PROJECTS FROM 1900

THAT WILL HELP YOU IN THE NEXT CRISIS

Chris Cole

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Introduction

One of the biggest worries about people today, in advanced countries at least, is that they're quickly forgetting how to do things for themselves. Part of that is down to nanny state government regulations – in much of Europe it's against the law to do basic electrical work unless you're a qualified electrician, for example. In some countries you're not even allowed to fit a plug to a cable yourself, and that only involves a couple of screws. Putting up a new lamp in the bedroom? Forget it!

Bossy governments are a problem, but probably not the biggest one. That's just the modern attitude to the things we own. Technology is advancing faster than it's ever done, and most people want to have the latest model of everything- Our possessions get discarded just because there's a newer version available; we redecorate, and replace all our furniture, because a new fashion appears in the media.

This is not the way our ancestors lived. They only got rid of something when it was broken beyond repair. If it was still in working order, or could be fixed, they'd never dream of replacing it. As for furniture, why throw it out and buy new stuff just because the color was so last season? In fact, furniture was routinely inherited, and passed on through generation after generation.

A few generations ago, people didn't buy anything like as much stuff as we do now. There were various reasons for that. One is that things cost more. There was no huge international trade in cheap goods made in the Far East. On top of that, most people had less money to spare. We might complain about the cost of groceries, but as a percentage of family income it's the lowest it's ever been.

Finally, there was just a lot less to buy – and one reason for that was that people were used to doing things themselves. Most families made a lot of their own clothes. There were a lot more manual workers and tradesmen than there are now, so people had the practical skills to do repairs or improvements around the home.

DIY hasn't gone away – millions of people still upgrade, or even build, their own homes – and preppers are a lot more likely to do that than the general population, but it's a lot less common than it used to be. The average American, if they need work done on their home, hire a tradesman to do it. If they want furniture or clothes, they buy them from a store. Most of the things we buy are far beyond the reach of DIY anyway – who can build a cell phone at home?

A hundred and fifty years ago it was very different. Most families only owned a handful of things they couldn't make themselves – the most common examples were cast iron stoves, guns and tools. They *could* make just about everything else, and more often than not that's exactly what they did.

At the beginning of the 20th century a lot of rural Americans still lived in homes that they or their parents had built themselves. They put up barns and sheds on their own, or with help from neighbors. If their family expanded and they needed more space, they'd fell a few trees and start building an extension.

The USA in 1900 wasn't a backwards country. In fact, it had one of the most advanced economies in the world. The Industrial Revolution might have started in Britain, but by the Great Exhibition in 1851 the British were amazed at the variety and quality of things being made in the USA. Even so, if people could do something themselves they generally did. They didn't hesitate to take on big jobs, either – many turn of the century DIY projects were a lot more ambitious than putting up some new shelves in the den. In this book we'll look at some typical projects our not so distant ancestors were familiar with, and which can still improve our lives today.

The Smokehouse

Today bacon, ham and sausages come from the supermarket. At the beginning of the last century, most rural families made their own. Every fall they'd slaughter their pigs and make the preserved meat products that would see them through the winter.

For a lot of that meat, the preservation process included smoking – and that meant having access to a smokehouse.

Luckily, building a steakhouse was well within the abilities of the average 1900 rural American. If you could build your own house – and many of these people had done exactly that – a smokehouse wasn't going to be a challenge.

Thanks to that, most rural houses had one, and it was one of their most valuable assets.

At the turn of the 20th century nobody had a refrigerator at home – the first domestic model wasn't invented until 1913, and it was another couple of decades before they started to become affordable. The only way to keep food cool was with an ice box, and outside the big cities in the northeast, ice wasn't cheap.

Nowadays we can keep our bacon in the fridge, and we only buy the smoked kind because we prefer the taste. In 1900, people smoked bacon so it would stay safe to eat for more than a couple of days.

Meat can be preserved using just salt, but smoking reduces the amount of salt you need. Salt's cheap now, but not that long ago it was a lot more expensive, and that went double away from the coasts and big cities.

A way to preserve meat that used less salt was valuable. Of course, now we know that too much sodium is bad for you (although the safe limit is a lot higher than government guidance says it is) so using less salt is still a good idea, even if the stuff costs pennies now.

A smokehouse is just a small building that lets you hang up meat, fish or cheese and keep it surrounded by a lot of smoke for a long time. There are various ways to build one, but home ones usually used a design that used cold smoke.

