurity found in the foreshots.

BAM: Beverage Alcohol Manual

Barrel Whiskey (wooden) 53 US gallons, 44 Imperial gallons, or 200.6 liters.

Beer Barrel (Stainless Steel) Bbl. 31 gallons.

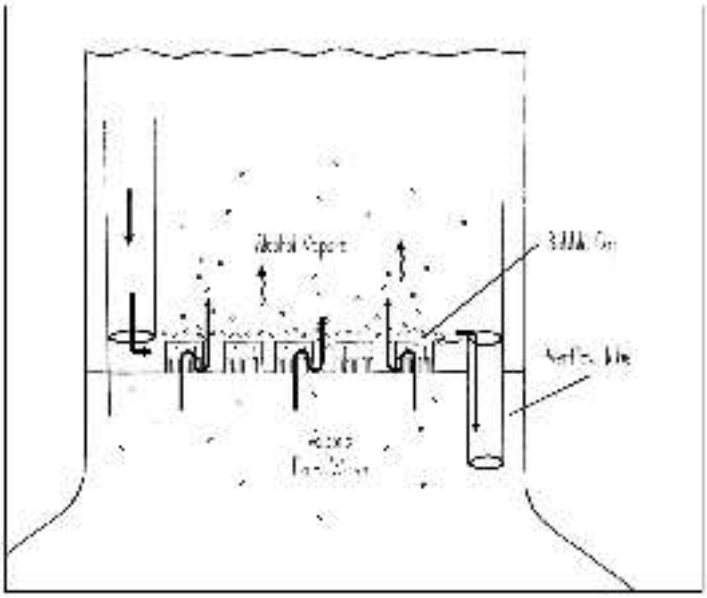
Beer Stripping A crude primary distillation of fermented wash. See “stripping.”

Bubble Cups sit over vapor pipes. When rising alcohol vapors hits the cup it is forced down to the rim. At this point evaporation occurs, enriching the vapors.

CFR A U.S. government codification of administrative rules, known as the Code of Federal Regulations. Title 27 cover regulations for alcohol beverages.

Charge The volume of alcoholic beverage wash, or low wines going to the still.

Condenser An apparatus, often a “tube in shell,” in which hot vapors are cooled and con- densed into liquids.



Congeners Impurities. These minor chemicals give liquor (spirits) distinctive character and flavors They are found in both heads and tails. May be considered desireable or undesireable depending on quantity and type.

Cuts The process of separating different types of alcohol through the foreshots, heads, hearts and tails cuts made during the final distillation run.

Density Meter Portable device that measures specific gravity, thus allowing the distiller to make precise cuts.

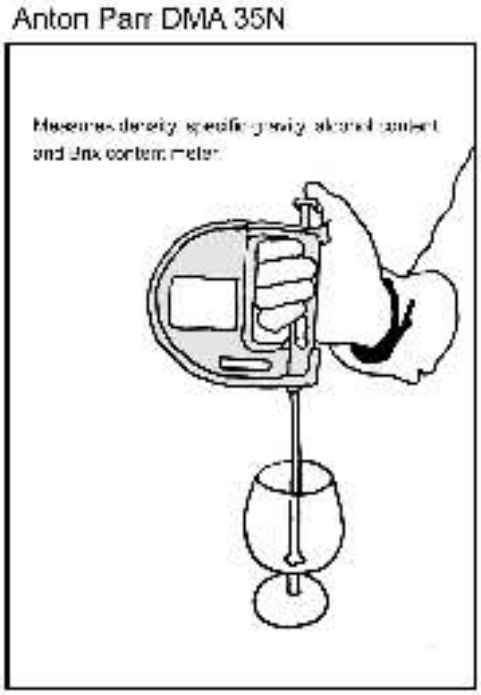
Dephlegmator A small pre-condenser that sends distillate back to the pot. This process increases the reflux and the purity of the spirit.

Dextrose Basic sugar also known as corn sugar. An optional base for distilling moonshine.

DME Dried malt extract. When dissolved in water and fermented, can be distilled.

DSP A federally licensed distillery, known as a Distilled Spirits Plant.

Esters Fermented byproducts made by yeast action that contributes fruity characteristics, aroma, an flavor to the wash.



Enzymes Proteins that assist conversion of starches into sugars that will ferment.

False Bottom In a mash tun the false bottom is a slotted copper pipe, the “slots” of which allow wash to drain while holding back the grain.

Final gravity the density of the was after fermentation. Knowing the original and final gravity of a wash allows you to determine the percentage of alcohol of the wash.

Flocculation The clumping and settling of yeast out of solution, forming a cake-like substance in the bottom of the tank or tub.

Foreshots A small amount of low boiling distillate containing acetone, methanol, and aldehyde volatiles. Catch and discard.

Fusel Oil A bitter oil found in tails. A liquid composed of amy and burly alcohols.

Heads Spirits from the beginning of the run that contain a high percentage of low boiling alcohols such as aldehydes.

Infrared Thermometer Gun Instant reading thermometer device.

Low Wines The spirits collected from the first distillation.

Mash A mixture of ground malted grains and hot water.

Malt Sprouted dried grains. Malted grains contain enzymes that convert starches into fermentable sugars.

Mash Tun A double-jacketed tank with a false bottom in which hot water and grains are mixed.

NGS Neutral Grain Spirits (190+ proof alcohol). Most often produced from corn. Used by distilling companies around the world for blending to produce vodka, gin and whiskey. It is the workhorse of th commerical distillation industry.

Original gravity The density of the wash before fermentation.

Packing Copper mesh or ½” copper T’s used in a still’s column to increase the surface area and thu

the reflux and quality of the alcohol.

