

**WOOD,  
WHISKEY  
AND  
*Wine***

A HISTORY OF BARRELS

HENRY H. WORK



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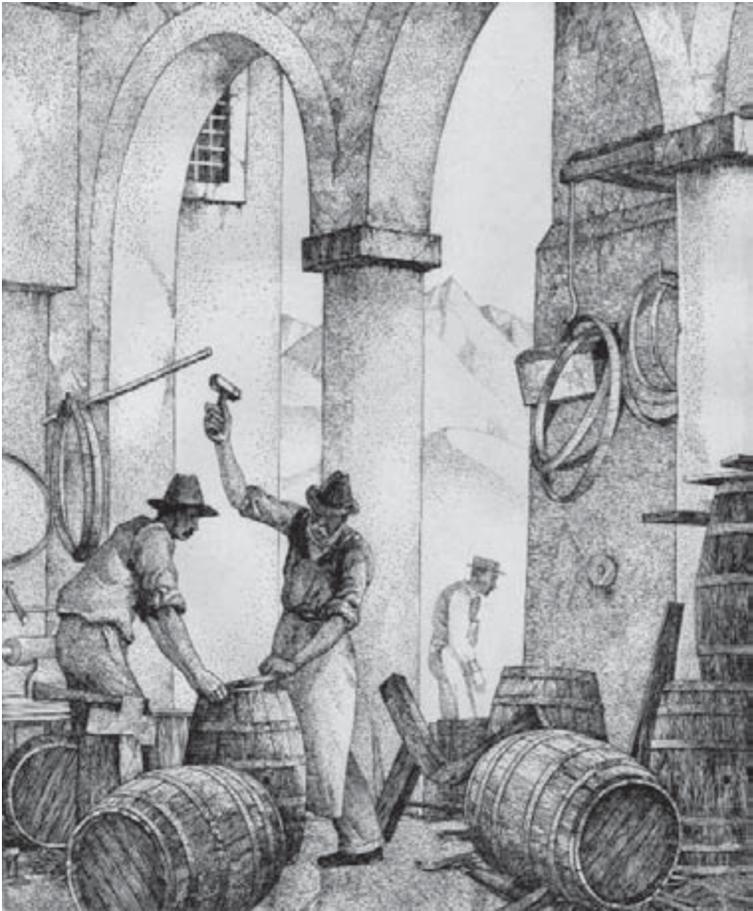
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Etching by Leonard Beaumont of Spanish coopers fabricating barrels, c. 1930.

# Introduction



For over 2,000 years wooden barrels have been used as bulk containers. Since their initial development, crafted by the Celtic tribes of northern Europe in the first millennium BC, they have stored, transported and aged an incredibly diverse array of provisions and liquids. And despite having been largely replaced by plastic, cardboard and metal, they are still highly valued for ageing the world's finest wines, bourbons and whiskies.

The pipes, or port barrels, of Vila Nova de Gaia provide an iconic example of this manifold usage. At this Portuguese town, located opposite Oporto on the Douro River, the barrels can be seen lashed to the decks of the *barcos rabelos*, the flat-bottomed sailing vessels that transported them up and down the river. A view from Google Earth clearly shows several of the boats moored at the quay in front of the red-tiled port lodges. Aboard each boat are six large pipes.

Oporto and Vila Nova de Gaia were established towns well before the Romans expanded into what is now Portugal. By the time the legions arrived, the indigenous Celts had rudimentary barrels for the ageing and storage of their wines and ports, plus river-going vessels with which to transport these liquids between the vineyards and cities.<sup>1</sup> Historically, the newly fermented port, from wineries located on the terraced slopes in the upper reaches of the Douro, was shipped down to the ageing and export warehouses at Vila Nova de Gaia on the boats. Today, these *barcos rabelos* are moored along the waterfront primarily for the ambiance; their function was handed over to trucks in the 1960s when the river was dammed.<sup>2</sup>

Ambiance! Years ago the port would be aged and shipped to London or New York still in the barrel. Now, while the port is aged in the pipes, it is disbursed to customers around the world in bottles packed in cardboard cases: a poignant indicator of the way the wooden barrel is slowly being replaced.

Thinking back, do you recall seeing barrels used for products other than beer, wine or whiskey? While barrels were ever present in our grandparents' day, a small number of our parents, and even fewer of us, relied upon them for our provisions.