Hot-smoking involves much higher temperatures, so the smokehouse has to be built of brick, but for cold smoking hardwood is fine. It's also cheaper and easier to work with, and this style of smokehouse is safer.

The Basics

This style of smokehouse is basically a wooden shed with an external fire pit to supply the smoke. Because smoke rises the fire needs to be lower than the floor of the smokehouse, so the best place to build one is on a slope. It can be at the top, or actually on the slope – as long as there's space for a fire a few feet lower down. Ideally look for a shady location – this will prevent the sun from warming it up, so that the only heat comes from the smoke and the inside stays cool when the fire isn't lit.

The first step of building the smokehouse is to dig out the fire system. Seen from above, this looks like the profile of a dumbbell – Two rectangular holes joined by a narrow trench. The lower hole is the firepit, and it's usually about 20 inches long, 16 inches wide and eight inches deep. The upper hole is about 16 inches square and two feet deep. Between them is a trench about six inches wide; this will hold a pipe to channel the smoke from the fire to the smokehouse. Because the upper hole is deeper than the lower one, you need enough of a slope to ensure that the pipe is angled upwards.

The Firebox

For obvious reasons the firebox needs to be heat resistant. It can have a stone slab as a base, but a poured concrete foundation is best. The sides are built with fire bricks, with a slab for a roof and, usually, an iron door at the front for lighting the fire and feeding it with wood. The pipe projects through the back wall of the firebox. That's obviously fine with old-style cast iron pipe, but less so with modern PVC. You'd need to line the first couple of feet of the tunnel with concrete or fire bricks to keep the pipe far enough away from the actual fire. Once the pipe is installed, backfill the trench.

At the top end of the pipe is an elbow joint, to bring it up above the foundation of the smokehouse. It's a very simple system; wood is burned in the firebox and the smoke, cooled to under 200°F as it moves up the pipe, escapes through the top end into the smokehouse.

The smokehouse itself is a small wooden structure on a heatproof foundation. The foundation is built by pouring a concrete base into the upper hole, then building a brick wall on it. This wall should have about five layers of bricks, which along with the concrete brings it up above ground level.

Now there's a low, square brick wall about 16 inches on a side. The actual smokehouse sits on top of this. It's built on a simple frame covered with boards, with a pitched roof and a small door at the front. Inside are wooden racks that meat can be hung from on hooks. Traditionally smokehouses are made from hardwoods, usually cut from fruit trees – cherry, apple, pear and apricot are all good. Most smokehouses are painted dark brown to hide any stains from escaping smoke. A small chimney fitted high in the back wall lets the smoke escape, and a thermometer is usually fitted in the door so the temperature can be monitored. Usually the roof is removable, so the contents can be checked without using the door. In total the smokehouse is usually about four feet high – three feet for the walls, and another foot for the roof.

Meat can be smoked for a few hours to give it a delicious traditional taste, but you'll get the most benefit from your smokehouse by leaving your food in it for days or even weeks. That will give time for water to evaporate, the heat from the smoke to cook it thoroughly and the smoke itself to penetrate deep inside and enhance the flavor.

A smokehouse is something that can be easily built in a weekend, and it's well worth the effort. You'll be able to turn cuts of meat into delicious, specialty hams and sausages. You can make your own traditional-style bacon, which is much tastier than the mass-produced kind. Best of all, you'll have an effective way to preserve food that doesn't rely on electricity, gas or any modern technology – it will keep working as long as you have access to wood and a bit of salt.

The Root Cellar

A smokehouse is great for meat, fish and cheese, but it isn't going to help you much with your stores of root vegetables. If you want to be self-sufficient you need to have a way to preserve the potatoes, beets, carrots and turnips you harvested in fall. Luckily, they're more robust than meat; as long as you keep them cool and dry, they'll keep you fed until you bring in the next crop.

The problem is that indoor temperatures are too warm for storage, and outdoors isn't stable enough – temperature changes between the seasons, and even between day and night, will quickly destroy your stores. One way around that is to store them in clamps, where the earth covering will insulate them, but clamps aren't exactly convenient; do you really want to start digging one up every time you need a dozen potatoes for dinner?