Parrot A device resembling a stylized bird that attaches to the still and floats the hydrometer.

Proof A measurement of alcohol's strength: In the US, proof is twice alcohol content at 60°F. (i.e., 120 proof is 60% abv).

Pitch The process of adding yeast to the wash.

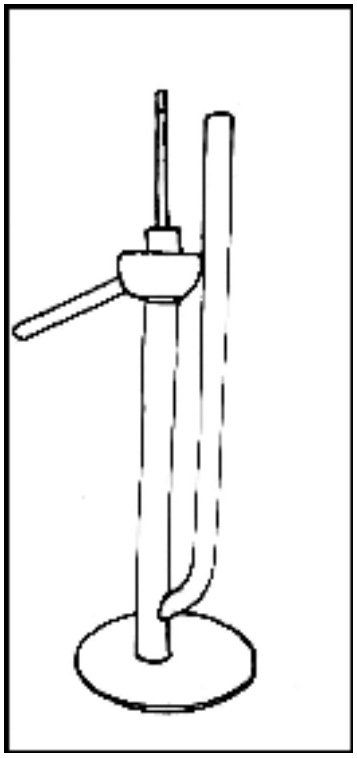
Plates: (or tray) Located horizontally at intervals in a column, often contain bubble caps that enrich the reflux

Reflux Formed when vapors condense and re-vaporize in the column of a still.

Slop, Hot Hot, stinky, spent corn mash from the still.

Sparging At end of mashing, a process in which hot water is sprayed on, or run through, the grain bed to extract additional sweet barley water.

Spirit Still A still designed to do the final distillation, producing finished whiskey.



Sweet Spot The head temperature between 174ºF and 180ºF. This range produces a sweet tasting spirit and is considered the heart of the distillation run.

Stripping The process of running low abv wash through a still with no head or tail cuts to remove alcohol that will be re-distilled.

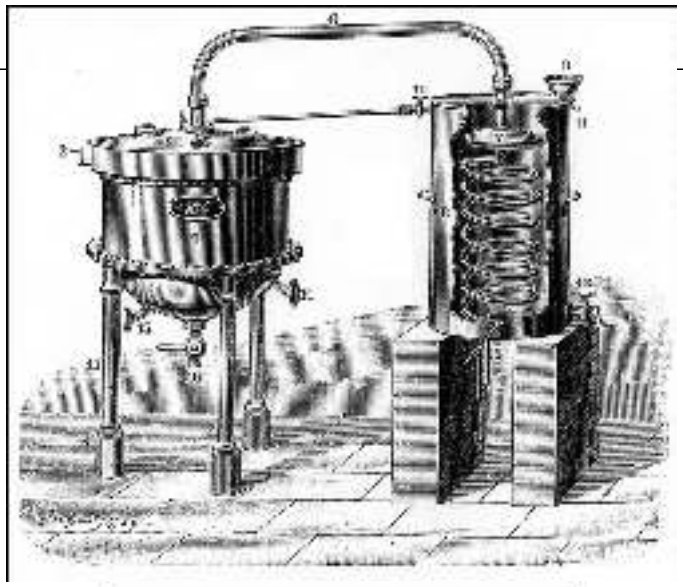
TTB Alcohol and Tobacco Tax and Trade Bureau, formerly BATF.

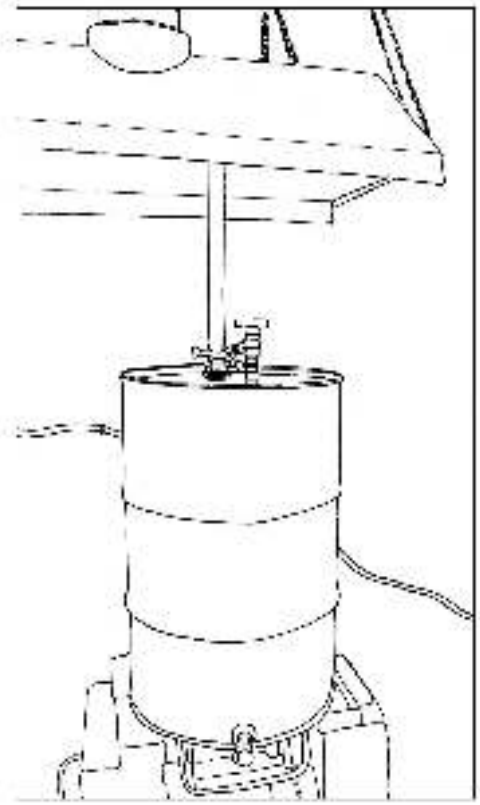
Tails A distillate containing a high percentage of fusel oil and little alcohol.

Tub A 55-gallon plastic or stainless steel barrel used as a fermentation vessel.

Wash Fermented substrate containing alcohol.

Water Temperature Controller Device that allows cool water to flow through a copper coil, controlling excess heat in a fermentation.





Introduction

Whiskey is simply distilled beer

To learn how to make whiskey you first have to brew beer. Go to amazon.com and search “brewing and you will find numerous books on this subject. The easy way, however, is to take a home brewin class offered at most home brew shops. These shops also sell brewing kits, malt extracts, dried ma extract (DME), malted barley, wheat, rye, and flaked corn.

The next generation of distillers is going to come from the craft brewing industry since they kno the complex flavors found in barley make great beer and will make great whiskey.

Modern Moonshine Techniques has three sections: First is how to use sugar to distill “moonshine.” Second, how to build an inexpensive corn cooker and make corn whiskey. Finally, ar most importantly, this book, with text and illustrations, shows how to build a mash tun to create grain whiskey wash. And, then instructions to distill that wash into whiskey.