Growing up on America's East Coast, I recall only a few examples of wooden barrels in use. I do remember that in houses under construction there were kegs containing the bulk nails used by the carpenters. If the workers were friendly, they would flip over an empty keg and allow me to sit on it, listening to their banter as they ate their lunch. These barrels were relatively small, perhaps 40–50 centimetres tall and 20–30 centimetres in diameter. Some were held together by wire and others by thin metal hoops. If the kegs survived the house construction, they might have been used later to hold firewood, golf clubs, hockey sticks or other items in the household garage or basement. Today, nails come in cardboard or plastic boxes, which are generally tossed out when the nails have been used.

Many houses in the eastern United States had a cellar or basement. Within these cellars, some residents cleared their accumulated and unused household goods to make a living space complete with a small bar. One day, while visiting a neighbour's basement where there was such a bar, I saw, proudly sitting on small stands, several kegs which held brandy or port. Some were unadorned, simple kegs, but others, usually those imported from Europe, were made in an oval shape, with the front painstakingly carved. The liquid was dispensed via a wooden or brass spigot from the head of the keg. Nowadays, most of us pour our port or sherry from glass decanters or bottles.

I also remember that wooden barrels were part of the display seen during a visit with my parents to a historic sailing ship moored in the seaport of Mystic, Connecticut. These barrels would have contained the bewildering range of supplies necessary for long ocean voyages, as well as some of the cargo the ship would be carrying for

trade. Today, those supplies are stored in plastic bins and boxes, and metal shipping containers are far more commonly used for transporting the cargo. On another occasion, at a sweetshop, I chose my selection from an array displayed in a wooden barrel. This would have been the forerunner to presentations within barrels in stores and restaurants now peddling folksy nostalgia.

By the 1970s and '80s, I saw wooden barrels which had been cut in half to make planters and occasionally whole ones used to catch rainwater, placed at the bottom of a downspout. Although by this time, having moved to California, they probably weren't as plentiful as they were in the eastern states, nearer to the source – the surplus of used whiskey barrels coming from the distilleries in Kentucky and Tennessee. The barrels I saw in California were more likely discarded from the growing premium-wine industry.

But it was when I moved to the Napa Valley in 1974, with its wine fame gaining on that of France's Bordeaux and Burgundy, that my encounters with the wooden barrels become significant and personal. These were the critical ageing vessels for the expanding premium-winemaking industry in California, and so a source of livelihood for me.

Hired by a struggling barrel sales-and-repair enterprise which was exploring all manner of income sources, including making redwood hot tubs – this was, after all, California in the 1970s – I gravitated towards the assignments that involved wine barrels. There was something captivating about the barrels that the Valley's wineries were purchasing in ever-increasing numbers. The historical development and use of wooden barrels begged to be explored. It seemed they would be around longer than wooden hot tubs.

My trial by fire came when two co-workers and I were sent, in the middle of winter, to a large, upstate New York winery. There, we were to assemble several hundred puncheons, or 600-litre barrels. The wood for these puncheons was American oak, which had been shipped to Portugal where, with inexpensive labour, it was made into the barrels. When the barrels were completed, the staves, hoops and heads were carefully numbered. They were then dismantled, to conserve space in the shipping container, bundled and shipped back to the United States to this winery. Our job was to sort through

the 200 or so potential barrels and assemble all the pieces correctly; each head was made, and each hoop was sized, specifically for a certain barrel. Ironically, it was wooden barrels that were the ‘shipping containers’ for the world up until just a relatively few years ago.

Being California boys, we were not acclimatized, or prepared, for the bitter cold in an unheated New York warehouse. The job was further complicated by the height of the puncheons – 1.4 metres tall – and the force needed to work them. These barrels were encircled by heavy metal hoops, and to cinch a barrel together, the metal hoops need to be forced towards the bilge, or middle of the barrel. This is accomplished using a hoop driver: a handheld piece of metal upon which to transfer to the hoop the downward force from a heavy hammer. The action is similar to hammering on a chisel, but instead of light taps, the cooper puts all his strength into bringing the hammer down for each blow. As novice coopers, it was this force that we lacked – we didn’t have the strength to swing the hammers high above our shoulders for the many repeated hits necessary to drive down the big hoops. What was anticipated as a one- or two-week job turned into three; and only during the last week did the cursing and sore muscles subside into sustained and productive barrel assembly.

Upon returning to California, while not anxious to repeat my New York experience, I was grateful that it had offered a glimpse not only of a different aspect of the wine industry compared to the practices that I saw in the Napa Valley, but also of the larger world of cooperage – the general term for all wooden pails, buckets, barrels and tanks. That oak wood could be sourced in the United States, coopered in Portugal and then returned to age New York wine was intriguing. Little did I realize, the port barrels resting in the port warehouses at Vila Nova de Gaia and on the *barcos rabelos* at the quay were also made from American oak.