The solution is a root cellar. Partly underground, and with its upper walls and roof heavily insulated with soil, a root cellar maintains a much more stable temperature. Inside it's cool, the humidity is low, and the conditions are perfect for storing any kind of root vegetable. Even if you don't grow your own vegetables a root cellar makes a lot of sense. Look at what a few pounds of potatoes costs at the grocery store. Now compare that with the per-pound cost of buying them by the sack. Buy vegetables in bulk and you can save a lot of money over the course of a year; a root cellar will let you store them until you need them.

A century ago every rural home had a root cellar. They were first developed in 17th century England, brought to America by the early settlers, and quickly became an essential of pioneer life. They only started to fade away when refrigeration became available, but even so, many people still have one and use it regularly. Others are seeing the value of this old storage solution and building their own.

In 1900, building a root cellar was a common DIY project for anyone who didn't already have one. It took some work, but nothing that was out of the reach of the average homeowner, and that's just as true today. If you want a root cellar you can have one, and it won't cost you much – apart from some sweat.

Decisions to make

There's no one way to build a root cellar. Big, wealthy farms often had elaborated, stone-lined ones; on smallholdings, it would more likely have earth walls and a timber ceiling to support the soil overhead. Space and budget helped decide how a cellar should be built. So, did the local climate. In areas with warm summers and mild winters cellars need more insulation to keep the temperature down. Where the winters are cold, the problem is to stop the contents freezing or drying out.

There were late 19th solutions to these problems. In warm climates, a cellar that's dug deeper and has more earth around the upper walls and roof will stay cooler. Less heat from the sun and air makes its way into the interior. More of it what does get in will be soaked up by walls dug into the cooler sub-surface soil. Most of the sun's energy that hits the ground is absorbed by the top few inches of soil and re-radiated back into the air; even in the hottest deserts you'll find lower temperatures if you dig down a few feet. The same effect keeps a deep root cellar cool enough even when it's scorching outside.

Areas with cold winters create different challenges for a root cellar. Again, having more soil around it will help, but it probably won't be enough. More insulation was often added to retain heat – a layer of straw, for example.

The problem with insulating a root cellar to keep the heat in is that there isn't much heat inside to start with; that's the whole point of a root cellar. To keep the temperature above freezing some heat has to be applied. A modern solution is to keep a single lightbulb burning; that will generate enough heat to prevent freezing. Unfortunately, the light also encourages root vegetables to sprout. An older solution was to dig a pit in the floor of the cellar, fill it with compostable waste, and put a loose wooden cover over it. The heat created by the decomposing compost will rise into the cellar and maintain a cold, but non-freezing, temperature.

Choosing a location

There are a couple of factors to consider for a root cellar. If possible, it should be built on the north side of the house, where it will be in shadow when the sun is at its highest. That helps with keeping the inside temperature down. In areas that get a lot of snow, cellars were located somewhere that could be accessed even when everything else was buried – under a porch was one option. They were also placed away from low-lying areas that collect water when it rains; water collecting in the cellar would encourage rot in the food stored there.

The hard part of building a root cellar is digging out the pit. A lot of earth needs to get moved, so people didn't build a cellar bigger than they needed. On the up side there wasn't a problem disposing of the soil, because it would be reused to cover the top of the cellar. As well as the cellar itself steps had to be dug out to give access to it. The stairs would usually be built of timber or stone slabs, but cinder block is a good modern solution.

The construction of a root cellar depends on local conditions. A dirt floor is ideal, as it helps cool the interior and keep humidity constant. If the floor feels dry you can also sprinkle water on it, and it will slowly evaporate into the air. If the soil is very moist, planks or gravel will make walkways to stop it getting muddy.

Walls can be built from brick, stone or timber – most small farms used wood, as it was cheap and easy to obtain. Solid uprights and beams supported the heavy roof, while the walls were usually just boards to stop the sides collapsing. Some root cellars have bulkhead doors in the top, with internal steps, while others have steps down to a door in the wall. Doors are often insulated to help keep the inside temperature stable.

The interior of a root cellar usually has shelves to hold canned goods and boxes of produce, as well as wooden bins for bulk quantities of potatoes, turnips and other staples. Larger cellars could be divided into two sections, one with a drier atmosphere and one with a moist one.

Most homes now – even rural ones – don't have root cellars, but it's still a valuable thing to have. As well as giving you a simple, efficient way to store vegetables, there are also other uses for a strongly built, mostly underground space. It's an ideal storm shelter, for example, and if you add an air filtration system it will even work as a fallout shelter if there's a serious industrial accident or nuclear attack. Building a root shelter involves a bit of sweat, but it's a really worthwhile project for anyone who's serious about being prepared.