Finally, get your DSP from the TTB, your State (ABC) license and open an “artisan” distillery. The distill the grain whiskey here and put it into a barrel. It will, in a matter of months, pick up flavor ar color as it matures. And, if you leave your whiskey in a charred oak barrel for two years, it become “straight Bourbon whiskey.” Craft distilleries often drop the word “straight” and age their whiskey fo less than one year.

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Chapter 1

Moonshine – The Legend and the Law

“Where the English went, they built a house; where the Germans went, they built a barn; where the Scots-Irish went, they built a whiskey still.”

— An old Appalachian proverb

With the rise of artisan distillation in the US, most producers have decided to focus on typic spirits such as vodka, gin and rum, or more specialized spirits such as eau de vie or malt whiskey. few other distillers, however, are choosing to trade on a bit of legendary history and produc moonshine.

The term moonshine was first used in Britain where it referred to employment or other activiti that took place late at night. In the US, however, it has always been associated with illegal liquor th has been known under colloquial names such as white lightning, popskull, corn liquor, rotgu panther’s breath, or, more simply, shine.

The practice of moonshining is inextricably tied to US history in numerous ways. After th American Revolution the United States was strapped financially due to fighting a long war. In a attempt to address this problem, a federal tax was levied on spirits. This did not sit well with th newly liberated people who had just concluded a war to eliminate British taxation. This gave rise the practice of making distilled spirits clandestinely to circumvent taxation.

Early on, this practice was a method of survival, not extra profit. If farmers experienced a bad cro year, they could use their corn for making whiskey. Because this was a practice of subsistence, th payment of tax on this product might mean they would be unable to feed their families. Thus bega the contentious relationship with federal agents who often were attacked when they tried to collect th tax.

In 1794, things finally came to a head with the Whiskey Rebellion. A group of several hundre managed to overtake the city of Pittsburgh, Pennsylvania. In reaction, George Washington dispatche 13,000 militiamen to take back the city and jail the leaders. This incident served as the first major te of authority for the fledgling federal government.

The battles between the US Congress and moonshiners continued to rage on. In the 1860s th government attempted to collect more excise taxes to fund the Civil War. In response, a number o elements, including Ku Klux Klansmen, joined the moonshiners in an attempt to fight back. The ne alliances led to more brutality and incidents of intimidation of local people who might reveal still and revenue of agents and their families.

The Temperance movement then added these happenings to their arsenal on the march towar prohibition.The states began to prohibit the sales of alcohol in the early 1900s, and then comple national prohibition was established in 1920. Prohibition’s enactment provided the best possib scenario for moonshiners. With no legal means of obtaining alcohol, demand grew exponentially wi which the moonshiners could not keep up. In response, the producers began using cheaper ingredien such as sugar and even watering down their whiskey.

A large network of distribution was established with the assistance of organized crime. To suppl the illegal spirits to this network, young men in rural areas close to the still operations delivere moonshine in highly modified, high performance cars. The temptation was irresistible to these men, the income they could make in a single night was greater that a couple of months of honest wor What started as a transportation method for moonshine gave birth to stock car racing whic formalized into today's NASCAR.

With the repeal of prohibition in 1933, the demand for moonshine declined rapidly, returning th practice mostly back to areas concentrated in the Appalachian region of the East Coast. Even toda there is illegal production of moonshine in these regions with operations located in northern Georgi western South and North Carolina and eastern Tennessee. Due to the independent and strong wille character shared by most Americans, most historians feel that moonshine will always be around in or form or another.

Today there are a few who have decided to produce moonshine legally. Not surprisingly, thes individuals are located in the same regions of the East Coast where the illegal version is still made.

WEST VIRGINIA DISTILLING
www.mountainmoonshine.com

West Virginia Distilling is located in a suburb of Morgantown, home to West Virginia University and is only 8 miles from the Pennsylvania border. The owner and operator of West Virginia's firs legal distillery is Peyton Fireman, a lawyer and childhood acquaintance of mine.

Beginning in 1998, Peyton tried to get access to regional, illegal moonshine producers to learn ho to make moonshine, but did not have much success. What he found was that the younger generatio that he expected to have had the practice of making moonshine handed down to them found that it w far more profitable to grow marijuana than it was to make moonshine. So, he had to learn on his ov by reading distilling texts and asking questions of the few microdistillers that existed at the time.

This small distillery is housed in a former transmission shop. Peyton is a very resourceful tinkere With the help of a local engineer, he made his stills out of old 40-gallon electric water heaters wi columns made from lengths of copper pipe and condensers made from copper coils, all sourced fro local home builder supply outlets. He now uses these stills to re-distill head and tail cuts and instea undertakes the main distillation in the equipment pictured above. His total investment to date has on been $40,000! Three times a year, Peyton puts his law practice on hold and becomes a distiller.

Peyton makes only one distillate but it is presented two different ways. One, Mountain Moonshin is a colorless spirit bottled immediately after final distillation. The other, Old Oak Spirit Whiskey, mellowed by soaking toasted oak wood chips in it for 30 days.

Peyton introduces corn grits into the home-built still, which also serves as his mash cooker an fermenter. It is heated in a hot water boiler fueled by waste oil that supplies hot water to external coi mounted underneath the vessel. He accomplishes starch conversion by allowing the mash to re heated for a couple of hours and then adds enzymes.

Once mashing is over, he attaches an external chilling loop to the vessel and cools the mash fermentation temperature via internal coils. Once cooled, he adds brewing yeast and allows the mas to ferment for 4 to 6 days. When fermentation is over, he then heats the vessel again and distills th alcohol from the wash.

