FROM ALEGAR TO SARSON'S: A HISTORY OF MALT VINEGAR

Reginald Smith

Vinegar is so cheap, so seemingly simple, and so nearly ubiquitous that few people stop to ask themselves what it really is or where it comes from. Vinegar is probably one of the oldest condiments in the world. In fact, my forthcoming book on the history of vinegar is named *The Eternal Condiment* for the fact that vinegar has been with us since the earliest times and is one of the few things that, properly stored, is very resilient against spoilage.

Vinegar is made primarily of a solution of acetic acid in water. Acetic acid itself takes its name from the Latin word for vinegar, aceto, and was one of the first acids discovered and analysed by alchemists and early chemists. Vinegar is fermented by a narrow group of bacteria, called acetic acid bacteria, that have the unique talent of using oxygen to ferment ethyl alcohol into acetic acid. Being hardy enough to survive the acidic environment of vinegar that kills most other microorganisms allows vinegar to be both biologically fermented as well as a strong antiseptic. Historically vinegar was made in a passive manner—get an alcoholic beverage and let it sit in a barrel or urn and over time until it forms a thick surface mat (biofilm) made of cellulose known as the ‘mother of vinegar’, and after fermentation and aging forms a good vinegar.

The Babylonians were the first to write extensively about vinegar which they primarily made from dates, figs, honey, or beer. They had a saying ‘vinegar is beer that wandered into the kitchen’ which is accurate in describing both its discovery and subsequent use. Later Egypt would also make vinegar from beer but the most popular vinegar in the Mediterranean, especially with the Greeks and later Romans, would be wine vinegar.

Today, vinegar is made in giant vats in an industrial process, usually by large machines called acetators. Made by only two
companies (both in Bonn, Germany) these efficient generators can transform alcohol into vinegar in only 24–48 hours. Finished vinegar is then stored for aging and later pasteurized and bottled. Vinegars come in different strengths based on acidity which is a percentage designating the grams of acetic acid per 100 ml of water. Most store vinegars are 5% acidity with bargain vinegars being 4% and many European wine vinegars being 6–8%. For efficiency, however, most aceta tors manufacture vinegar to acidities of 10–15% before final dilution with water to the target acidity.

The conversion to acetic acid from alcohol is relatively straightforward chemically. In fact, in a perfect fermentation one per cent of alcohol v/v in the starter yields 1% acidity in the final vinegar. Of course there are losses so the conversion is usually only 80% efficient. However, vinegar-makers recognize well that more sugar in the mash gives more alcohol which gives a higher strength vinegar.

Like many of our words, the word in English ‘vinegar’ comes from French, in this case the French term ‘vin aigre’ which means sour wine, combined in modern French to just vinaigre. For most of the history of Europe, vinegar was invariably made from wine, due to the influence of the Greeks and Romans, with some made from figs, honey, or fruits. The Celts are thought to have been the first to popularize apple cider vinegar though a common legend of Julius Caesar finding the Britons using cider and cider vinegar is likely apocryphal and finds no support in classical texts.

The thrust of modern development of vinegar brewing in the West started in many places but chief among these was the city of Orléans in France. Orléans is the closest large city to Paris on the Loire and wines from the Loiret region, en route to Paris, would often disembark barges at Orléans. The best wines were sent on while the rest were left, often turning into vinegar. This misfortune was a blessing in disguise and eventually a robust and organized vinegar guild emerged in the city, first organized in 1394 and gaining the royal blessing as a French corporation in 1580.

The vinaigriers (vinegar-makers) of Orléans developed much of the technique of fermenting and aging vinegar in wooden casks, known historically as the Orléans process. This included not just leaving the vinegar to ferment but understanding the importance of surface area (the casks laid on their sides) as well as heating (provided by steam pipes) to progress fermentation. They also formed a rigorous standard of regulation amongst the members of the corporation ensuring quality and making its vinegars in demand across Europe and later the world.

The development of malt vinegar, primarily in Britain, was different from most European vinegars not just because of the
starting alcohol, ale, but because almost no other vinegars in the West are cereal based. This contrasts sharply with the East where most traditional Chinese vinegars, going back millennia, have been based on cereals or rice with fruits playing an almost vanishing role. The first known mentions of malt vinegar in England are in cookbooks and writings from the High Middle Ages and Renaissance where the term alegar is found. The oldest known reference is a cookery book from 1430. Alegar is a portmanteau derived from ‘vinegar’ designating ‘sour ale’ rather than ‘sour wine’.