The Well

It's hard to beat the convenience of a modern water system – unlimited, clean water available at any time just by turning on a faucet – but it's a luxury our ancestors didn't have. Even well into the 20th century, many rural Americans weren't connected to the water supply. Unless they wanted to fetch their water from the nearest river – not usually the cleanest source – they only had one real option: Dig a well.

The principle behind a well couldn't be simpler. Below a certain depth, the *water table*, the ground is saturated with water. If you can dig a hole to below that depth the bottom of it will fill with water; then you can lift it out with a bucket or pump, and you have a water supply. Well water is untreated, but usually safer than water from a river or lake – you know there isn't going to be a dead sheep in it.

In some places the water table is only a foot or two below the surface, and you can get to the ground water by digging a fairly shallow pit. Other times you might have to go down anywhere from ten to thirty feet before you reach it, and then a few feet more to allow a good amount of water to collect in the bottom of the well. That's no problem with modern equipment; a mechanical auger can bore a deep well in an hour, then all you need to do is lower a pump hose down it and you're in business. At the start of the 20th century most wells were still dug, and operated, by hand.

Not everyone dug their own wells. Professional well diggers existed and could be highly paid. A lot of their perceived value was their ability to know the right place to dig. Many of them were dowsers – water diviners, who claimed to be able to find underground water using pendulums or hazel twigs. In reality, dowsing doesn't work – but that doesn't matter. The water table doesn't vary much over short distances, so if there's water ten feet down at one point on your property there will be water pretty close to ten feet down under all of it.

People who didn't want to pay a well digger would sometimes hire a dowser to show them where to sink a well, or they'd just pick a likely spot and start digging. The procedure was simple – just mark out a circle large enough for one man to work in, dig it out, then keep going down until they reached the water table. However, the details varied depending on the ground.

Firstly, you had to pick the right time of year. This makes a big difference. In most places, the water table is seasonal. It's important to sink a well when the water table is at its lowest. A well dug when the groundwater is *high* probably won't be usable all year round. It will be fine at the time of year it was dug, but as the water table recedes it will go dry. One dug at the right time will be as deep as it needs to be when the water is furthest from the surface; a rising water table will simply put more water in the well.

Seasonal variations in the water table depend on the local climate. Some areas have cold, dry winters and rainy summers; that means the water table will be higher in summer, so wells were dug in winter. That presented problems of its own. The top few feet of soil would often be frozen solid. Building a fire and keeping it burning for a couple of days would thaw it far enough down for the well to reach the deeper, unfrozen layers.

In other places, such as California, summers are relatively dry and most precipitation comes as winter rain or snow. That leads to water tables that are highest in late winter, and lowest in late summer and fall.

It's easiest to dig wells in sand or gravel, because a pick and shovel are all that's needed to excavate the hole. To avoid any risk of the sides caving in, destroying the well and potentially burying the digger, temporary wooden shoring would be used to support the soil.

Where the well had to be dug into bedrock, different methods had to be used. It's possible to dig through softer sedimentary rocks with a pick and crowbar, but it can be a low process; hard rocks will defeat normal digging tools. One option was to bore holes in the bottom of the hole, pack them with black powder cartridges – or, later, dynamite – and blast the rock. The rubble could then be cleared away, new holes bored, and the blasting repeated until the well was deep enough.

Not everyone has access to explosives, though, and there's also a risk of using too heavy a charge and collapsing the well. An alternative is percussion drilling. This process was invented in ancient China and used to sink shafts up to 3,000 feet into the bedrock. It's quite a simple principle; a heavy weight, usually with a sharp point, is dropped down the well to crush and shatter the rock; then it's pulled up in a rope and dropped again. When the bottom of the hole starts to get choked with rubble it's cleared out, then the weight is dropped again.

A percussion drilling rig could be built with a simple wooden tripod over the top of the hole, with a pulley hung from the top to take the rope. If a pulley wasn't available a steel ring or even a loop of rope would do, but it took more effort to lift the weight.