Technically, Peyton is not producing a traditional moonshine but rather a spirit whiskey. His co

mash-derived spirit makes up only 20 percent of his product. To produce the final spirit he blends h distillate with neutral grain spirits. His products are released to market at 80 and 100 proof.

When asked if he feels there is a market for his product, Peyton defers to a quotation from a rece newspaper article. Montie Pavon, the owner of a local bar called Levels, stated “people like the idea drinking moonshine. They see it up on the shelf and say: ‘You sell moonshine? I thought it wa illegal.’ ” This attention-getting feature of the product certainly provides advantages when trying induce people to try it. Presently, West Virginia Distilling sells a little over 1,000 bottles of Mountai Moonshine and Old Oak Spirit Whiskey per year.

ISAIAH MORGAN DISTILLERY – SUMMERSVILLE, WV www.kirkwood-wine.com/isaiahmorgan.html

The Isaiah Morgan Distillery is located on the site of the Kirkwood Winery, which was establishe in 1992 by the late Rodney Facemire. Unlike West Virginia Distilling, this location is tucked into quiet mountain valley that makes it easy to picture that moonshine has been produced in this regio before!

Shirley truly produces his moonshine, Southern Moon, the way it was done in this area for a lon time. Instead of mashing milled corn, the raw corn is placed in straining bags and soaked in hot wate The bags are removed after sufficient soaking and cane sugar is added to the liquid left behind. For still charge of 50 gallons he uses 50 pounds of corn and 100 pounds of sugar. Shirley told us that th practice comes from way back in time where the old timers couldn’t mill corn, so they dissolved th husks with lye before soaking the kernels in hot water. No, Shirley does NOT use lye!

The distillery ferments its wash in a group of reclaimed plastic barrels that are connected by draining manifold that supplies the still.

Shirley charges the still with 50 gallons of wash and conducts a double distillation with the fin spirit yield of 7 to 8 gallons at 176 proof. The liquor is then diluted with filtered well water to 8 proof and bottled.

Rodney Facemire can be credited with establishing the classification “mini-distillery” in We Virginia. He managed to get a bill sponsored and passed that created the legal class of alcoh distillers, designated “mini-distillery,” which are defined as “where, in any year, twenty thousan gallons or less of alcoholic liquor is manufactured with no less than twenty-five percent of ra products being produced by the owner of the mini-distillery on the premises of that establishment, an no more than twenty-five percent of raw products originating from any source outside this state Additionally, unlike Wisconsin and some other states, the law allows mini-distilleries permission allow on-site tasting and on-site retail sales of the liquor they produce. It also allows the min distillery to advertise off-site. Because West Virginia Distilling was established prior to this law, it the only distillery exempt from the ingredient sourcing provision.

In addition to Southern Moon Corn Liquor, Shirley also produces a grappa made from Conco grapes and a rye whiskey. He plans to release a barrel aged version of a whiskey made from rye, ma and corn in 2010. Recently he has begun experimenting with making rum from sorghum molass pressed from cane grown in Northern West Virginia.

BELMONT FARM DISTILLERY – CULPEPER, VA www.virginiamoonshine.com

After visiting the Isaiah Morgan Distillery, our trek took us into Southern Virginia about 3 hou southeast of Summersville, West Virginia to Culpeper, Virginia.

Culpeper is a very quiet area of rolling hills with many farms and several well-regarded winerie The area's quiet appearance belies its close proximity to Washington, DC and Charlottesvill Virginia.

Chuck Miller, owner and distiller, is a consummate showman and quite a character. He opened u his distillery to us which is located in a large converted barn on his farm where he grows all the cor barley and wheat that goes into his products. If you are a viewer of the History Channel or/and t National Geographic Channel you may have seen him in segments about distilleries.

Chuck produces two products: Virginia Lightning (100 proof) and Kopper Kettle Virginia Whiske (86 proof). He also sells a version of Virginia Lightning in Japan, but its proof is reduced to 80 cater to Japanese tastes. Virginia Lightning is made only from corn, whereas Kopper Kettle Virgin Whiskey is produced from corn, barley and wheat. Both are twice distilled.

Unlike Virginia Lightning, which is bottled just after distillation, Kopper Kettle Virginia Whiske undergoes two stages of wood aging. The first stage exposures the spirit to oak and apple wood chi in a large converted stainless steel dairy tank. After sufficient exposure to the wood in the above tan it is moved to charred barrels to age for an additional two years before being filtered and bottled. H now sells 4,000 cases per year of his combined product offerings.

Belmont Farm Distillery combines historical and modern equipment. His still, built in 1933, is mammoth sight to behold and has a capacity of 2,000 gallons.

How Chuck acquired this still is a story in and of itself. It originally was located in New Jerse where it was operated legally until 1962. The still then was operated illegally until the late 70's whe the operation was discovered and shut down by the federal authorities. Just shortly after this, Chu was beginning to investigate starting his distillery. In a conversation with federal regulators he aske where he might acquire a still for his operation. An agent mentioned that he knew of the still in Ne Jersey. Shortly thereafter, Chuck negotiated a purchase price and he relocated the still to his farm Culpeper. Chuck then installed the rest of his equipment and filed for his federal permit in 1980.

Standing in stark contrast to his museum piece still is his elaborate water treatment system that uses to process water from his on-site well.

Installed on a wall opposite the still room are multi-stage sediment filtration units and a hig capacity deionization unit as well as a reverse osmosis system. We had intended to continue on North Carolina to visit Piedmont Distillers, the producers of Catdaddy Carolina Moonshine and t recently released Junior Johnson's Midnight Moon, but advance calls to them revealed they were to busy to meet with us. That was unfortunate because had we visited them we would have made complete sweep of mid-Atlantic and southern producers of legal moonshine and moonshine-inspir products. The most recent resource directory published by The American Distilling Institute and t website ofPiedmont Distilleries does not show them producing a corn whiskey.