Where else was cooperage traded? How were other wine barrels made, and where? Who made the first barrels, and what were the other uses of barrels through the ages? All these questions piqued my curiosity and imagination. The subsequent years, employed within the cooperage business and including a stint as general manager of a Kentucky bourbon barrel plant which was transformed

to craft wine barrels, provided opportunities to search for answers. The hands-on experiences I encountered, with both many various-sized barrels and wooden tanks, coupled with travel to numerous wine and whiskey regions, slowly provided insight into the fascinating world of cooperage.

As cultural icons for the port region, the barrels, resting within the *barcos rabelos*, provide a picturesque reminder of their importance to the port trade and to this area's way of life. And while wooden barrels are displayed within other historic ships in waterfront cities around the globe, few exemplify so well the critical integration between wooden boats and wooden barrels: a fundamental connection in the long history of cooperage.

Wooden barrels, and the associated cooperage containers, have aided the trade and storage of all manner of foodstuffs and supplies, on land and at sea, and contributed to the advancement of most of the water's edge cities of the Western world. These topics, along with how barrels are crafted and used within today's wine and whiskey industries, will be explored throughout this book. Additionally, we will examine the factors which influenced decisions by vintners, distillers, brewers, sailors, fishermen and merchants to contain their products within those vessels.

### A Note on Terminology and Measurement

While the past development of the wooden barrel was a rather unscientific process, to attempt to bring cooperage into the twenty-first century, metric measurement has been used throughout the book. However, where use of the historical measurement makes more sense, I have utilized it, followed by the metric measurement. Gallons are U.S. ones, not British, and currency is denoted in U.S. dollars.

Additionally, 'whisky' will be spelled without the 'e' when referring to Scotch, the spirit produced in Scotland, whereas it will be spelt 'whiskey' when referring to bourbon and generic whiskies.

# Need: Why Wooden Barrels?

Wooden barrels have been arguably the most significant shipping container in history. They served Romans, explorers, pilgrims, pirates, pioneers and samurai through 2,000 years of civilization.

Diana Twede, 'The Cask Age: The Technology and History of Wooden Barrels'



The now-ubiquitous plastic water bottle is symptomatic of our throwaway society. It is also a symbol of 'individualized packaging' and is basically the antithesis of the barrel. Wooden barrels were, and are, bulk containers. Travellers of 150 years ago on a sailing ship, a steam train or a horse-drawn coach would have filled their own glass bottles or leather canteens from water stored in a wooden barrel. On sailing ships, when not on duty, sailors often hung around the water-storage barrel to get a drink and to chat (a forerunner of our modern-day sessions at the office water cooler). The barrel around which they congregated was usually placed on the deck of a sailing ship, near a hatch that was known in naval terms as a scuttle. Most barrel sizes have specific names, and this large barrel was called a butt. The conversation, or scuttle-butt, that ensued took its name from the location and the barrel. Though the barrel is long gone, the term lives on as a word for gossip.

Barrels were also the container of choice for an extremely wide range of other commodities. Before the use of individual pockets in cardboard or plastic trays, apples were packed in what were called slack barrels – that is, wooden barrels which were not liquid-tight. Bulk nails and gunpowder were stored in small barrels called kegs. Because nails needed little protection from the elements, they would have been packaged in 'slack' kegs, while the gunpowder was kept dry by being sealed in a 'tight' barrel, the general term for water-tight cooperage. Salted meat was packed in hogsheads – capacious 340-litre barrels which were slightly larger than the typical wine or bourbon barrel. Over the centuries, an enormous range of products

were transported and stored in barrels: animal hides and skins, beer, cement, cheese rennet,<sup>1</sup> cider, coconut oil, coins, cornmeal, crackers, flour, grains, green ginger, molasses, palm oil, paint, petroleum products, pickles, potatoes, putty, salt, salted fish,<sup>2</sup> salted meats, seeds, sugar, syrup, tar, tobacco, vinegar, whale oil, whiskey, wine and even linens and crockery, cushioned in straw.<sup>3</sup> The barrels for these diverse commodities were all roughly similar in shape – the bulbous cylinder with flat ends – but varied considerably in size and in the type of wood used for their construction. Most acquired their own specific names and identities.

In the eighteenth and nineteenth centuries, portions of America's bountiful cod, harvested off the New England coasts, were dried, salted and packed in barrels to be sent to England and Europe.<sup>4</sup> At the height of the United States' Chesapeake Bay oyster harvest, barrels of oysters would be shipped across the country by railroad, and many a household in the Midwest or on the Pacific coast had a barrel of Chesapeake oysters in the cellar.<sup>5</sup> Nineteenth- and twentieth-century French homes may also have had a barrel of oysters, plucked from the cold Atlantic waters, in their cellars and would certainly have



An 18th-century advertisement for Sancho's Best Trinidado tobacco paper, with a tobacco barrel in the background.