For the weight itself, the heavier the better. Even a shovel dropped blade-first onto soft rock would have an effect, but something bigger makes much faster progress. A sharpened log with a steel cone over the point was one option, or a blade improvised from an old plough or harrow. The main thing was that it had a strong, sharp point or edge, and enough weight behind it to drive it into the rock. The good thing about percussion drilling is that the deeper you go, the more force you can put into each blow of the weight – gravity does the work for you.

The tripod and rope would also be used to haul spoil out of the shaft. When enough rock had been broken up to start obstructing the weight it would be removed from the rope and replaced with a bucket. The broken rock would be loaded into the bucket and pulled up, the hole opened out with hand tools, then the weight went back on the rope and rock-breaking started again.

When the well shaft reaches the water table it will be pretty obvious, because the bottom of the shaft will start to fill with water. That didn't mean it was time to stop digging – it just meant it was time to get your galoshes on. The shaft doesn't just have to reach the water table; it has to penetrate down into it. How far? At least the height of a bucket, and then an extra few inches. The pool of water in the bottom of the well had to be deep enough that whatever method was used to lift the water could be submerged enough to actually work.

Once the well is deep enough it was time to start lining it. An unlined well will work for up to a couple of years, but it won't have a long life. Frost, erosion and seasonal expansion and contraction of the ground will gradually break down its walls. Soil will fall into the well and gradually raise the bottom; eventually it will raise it above the water table and the well will go dry. At that point it has to be dug out again, which can be dangerous if the walls are already becoming unstable.

To protect the work they'd done, well builders lined the shaft. Sometimes timber was used, but that was a short-term solution. In the humid atmosphere of a well shaft, and with one side in constant contact with damp soil, any wood will eventually deteriorate – and only high-quality hardwood will last more than a couple of years. Most wells were lined with brick or, when brick wasn't available (which was most of the time) with stone.

Lining a well could be tedious, because all the stone had to be lowered down the shaft, but it wasn't a difficult job. The lining didn't need a lot of structural strength, just enough to stop the walls eroding. Dry stone linings were occasionally built, relying on fitting the stones carefully together to hold them in place, but usually they were cemented in place. That helped seal the gaps between the stones and prevent things growing in there – birds and animals could even nest in a dry-stone lining, and that didn't exactly help keep the water clean.

The next step was to build a low wall around the top of the well. This was usually circular, made of brick or stone, and around three to four feet high. It had a couple of purposes. Firstly, it prevented dirt and debris being swept into the well by wind or rainwater. Secondly it reduced the risk of children (or clumsy water collectors) falling down the well. Usually the top of the wall was given a smooth, level cement surface.

Often, a roof was put over wells to keep debris out. Many traditional wells had two heavy timber supports mounted on, or even built into, the surrounding wall; a small pitched roof would be built on top of the supports. The same supports could also hold a windlass for raising and lowering buckets.

Many wells had a layer of fine gravel or sand at the bottom. With the walls sealed by cement, the only way groundwater can get into the well is through the bottom. That won't make it any less effective – as long as the bottom is open, simple pressure will equalize the water levels inside and outside the shaft – and it also gives you a way to filter the well water. A few inches of sand at the bottom will trap most debris and small creatures that might come up with the water, making it easier to purify.

Not many homes have their own well today, but if preparedness matters to you it's an excellent project. You probably don't want to give up the convenience of having clean water on tap – who would? – but modern water systems are vulnerable to disruption in any sort of crisis and having an operational well gives you a fallback option. It doesn't have any unwanted side-effects on the local water economy, either. Diverting streams for irrigation will bring water from some places but take it away from others. Building drainage ditches can transfer rainwater to places where, it turns out, it does a lot of damage. A well just opens a route to get at water that's already there, under the ground.

Even if you don't think a well is worth building now, knowing how it's done is vital survival knowledge. If the water supply does go down, and there's no prospect of it being restored in the near future, you can build a well *then*. Your emergency water supply should be enough to keep you going for weeks, and unless you're boring into bedrock without explosives a reasonably deep well can be dug and lined in a few days. By the time you've emptied the last barrel of stored water, you can have your own well delivering a steady supply.

The Hunting Bow

The bow is the oldest machine known to man. We know from cave paintings that our earliest ancestors hunted by throwing rocks, and later spears, at their prey. These are inefficient weapons, though. They can only be launched with as much energy as you can generate in a throwing motion.