Thanks to Eric Watson for the text on legal moonshiners. He can be reached at: craftbrewfreak@yahoo.com.

Artisan Whiskey Distilleries

Copperfox.biz, Dryflydistilling.com, Stranahanscoloradowhiskey.com, Templetonrye.com, Corsairartisan.com, Peachstreetdistillers.com, Ciscobrewers.com, Montanawhiskey.com, Copperrundistilling.com, Tuthilltown.com, Garrisonbros.com, Highwestdistillery.com, StGeorgespirits.com, Clearcreek.com, Yellowstone Valley Distilling, Solas Distillery, to name a few.

Q&A The Legend and the Law

1. In the United States, moonshine has always been associated with:

[a] The production of illegal liquor.

[b] Employment or other activities which occurred at night.

[c] A rare kind of lunar eclipse.

2. Common themes running through the practice of moonshining in US history are:

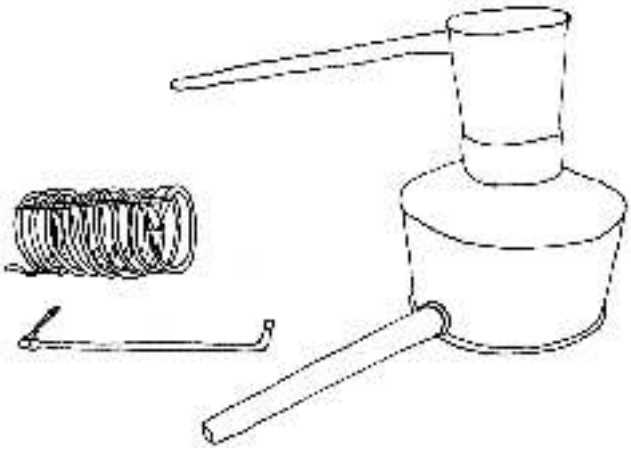
[a] The avoidance of paying a federal tax, which is normally levied on all spirits.

[b] Moonshining as a way of making a living in depressed economic conditions.

[c] An expression of the fiercely independent spirit of the American people.

[d] All of the above.

[e] None of the above.



Chapter 2

Distilling in 18th Century America*

1 The corn was first put into a burlap bag and then soaked in a tub of warm water. The water was changed each day for the next three days.

2 The tub was drained and the corn sat for three more days, or until it sprouted.

3 The corn was then spread out in the sun to dry.

4 Once dried, the corn was put back into the bag and tumbled, thus knocking off the sprouts.

5 The corn was cracked in a roller mill set at 1/64”. Flour and corn mills were in every town in America.

6 The cracked corn was mixed into hot water, thus creating a mash for fermentation. The distiller used the “Rule of Thumb”** to determine if the water was hot enough. If he could hold his thumb in the water for 5 seconds it was the right temperature to create the mash.

7 After mixing, the mash was left to sit for a few hours. This allowed the corn starches to convert to sugars. Some distillers would let the mash just sit and undergo a spontaneous 7-15 day fermentation.

8 Fermented wash was then bucketed into the still. Today, distillers use a sump pump to move the wash.

9 The wash was brought up to low boil, allowing vapors to flow up and out to the condenser and the collection pail.

10 18th Century distillers use smell and taste to distill moonshine.

[Notes: A primitive pot with a 5% abv wash will yield about 25% abv. Moonshiners often doub distilled to obtain 100 proof spirits, which was perfect for drinking and bartering for goods ar services.]

* This is a best effort to figure out how 18th Century distillers made moonshine. How accurate the process is yet to be determined.

** The original meaning of the rule word was, you couldn’t beat you wife with a stick bigger than you thumb.

Q&A DISTILLING IN 18TH CENTURY AMERICA

1. When distillers in early America used the “Rule of Thumb,” it referred to:

[a] A law which required that all distillers have at least one thumb if they were going to operate a pot still safely.

[b] A method for determining if the mash of corn and water was hot enough for proper fermentation.

[c] A method for determining the amount of yeast to use in their whiskey recipe.

2. In order to make all the right heads, hearts, and tails cuts in their distillate,

18th century distillers would:

[a] Use a very primitive version of modern hydrometers and alcoholmeters.

[b] Only use their sense of smell and taste.

[c] Run three or four distillations, thereby coming out with a pure spirit.

3. After the corn was soaked in a tub of warm water, drained, and then spread out to dry, early distillers would then:

[a] Add more water and immediately distill it.

[b] Turn it into feed for farm animals.

[c] Put the corn back into a bag and tumble it, thus knocking off the sprouts.