The first alegar was likely made by beer-brewers, who inadvertently allowed their beers to spoil (preservatives and pasteurization were unknown) or deliberately made beer that was not good for drinking into vinegar. While malt vinegar-makers in Britain were not as organized as those in France, over time, malt vinegar-making became more refined and separated itself from beer brewing to become its own industry. Malt vinegar, while it had many recipes, eventually designated mostly the same thing: vinegar made from unhopped ale, that was usually made from malted barley.

To make malt vinegar, first the malted barley is crushed in a mill and then soaked and washed in hot water to activate enzymes called amylases (the traditional term being diastase) to break down the starches into sugar. The resulting sugary liquid, known as wort by beer brewers, is then fermented to alcohol with yeast. This ale-like alcoholic liquid is known as gyle in the vinegar brewing community. Vinegar-makers paid more attention to converting almost all starch in the barley to sugar and that sugar to alcohol and vinegar with as little residual sugar as possible. This meant choosing a very starchy barley with large diastatic (enzymatic) power to maximize production. Malt vinegar recipes, then and now, were relatively simple and largely based on barley though other ingredients such as corn or wheat could be added. Malt vinegar is distinguished from beer vinegar due to the lack of hopping of the ale. The hops and other additives to beer vinegar not only affected the taste, but made it difficult to keep and age well which is partially why beer vinegar never became as prominent as its cousin.

Similar to French vinegar-makers, British vinegar-makers used wooden casks to ferment malt vinegar. However, some of their technique was different. For example, malt vinegar-makers usually fermented the casks outside, starting from spring and continuing through the summer in their ‘yard’. This process was known as ‘fielding’. In the late summer and fall the last batches would be stored for aging while fermentation, usually much more limited due to space, could only continue on the inside of heated rooms during the late fall and winter months. The fermentation in these rooms, heated by stoves to a temperature around 30°C, was known as ‘stoving’. In either method, the results were the same with vinegar production usually taking 1–3 months plus several months for aging.

Over the centuries the vinegar industry slowly grew. As early as 1604 the Rush family owned a large vinegar yard on Castle Street in Southwark, London. By the end of the seventeenth century, in 1673 during the reign of Charles II, the Crown began taxing vinegar for the first time, implying it had become a product of some economic importance. The initial tax was sixpence per barrel of vinegar made from beer or ale. No barrels were allowed to leave a vinegar brewery without a permit from an Excise Officer. Penalties for evading excise taxes were added in 1696 at 40 shillings per barrel and the taxes were increased to ninepence per barrel in 1710 where they would stay for about 100 years. The excise was finally repealed permanently in 1854.

Figure 3: A traditional malt vinegar yard. (Source: Cyclopaedia of Useful Arts: Mechanical and Chemical, Charles Tomlinson, ed. London: Virtue & Co., 1868.)
MALT VINEGAR AS A BUSINESS

As discussed earlier, the malt vinegar brewers became their own independent operations either making their own ale for fermentation or buying it in bulk from a local beer brewing operation. Malt vinegar at this time was not necessarily dark as it is universally known today but often a straw amber having been fermented from ale. The impetus to darken it came primarily not from the vinegar brewers themselves but in order to battle foreign competition.

In 1893, Edward Collens, in a speech later published in *The Analyst*, discussed some of the history of vinegar in Britain including the interlude of competition from vinegar from the West Indies. For a time, particularly in the eighteenth century, an imported, cheaper dark coloured vinegar made from fermented molasses had dominated the market to the detriment of the malt vinegar-makers. Customers became used to the dark brown colouring for the vinegar and in an effort to compete, malt vinegar-makers added caramel as a colouring to malt vinegar to imitate the colour. Even as this imported vinegar became less common, the convention remained so that the ordinary straw coloured malt vinegar became a much rarer sight. This tradition carries down to the present day where Sarson's and some other brands of malt vinegar add liquid malt extract to the final vinegar for colouring and sweetness.

The distribution and retail sale of malt vinegar was much different up until the late nineteenth century when the current practice of distributing and selling bottled malt vinegar started. Malt vinegar manufacturers would wholesale their vinegars in wood barrels or casks, which is why barrels were the targets of excise taxes. Wholesalers would sell the barrels to various operations such as chemists, grocers, and door to door salesmen. A typical customer needing vinegar would either have a container filled by a salesperson that travelled door to door, a practice it seems was more prevalent on the continent than in Britain, or go to a grocer and have a container filled from one of the grocer's barrels. Larger customers like inns or restaurants would buy entire casks as well.