Sometime in the late Stone Age, at least 13,000 years ago and perhaps as long as 71,000, the bow was invented. This was a huge advance in weaponry. It wasn't just an object that could be thrown; it was a machine that allowed energy to be input, stored, and then violently released. Now a hunter could exert sustained effort to tension the limbs of his weapon, take careful aim, then unleash all the energy instantly. Compared to a spear, a bow was more accurate, deadlier and had a much longer range.

By the time the first settlers arrived in the USA guns were already common in Europe, and the settlers brought plenty with them. What they found in the New World was a civilization that had never invented guns, and still relied on the bow. However, much to their dismay, they soon found that in skilled hands a bow was still a deadly weapon.

In fact, in skilled hands a bow was far superior to the guns of the day. A typical flintlock musket could fire three or four shots a minute and, expertly handled, might hit a man-sized target more often than not at a hundred yards. An English longbowman could reliably put quarter-pound war arrows into a one-foot circle at that range, was reasonably accurate to 250 yards, and was capable of losing a dozen arrows a minute. George Washington and the Duke of Wellington, the most successful generals of the flintlock age, both tried to find trained longbowmen to increase the firepower of their armies.

The native bows of North America didn't approach the terrifying power of the English war-bow, but they were still effective and hard-hitting weapons. Short and light enough to be used from horseback, they were also deadly accurate in the hands of warriors who'd been taught to use them as children, then hunted with them every day. A war party of archers on horseback was a real threat to a group of Americans armed with muskets.

By the end of the Civil War, guns had advanced far enough that they could outshoot bows in most respects – but bows didn't disappear. Anybody could make one, with a bit of practice, from natural materials. Arrows were even easier to make, and unlike rifle or shotgun ammunition they could be reused. Bows are also quiet to shoot. The boom of a shotgun will spook any game in the area, but a good archer can harvest two or three animals before the rest panic. That made them ideal for hunting, especially when money was tight.

The other big advantage of a bow was that, if you had some basic skills, you could make one yourself at basically zero cost. It takes a lot of tools and skills to make a reliable gun. You might see TV documentaries about craftsmen in the Khyber Pass who can make any gun to order using a few hand tools, but I've handled some of those guns and I would never risk firing one.

A bow is different. Some native designs featured elaborate laminates of horn, sinew, plant fibers and even fish skin, but they also used much simpler wooden weapons. A wooden self-bow – carved from a single stave of timber – can be made with nothing more than a knife if you need to.

Finding the wood

The first stage in making a bow is to select the wood – and if the bowmaker didn't get this right, the rest of the process was a waste of time. Bows can be made from of any appropriate-sized piece of timber but choose wrong and the result one that either shoots weakly, breaks after a couple of shots or quickly takes on a permanent curve and loses all its strength. On the other hand, good stave makes a powerful weapon that lasts for years.

Native Americans and pioneers were lucky, though. North America has some great bow woods and some of them are quite common. Ash, hickory and red oak all make tough bows; hazel, hornbeam, maple and acacia aren't quite as rugged, but more pleasant to shoot. Boxwood has a very fine grain and makes powerful bows. Yew makes the most powerful and fastest-shooting bows, but it's difficult to work with. It also needs care – the wood is poisonous and inhaling the dust can be lethal. Never try to work yew without a dust mask. The best of all is probably Osage orange. It makes bows that are almost as good as yew ones, but it's easier and safer to work with.

Saplings almost never make good bows. A better choice is a straight branch, four to six inches in diameter. The perfect material is a section between four and six feet long that's as straight, and as close to the same diameter all along its length, as possible.

Once the wood had been selected and cut, it needed to be seasoned. The best way to do that is to store it somewhere well aired, but protected from rain, for a year or two – under the eaves of a roof is good. People who needed a bow faster would peel the bark off and leave it in running water for a month, usually weighted down with rocks on a stream bed. After that it would be left for another month to dry slowly.

Whatever method was used, the wood seasoned faster if it was split into staves first. Unless they were made from boxwood, bow staves were never sawn; instead they were split with wedges or axes, so the splits followed the grain. Smaller branches would be split in half; bigger ones, above about five inches in diameter, were usually quartered.