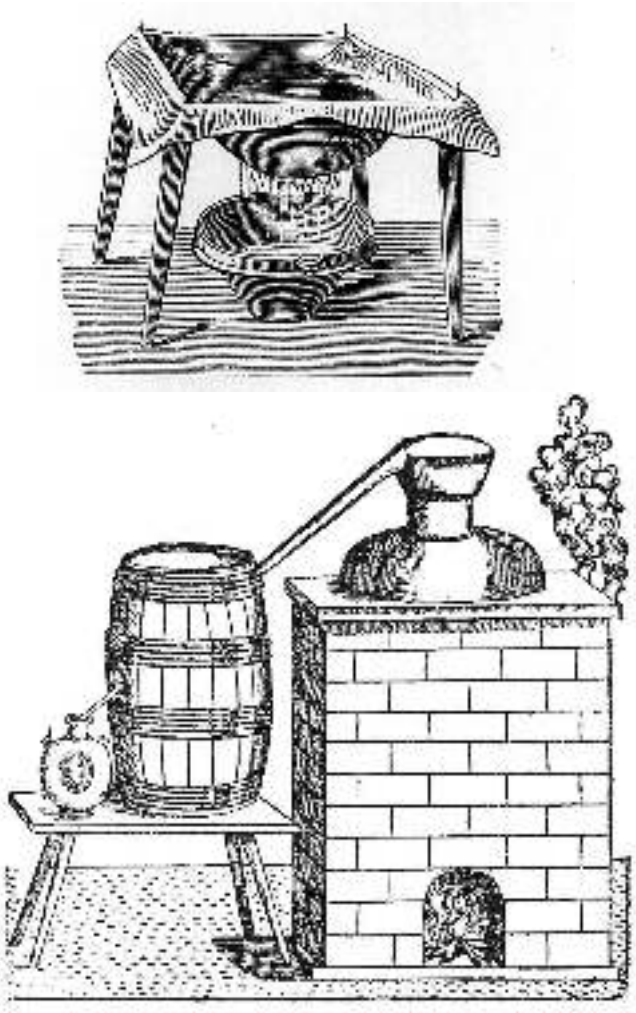


Fig. 61. Still with cooler, MOTHHOUSE

Chapter 3

What's Moonshine?*
Distilled spirits made in an unlicensed still.

Moonshiners don't have a distilling license, and they don't care about government rules. They bu sugar from wholesale vendors such as Costco because a 50 lb. bag of sugar will make about $80 worth of moonshine, and it's easy to make. Some moonshiners just add some whole corn kernels the sugar wash. When asked why they add corn? They say it adds "flavor." Purists say true moonshin has to be made from corn. Others say moonshine has no definition (under the law) and be made fro sugar, fruit, or any grain. Most distillers, however, feel that true moonshine has to be made from 10 percent malted corn.

The only true definition of moonshine is that it's untaxed liquor from an unregistered still. Anythin that calls itself moonshine and sits on the self of a liquor store is something else. You hope what yo are buying is an un-aged whiskey. Check the website and see if they have pot still. A photo is wort 10,000 words. Several craft distilleries produce moonshine-inspired products on pot stills classified a "Distilled Spirits Specialty." This CFR classification allows them us use a variety of ingredients produce "moonshine" that can be sold in liquor stores.

Most people think of moonshine is distilled in the mountains of Kentucky or Tennessee. The tru of the matter is that most commercial brands of bottled moonshines are made from neutral gra spirits (NGS), which is 190 proof spirit. NGS is distilled from corn on gigantic column stills. The tw biggest producers of NGS are Archer Daniels Midland Co., (ADM), Decatur, Illinois and MGP i Atchison, Kansas. These companies are the workhorses of the spirits industry producing 90% of th vodka and gin in America. The quality of their products is beyond reproach. Question: what is th difference between NGS produced at an industrial distillery and an artisan distiller? Answer: at 19 proof who cares? Why do distilling companies use NGS? It's cheap source of alcohol and gives yo bang for your buck. When you buy a bottle of commercial moonshine what you getting is closer vodka than an un-aged corn whiskey from an artisan pot still. Look for the real thing by reading th label.

The Code of Federal Regulations (CFR) that regulates liquor production in the US defines "Classe and "Types" for all spirit products. These Standards of Identity (27CFR5.22) do not limit the produc that may be made; they simply define the standards under which the identifying term may be used. The overall "Class" called Whiskey is a spirit distilled from a fermented mash of grain at less tha 190 proof and bottled at 80 proof or higher.

The Bourbon type is an internationally reserved name for a whiskey made in the US from fermented mash made from 51 percent or more of corn and stored in charred new oak containers. Th length of time required for storage is not defined, nor is the species of oak or its country of origi This gives artisan distillers broad latitude in choices for their Bourbon products. Have you taste Bourbon put-up in French Oak? Perhaps that's worth a try; it's only a stone's throw away from moonshine recipe.

Several other types of whiskeys are defined in the CFRs—like Rye and Wheat—along wi modifiers "straight," "light," or "blended." These terms are in the Beverage Alcohol Manual (BAM for spirits which define 36 different types within the class called Whiskey. None of them

Moonshine.

Merriam-Webster.com defines moonshine as illegally distilled corn whiskey. That's what th encyclopedia and dictionaries say, but that's not what the law (TTB) says. US law does not define t term "moonshine" so that term may not be used as a Class or Type identifier, but that does not rule o the use of "moonshine" as part of a brand name or a so-called fanciful name on a legally produc product. Again, unless the product exactly fits one of the descriptions found in the Standards Identity, it is likely that the bottle will carry the words "Spirits from Grain" just like most vodka. Th being the case, adherence to some legendary formula or recipe is meaningless, so the modern-da moonshiner should exercise his liberty to express himself by creating a unique product that tastes he likes it.

Learn more by reading the DSP regulations: www.ttb.gov/spirits/spirits_regs.shtml.

* The Spirit Beverage Alcohol Manual (BAM) is a condensed version of the CFRs at 27CFR5.22, Standards of Identity. When designing a product, be careful to read the CFRs; do not depend entirely upon the BAM. www.ttb.gov/spirits/bam.shtml.

Q&A WHAT'S MOONSHINE?

1. According to the Code of Federal Regulations' (CFR) definition for Bourbon, a creative artisan distiller could potentially:

[a] Use any kind of oak for aging, just as long as the barrel is lightly toasted.

[b] Age the Bourbon in a French oak barrel that has previously been used for cognac.

[c] Only use American oak, but choose between old or new barrels for aging.

[d] Use Hungarian oak if he or she decides to, as long as the oak is both new and charred.