A postcard of 1907 mailed from Rochester, Kent, showing the hooks used to grab barrels to load or unload them from ships and barges.

had a barrel or two of wine, quietly ageing. In Britain a pint at the local pub would have been drawn from a barrel.

From the time of the early Roman Empire until the early twentieth century, a number of factors meant that the wooden barrel was favoured as the bulk container of choice.<sup>6</sup> Before aluminium and plastic, wooden barrels provided a watertight container. Before tin and steel, wooden barrels offered protection against the depredations of rats. Before collapsible cardboard boxes, wooden barrels could be shipped unassembled, or ‘knocked-down’, and then assembled prior to packing or filling. And when unused, they could be knocked-down again to await reuse. Before forklifts, barrels containing heavy products, such as water or salted meat, could be easily rolled up ramps into ships or wagons. The barrels nested tightly against one another in the holds of ships or, when turned upright, remained relatively steady throughout the journey.

In the late 1850s, the first wells were successfully drilled to extract the petroleum seeping from western Pennsylvania’s sedimentary formations. Wooden barrels of 42-gallons (159-litre) capacity were used to transport that crude oil from the wellhead to the refineries for conversion into oil for heating and lighting. As the need for oil as fuel overtook its original medicinal uses, millions of these barrels

were employed.<sup>7</sup> Today, the thousands of tons of oil resting in the vast holds of a supertanker steaming through the Arabian Gulf are still measured in barrels, though the original wooden containers have long since vanished. And that tanker's capacity is measured in 'tons', from the French word *tuns*, meaning large barrels or casks. Long before twist tops on beer bottles or pull tabs on aluminium beer cans, beer was aged, transported and dispensed from barrels. Pork meat used to be transported in barrels too; the term 'pork barrel' now implies, in the U.S. at least, the transportation of money to a Congressman's home district. Barrels were also used to transport coins, and if one was 'scraping the bottom of the barrel' it was to find any remaining cash. And before the common use of glass for wine bottles, wine was transported and stored in barrels, then dispensed through a spigot in the head, or end, of a barrel into a glass, bottle or pitcher.

Barrels had significant advantages over ceramic containers for size and durability. Wooden barrels and tanks could be made much larger without adding significantly to their weight. And they were also less likely to break if dropped or jostled. In the vast forests of Europe, Russia and North America, wood – especially oak, poplar, elm, fir and chestnut – was a plentiful resource. And the use of barrels increased as these and further advantages over other containers – ceramic or stone vessels, woven baskets, bladder or hide sacs, shells or even large nuts – became apparent.

Air, insects and rodents were and are common enemies of the safe storage of many food staples. Wooden barrels provide protection from all of these: wine can stay bunged in barrels for several months without oxidation; water does not leak from a properly made barrel; and saltwater, insects and rats cannot enter to spoil flour, grain or meat. Some whiskies are aged for up to twelve years in the same barrel.

The ability of barrels to store salted meat safely created the need for even more barrels. Salted beef and pork, the staples of naval and merchant-ship diets during the age of sail, needed fresh water in which to soak prior to cooking and eating. Thus ships carried barrels of fresh water both for drinking and for preparing food for eating. The maintenance and repair of the barrels would have been

the responsibility of the ship's cooper, a name still used to describe the craftsmen who build and care for barrels, as well as a now-common English surname. And from cooper, the word 'cooperage' evolved as the place where the barrels are made and the generic name for the round, wooden containers.

Security, mobility, adaptability, cost and ease of fabrication were all advantages that food producers and merchants sought when considering the containers for their products. The wooden barrel, whether tight or slack, filled these requirements for many historic, and a small number of present-day, commodities.

Yet barrels were not a primary product; they were the packaging. And, by extension, the demand for barrels was subject to the winds of a constantly shifting economy which bought and sold greater or lesser amounts of wine, or herring, or oil. The coopers who fabricated the barrels constituted an adjunct part of the equation. Their livelihood was determined by which container the merchants considered best for their commodity, how well that commodity sold and what regional and national politics were currently in play. Compounding these factors were the periodic episodes of war, famine, plague and specific kinds of weather – all issues continually impacting demand for the barrel and its usage.

### Making the Barrels

The evolution of wooden barrels interweaves constantly with that of wooden boats – those built with timbers and planks. The materials and tools needed to build each are similar, as are many of the wood-working techniques. The ability to split, saw and shape hard wood, such as oak, was required. This meant durable tools, capable of holding an edge and with the ability to be used with some precision. Bending wood to form complex shapes was integral to both industries. And the ultimate requirement to be an effective barrier for liquid – keeping it in or out – is identical for boat or barrel.