Preparing the stave

Once the stave was seasoned it needed to be shaped down into a bow. You can make a bow with nothing but a sharp folding knife, but it takes a while and would usually be a rough job. A few simple tools made it a lot easier. These tools were commonly used to make bows:

- Pencil

- Tape measure
- Knife
- Drawknife
- Hand saw
- Ax
- Round, flat and triangle files
- Broken glass
- Coarse and fine sandpaper

Now the stave had to be prepared. If you look at the ends of the stave you'll see two different kinds of wood – the heartwood at the center of the branch, and the sapwood outside it. The back of the bow – the side that faces away from you – would be the inner ring of sapwood or the outside of the heartwood. The belly, facing towards you, came from the inside of the branch. If there was a lot of sapwood on your stave it would be shaved away to leave a single ring on the outside of the heartwood.

With the back ready, the bow's outline would be marked on it. To start, the stave would be measured and the center marked. That showed where to put the handle. A common mistake, even now, is to put the center of the handle in the center of the bow. That's wrong. The arrow pass needs to be very close to the center of the bow, and the handle was below that.

Traditionally there were two ways to make this work. Medieval English longbows were symmetrical and didn't have a handle. They were just shaped to bend into a perfect segment of a circle, with the arrow pass marked in the center. The bow could be used either way up, and the archer simply held it just below the arrow pass.

English longbows aren't easy to make, though. They have a deep D-shaped cross section and need to be *very* carefully shaped. Most American bows are flatbows, with a shallower rectangular cross section. That's much easier to work with, but it does need a handle.

The problem is, if the handle is in the center of the bow the arrow pass will be too far above it. When the bow is drawn the center of stress is at the arrow pass; if that's too far from the center of the *bow* the uneven stress on the limbs will probably break it. The solution is to put most of the handle below the center, and the arrow pass just above it.

With the handle marked, the tips would be marked next. A tight string laid down the center of the bow was used to mark the centerline, then marks would be made about half an inch each side of it at both ends. Straight lines were drawn to connect these marks to the corners of the handle, and that marked out the basic outline of the bow. The stave was cut down to that outline, and then the real shaping could start.

Shaping the limbs

The most important part of making a bow is shaping the limbs down so they bend evenly, giving the draw weight you want. The hard bit is getting an even bend; if the draw weight is too high you can just shave off more wood. But first, the handle was carved to fit the hand comfortably. This is an easy job, but doing it first meant that if it did get messed up the bow maker had avoided wasting work on the limbs.

To get the limbs right, a process called *tillering* was used. A tiller is a wooden frame with notches at the top to hold the bow, and a series of smaller notches down its length, usually about two inches apart, that can hold the string. The bow would be put onto the tiller and the string drawn back to the first notch. Then the bowmaker could step back, look at it and see how evenly it curved. If there were any straight bits some wood could be shaved from the back with a draw knife. For very fine shaving, the edge of a broken piece of glass gave more control.

Once the bow bent evenly at the first notch, the string would be pulled to the second notch. The shaving and bending process was repeated for each notch until the bow was fully drawn. Then the maker would draw it normally, to test the weight. If it was too heavy it would be slowly shaved with a drawknife or glass to bring the weight down. Finally, nocks were cut into each tip with a round file and the bow finished with wax or linseed oil.

The last stage was to make a string. Modern bowstrings are usually Dacron, Kevlar or Dyneema; traditionally, they were made from sinew or twisted plant fibers. A loop at each end fitted over the nocks, and the center was wrapped with fine cord to reduce wear from arrow.

Being able to make a bow is still a useful skill. In a survival situation, as long as you have a knife you can make an effective weapon. Just look for a dead branch that hasn’t been rotting on the ground, and you have a seasoned stave to work with. Get fibers from crushed nettle stems to make a string, fletch some arrows with leaves or feathers, sharpen their tips and harden them in a fire, and you have a hunting and defensive weapon that’s been used in America for many centuries.

Snowshoes

As the pioneers moved away from the original colonies and into the West, they encountered winters harsher than anything they'd seen before. It snows in Europe, but hundreds of miles from the coast in the US interior the temperatures were colder, and the snowfalls heavier, than most Europeans ever experience.

The problem was, even in the worst weather people still had to get out and about. Livestock had to be cared for, game hunted and food collected from stores.

Wading through deep snow could get exhausting in a hurry, and snowmobiles didn't exist in 1900. Luckily there was a slower, but cheaper, was to get around – snowshoes.

Snowshoes are simple. All they do is spread your weight over a larger area so you don't sink into the snow. Native Americans used them for centuries; the Plains Indians wore snowshoes on their winter buffalo hunts.