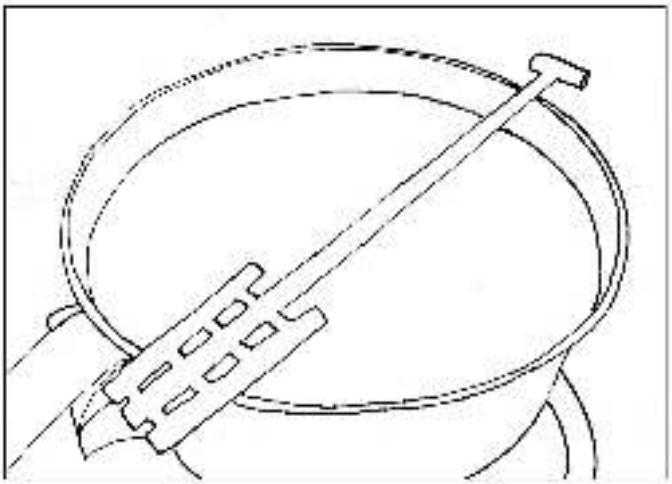
2. The federal Beverage Alcohol Manual (BAM) defines moonshine as:

[a] Nothing, because U.S. law does not define the term "moonshine" at all.

[b] Illegally distilled corn whiskey.

[c] Neutral grain spirits (NGS) mixed with at least 80 percent corn.

[d] A un-aged 100 percent corn whiskey.



Chapter 4

Moonshine: The Easy Way from Sugar*

American moonshine was traditionally made from corn using a pot still. Moonshiners built the own stills and did not own a thermometer. They distilled by taste and smell alone, and by the "light the moon," hence the word, "moonshine." This method of distilling, at its best, was primitive and t spirits they created were illegal and still are illegal.

For many generations moonshine was the source of income for poor farmers who distilled cheaply as possible. Over time, moonshiners started to add sugar to the corn mash because sug increased the volume of the moonshine. Today, you can purchase a 50-pound bag of sugar for $25.0 from Costco, from which you can make about $800 worth of moonshine. Sugar is still the cheape ingredient for making moonshine.* If fermented and distilled properly, sugar can make a nice tastin spirit.

There is very little character in a moonshine made from sugar. So, why do moonshiners continue add corn to the sugar mash? They'll tell you, "It adds to the flavor." Often they use the corn sever times—"until the flavor runs out," they explain. In reality, the corn is only adding romance becaus the corn starches have not been converted to sugars that ferment. Let's be serious about what they' distilling—it's really a high proof "rot gut" rum. There are many books and websites that explain ho to ferment sugar to make moonshine because it easy to do. They don't explain how to create a "rea corn mash because making real corn whiskey is a complex process that takes a corn cooker and skill distiller. That's too much work for the moonshiner who can buy sugar at wholesale prices.

*The purists say moonshine can't be made from sugar. It has to be made from corn.

Q&A MOONSHINE: THE EASY WAY FROM SUGAR

1. Moonshiners add sugar to moonshine because:

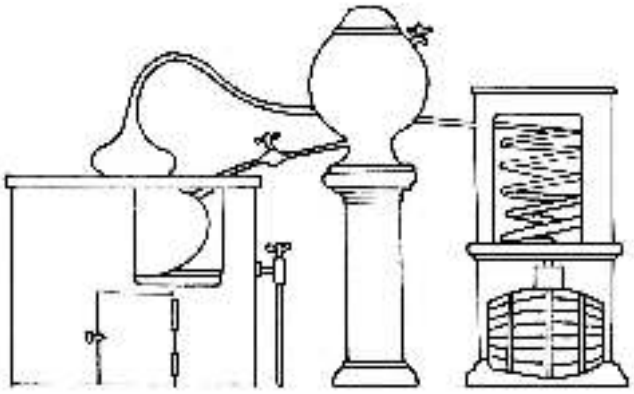
[a] It greatly increases the volume of the moonshine.

[b] Is an extremely cheap way to make moonshine.

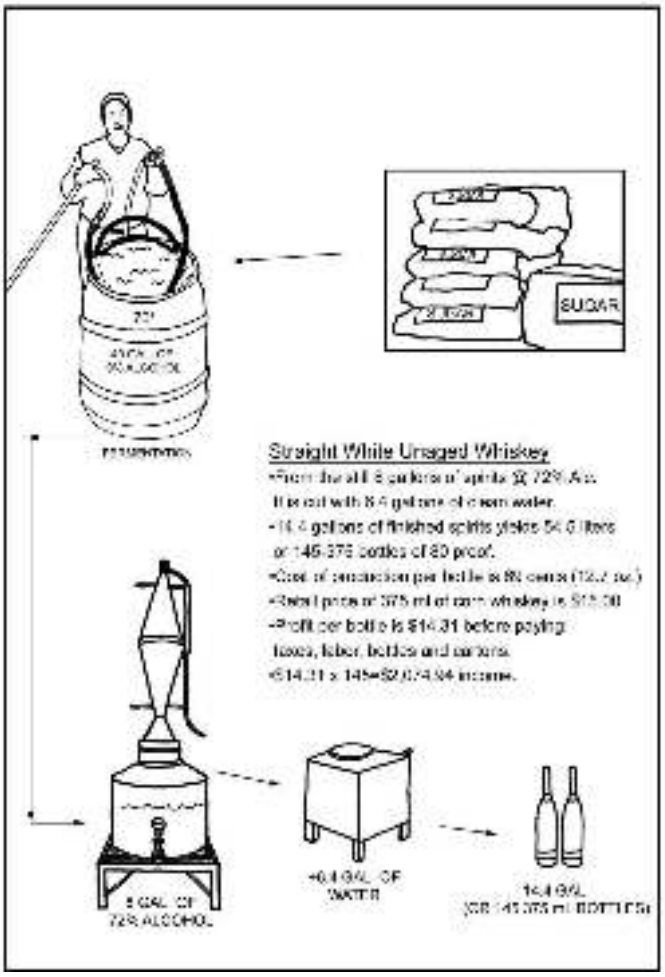
[c] Fermenting and distilling sugar did not take a lot of skill on the part of the distiller.