Many of the woods used to fabricate both boats and barrels – oak, cedar, chestnut, cypress, elm, fir, kauri, pine, spruce and walnut – have also been similar. Other woods, selectively used in various aspects of boat building, such as acacia, willow, alder,

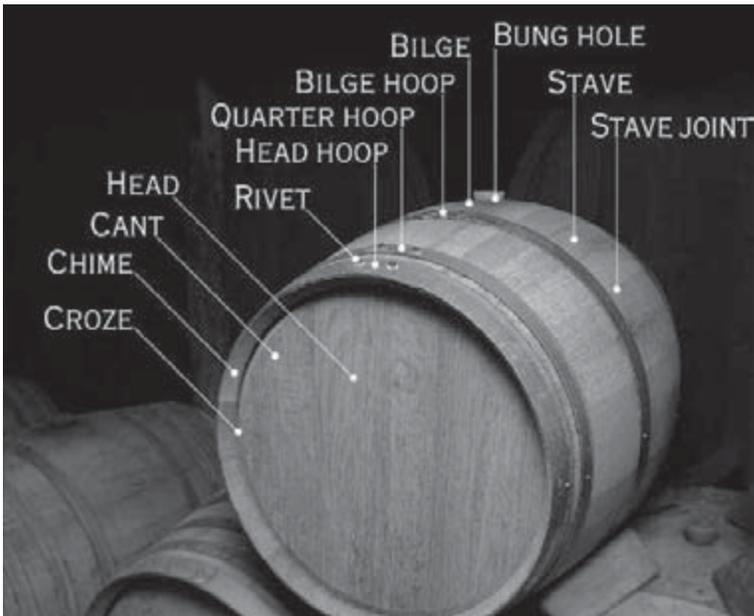
redwood, cherry, eucalyptus, white birch, poplar and linden, were also used for specialty barrels and vats.<sup>8</sup> It has been documented that possibly as early as 350 BC, the northern European Celtic tribes, with access in their part of the world to abundant amounts of these woods plus their ability to smelt iron and weld steel to the edges of iron tools, were crafting both boats and barrels from these timbers.<sup>9</sup>

Metal screws and fittings in boats were available, though not common until the sixteenth and seventeenth centuries. Similarly, the metal hoops used to hold the barrel slats, or staves, together were not in regular use until the end of the eighteenth century. Throughout most of their history, barrels have been held together by strips of flexible wood, such as chestnut or hazelnut saplings or willow boughs. These bands would have been curved into a circle, with the two ends then fastened by connecting hooked notches and that connection bound tight with willow caning: simple and ingenious. By using many wooden hoops on a barrel – historic paintings and illustrations often show sixteen to eighteen in use – a strength equal to today’s use of six metal hoops was achieved.

Barrel-making processes have changed little over the thousands of years during which barrels have been in use, and barrel staves are a case in point. The staves are the long pieces of wood that make up the sides of a barrel. The staves are extracted out of a log bolt – a short piece of the log that is cut just slightly longer than the desired stave length in order to allow for shrinkage and waste – as straight pieces of wood, just as they were when the Celts started to make barrels, and are then heated. Heating allows them to be curved into the shape required for the barrel. These processes are in common with those used for boat building.

The main use for wooden barrels today is for the ageing of wine, including fortified wines like sherry and port, and spirits, such as Cognac, Armagnac, whiskey, Scotch whisky, bourbon and rum. Today’s wine and spirit barrels are made from both European and American white oaks, while for whiskey and bourbon, American white oak is the primary wood.

Producing the staves and heading from oak differs depending on whether European or American oaks are being used. This is primarily due to the oaks’ intercellular structure, which affects the potential



The terms for the parts of a wooden barrel.

for leakage in the final pieces. The cellular structure in American white oak allows for the timber to be sawn in order to produce the staves and heading, while to extract the staves and heading from European oak, the wood needs to be split in order to minimize leakage.

### Different Uses, Different Sizes

Throughout the more than two millennia during which wooden barrels, and other wooden containers – from small buckets to huge tanks – have been constructed, the majority have been manufactured for specific commodities. The quality, quantity and weight of the commodity usually dictated the size and shape of that container, but occasionally the resources, or lack thereof, of a cooper also played a critical role. Barrels come in hundreds of sizes, most with their own unique names, often related to the product they contain – cracker barrel, nail keg, beer barrel and so on. To simplify the naming system used in this book, small barrels with capacities of up to 90 litres (25