French settlers in what's now Canada and New England soon started using them, and before long almost everyone who headed outdoors in the cold American winters had a pair with them.

Snowshoes have mostly been replaced with cross-country skis, but they still have advantages. They're a lot shorter, for a start. It's much easier to strap a pair of snowshoes to your pack when you go hunting than a pair of skis.

They're also easier to make. Not many people can make a good pair of skis, but basic snowshoes aren't difficult. That's why they were the top choice at the turn of the century – any hunter or farmer could make his own.

What design?

Traditional snowshoes come in two basic shapes – oval and teardrop. The teardrop shape is easier to make, so that's what most DIY ones were. Both shapes have the same three basic parts, though:

- **Frame** This defines the snowshoe's shape, and acts as a base for the other parts. It's usually made as a wooden outer rim, with one or two crossbars to add strength.
- **Webbing** The webbing is what does the work of keeping you out of the snow. It's made of light material, usually woven into a mesh.
- **Binding** This holds the snowshoes to your normal shoes.

Making the frame

The best material for snowshoe frames is the trunk of a sapling. To make the outer rims people would cut saplings that would give a flexible pole at least eight feet long. Except in an emergency they would usually shape them to get the same diameter along the whole length; this made the snowshoes lighter, and it was also easier to get the shape right. The frames had to be strong enough to do the job, but any extra wood was just deadweight to carry around – and that gets tiring.

Once the poles were cut and shaped, usually to under an inch in diameter, they had to be soaked for at least twelve hours (a couple of days was even better). Next the wet wood would be heated over a fire, taking care not to burn it or let it dry out. This process softened the wood, so it could be easily bent into shape. To make teardrop snowshoes the wood was bent in stages until it formed a teardrop shape and the two ends could be pressed together. Then the inside of each end was cut flat, holes bored through the wood with a heated awl or piece of thick wire, and the ends tied together tightly with cords.

To fit the crossbars, holes were cut in the insides of the frame and the ends of the crossbars fitted into them. The tension of the webbing would hold them in place.

The webbing itself was usually made from thin strips of rawhide, woven into a net which was then tied tightly to the frame. The idea was to have a dense enough weave that it wouldn't sink into the snow. For each strand to sink it needed to have a certain amount of weight on it, and with enough strands there just wasn't enough weight to do that. The average snowshoe used over a hundred feet of rawhide in its lacing. It was important that the webbing was quite tight, though, or the weight wouldn't be transferred over its whole area.

Snowshoe bindings were usually simple leather straps fastened to the crossbars. There were usually three – one over the toes, one over the arch of the foot and one round the heel. Between them they held the snowshoes firmly in place; unlike skis they're not flexibly attached, or they flop around.

If you're going outdoors in the winter, snowshoes still make a lot of sense. They're light and can be strapped to a pack or slung over your shoulder on a strap, so you'll have them with you when you need them. They also don't need complicated tools or expensive materials to make – you can do a good job with nothing more than a knife and something to bore holes with. Saplings are free, and the rest is just rawhide and leather.

Snowshoes also work extremely well. With good, tight webbing they'll support a lot of weight even on dry powdery snow, and after some practice you can run amazingly fast in them. Walking in deep snow doesn't need to be an exhausting slog anymore; a few hours' work and, just like farmers and hunters more than a hundred years ago, you can get around on your home-made snowshoes.

Conclusion

At the beginning of the 20^{th} century DIY wasn't just a hobby or something you do to save some money on home improvements; especially in rural areas, it was a way of life for most people. Hiring someone to do a job was reserved for the rich and the few jobs people couldn't do themselves – everything else was a candidate for DIY.

Old-school DIY was often a communal activity. That can still be seen at events like Amish barn-raisings – people would help their neighbors, and in exchange their neighbors would help them. That made more manpower available for big jobs, and it also meant that people didn't need to master every single skill. As long as *somebody* knew how to do it, they could supervise the job.

Anyone who values being prepared probably has a bit of a DIY mindset already, but it's usually possible to do a lot more. One of the most useful ways to expand your DIY horizons is to learn about the lost ways of our ancestors in the 18^{th}, 19^{th} and early 20^{th} centuries, to see what people did for themselves before the consumer society got into full swing. You'll find that, instead of trying to repair or replicate a modern solution to a problem, there's usually a simple and robust older one that will do the job just as well.