[d] None of the above.

[e] All of the above.



MOONSHINE FROM SUGAR



Chapter 5

How to Distill Moonshine From Sugar

YOU WILL NEED

- Infrared thermometer gun (www.Amazon.com)
- Wooden paddle (canoe or home made)
- Three 55-gallon food grade drums (www.baylesscontainers.com)
- Sump pump and 1” hoses (Home Depot)
- 3/4-inch soft copper tubing (local plumbing supply store)
- Hydrometers & alcoholmeter (home brew stores)
- Glass carboys, stainless steel collection pails, or stock pot

THE WISH LIST

- Parrot, in which to float the hydrometer
- Anton-Parr density meter MDA 35N (www.anton-parr.com)
- Used 40 gallon Groen or double-jacketed milk tank (junk yard)
- 55-gallon stainless steel drum turn into a fermentation tank
- Pump, Dayton 2P390A (Grainger.com)
- Count-down digital timer (www.Amazon.com)
- Wash temperature controller (see page 46)

FERMENTATION

- Mix 50 lbs. of sugar into 40 gallons of water.

Predict your original gravity (O.G.) from corn sugar. *1 lb. of corn sugar in 1 gallon of water will give you a O.G. of 1.039.* Take 50 lbs. of sugar and mix it into 40 gallons of water. (50x39/40=48.75). Round up to 1.049. It will ferment out to 1.000 giving you 6% abv. sugar wash. Single pass on a pot still will yield about 8 gallons of 30% abv alcohol spirit.

The Process

Use a sump pump or bail to transfer the wash into the still, leaving behind as much sediment possible. Turn on the burner to the still and relax as it will take about 30-45 minutes to bring the was up to temperature. Pure alcohol boils at 173°F, but a 10 to 14% abv wash will boil at a much high temperature—a little over 190°F. Most kettles don’t have a thermometer to monitor wash temperatur only vapor temperature at the still head. This is unfortunate because the still head may not he quickly, and many a boil-over has happened because the operator did not listen to the sound of th kettle. The sizzle can be heard before full boiling occurs, though it may be difficult to hear over th roar of the burner. Turn the burner down to listen, then back up.

Watch the thermometer on the head of the still. *When the needle hits 160°F, turn down the heat an turn on the water to the condenser.* The still will recover, the temperature will rise, and after a fe minutes the distillate will start to spit and sputter as it comes out of the condenser. Have the collectio pail (jar) or pot ready. The first sputters from the still are the foreshots. Cut about 1/2 cup and use it

solvent to clean auto parts.

At 174°F the sputter of distillate from the condenser turns into a small stream. As the still run record the distillate temperature, percent of alcohol and time since starting. Collect the distillate small jars as you learn. Smell and taste what's coming out of the still as the temperature rises. B collecting in small jars, any mistake will not ruin a large quantity of spirit. You will be able to go bac and re-sample the jars and get a time-series understanding of what the still is doing. Once you decid where the hearts begin and end, you can combine those jars into a larger container and discard or r distill the rest. The point is to go slowly and keep records. This avoids making the same mistak twice, and you will make mistakes.

A 40-gallon wash on a single pass through a simple pot still should yield 10 gallons of hearts at 10 proof alcohol. Let's call it a "spirit" whiskey.

How fast the still flows will depend on several factors:

- The amount of wash
- The amount of alcohol in the wash
- The amount of heat that is being applied to the still
- Size of the condenser

Foreshots: Collect the first 1/2 cup of distillate. It smells awful. Discard. The amount of foresho depends upon the quality of the wash.

Heads: Between 175°F to 195°F. Often distillers collect a generous amount of foreshots, skip th heads, and switch to hearts.

Hearts: Between 196°F to 201°F collect 13 gallons. The run starts at 80% abv and is stopped at 20 abv. The 13 gallons should contain 50% abv.

Tails: Don't collect above 203°F. Tails have undesirable oils and esters. Some argue there is a lot o flavor (congeners) in the tails and try to get everything out of them. A hydrometer will tell you ho much alcohol is coming out of the still. Do not collect below 20% abv. (Many whiskey distillery sto at 40% abv. A hydrometer reading will tell you when to cut.) Collect the tails in a separate containe for a future run. At 20% abv in the distillate, the kettle contains only about 1.5 percent remainin alcohol. You have to determine whether your time and the cost of energy are worth the effort t recover this small amount of alcohol.

[Notes on distilling: At the end of a run the alcohol coming from the still has dropped and water "picked-up" as the boiling point goes higher. A small pot still will have temperature "spikes" in th head. These spikes create fruit and spice like vapors such as anise and banana. You can taste an smell these flavors. Cut and toss them.]

Double Distillation

Fermentation: Go back to the fermentation process and make two more 40 gallon fermentations. Yo now have 120 gallons of 14% abv wash for stripping.

Stripping: Using the 120 gallons of wash make three fast stripping runs (don't make head or tai cuts). From each run collect 15 gallons of 100 proof (3x15=45 gallons) in preparation for the fin spirits run or "double distillation."

Double Distillation: Into the still add the 45 gallons of 100 proof from the stripping run for the fin distillation (where heads and tails will be cut). The final spirit run should yield 15 gallons of 14 proof. Adjust with distilled or RO water to 80 proof for bottling.