The eighteenth century also saw the emergence of several large and enduring dynasties based on vinegar manufacturing. The most well known, as well as the most enduring, lasting from the early 1700s to the twentieth century were the vinegar operations of the Beaufoy family. The family concern started in the early 1700s. The founder, Mark Beaufoy, was apprenticed to a distiller, Joseph James, in Bristol in 1730. By 1741 he became a partner in the business which became known as Beaufoy, James and Co. As a Quaker, Mark Beaufoy studied the vinegar business in detail including travelling to the Netherlands to learn continental vinegar brewing methods. In a great boost to his business, in 1756 Beaufoy obtained the contract to supply the British Navy with vinegar for food and antiseptic uses. The size of their vinegar yard in the mid-nineteenth century was attested by Thomas Pennant in the early nineteenth century:

> There is a magnificence of business, in this ocean of sweets and sours, that cannot fail exciting the greatest admiration...one of these conservatories...is full of vinegar, to the amount of fifty-six thousand seven hundred and ninety-nine gallons, or seventeen hundred and seventy-four barrels. Besides these, is an avenue of lesser vessels, which hold from thirty-two thousand five hundred, to sixteen thousand nine hundred and seventy-four gallons each.

While virtually unknown in Britain today, the Beaufoy family stood out for being not only the oldest vinegar manufacturers in

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*Figure 4: A portrait of Mark Beaufoy.*
the United Kingdom but also having many distinguished family members in Georgian and Victorian England. Mark Beaufoy's son, also Mark Beaufoy, became renowned outside of the world of vinegar for his scientific studies, particularly in naval ship design, astronomy, and mountain climbing. He was elected a fellow to the Royal Society as a result of his work. His grandson, Mark Hanbury Beaufoy, while continuing the family business was also a Liberal MP and famous benefactor for the poor, like his father Henry Beaufoy, and contributed to schools and charities for the growing ranks of the urban poor in Victorian Britain.

The firm Swann & Company, later Holbrook's, who became as famous for their Worcestershire sauce as well as malt vinegar, was founded in 1798 in Stourport-on-Severn near Worcester by Charles Swann and Hickin Bold. It grew rapidly building ever larger breweries until it was manufacturing 120,000 gallons per year by 1835 and 1 million gallons per year by 1894.8

Champion & Co., another London vinegar brewery and once one of its largest, was founded in 1705. One of the descendants of the founder, William Champion served for a time as the sheriff of London and purchased another factory on City Road which would become the long-standing location for the ever expanding brewery. They concentrated entirely on vinegar though they expanded into mustard in the nineteenth century. Champion & Co. would go through a number of name changes as different partners came and left the business such as Champion & Moore, Champion & Green, and finally Champion & Slee after being purchased by Slee & Co.9,10 By the 1870s Champion was brewing about 1.5 million gallons of vinegar per year. Champion was also one of the export champions of the London vinegar firms, being a primary provider of malt vinegar to many parts of the Empire, in particular Australia where it dominated the market until the twentieth century.

Last but not least, Thomas Sarson began his eponymous vinegar company in 1794 on Craven Street in London. Continued by his sons James Thomas Sarson and Henry Sarson, the first records for advertisements of 'Pure Malt Vinegar' from Sarson's are evident in 1842 and the firm heroically went into (and emerged from) bankruptcy in 1847 to become known as Sarson & Sons, led by John Sarson. Interestingly enough, Sarson's did not produce their own malt vinegar until 1894. The malt vinegar they sold up to this time was actually a relabelled product from Hill Evans & Co. of Worcester.10 By the eve of World War I in 1913, Sarson's was producing 1 million gallons of vinegar per year.9,10

As the nineteenth century dawned, vinegar manufacturing in England underwent several changes due to the impact of new technologies and the subsequent market consolidation. In the
1830s, two new processes for rapid industrial production were invented. The first, and most common, was the Schüzenbach packed generator invented by Karl Sebastian Schüzenbach in Freiburg im Breisgau in the Kingdom of Baden in 1823. The packed generator took advantage of the fact that the surface area exposed to air is a vital factor in the speed of vinegar fermentation since the bacteria require oxygen for the transformation.

Schüzenbach’s method was a tank with a false bottom in the tank a few feet from the bottom. On top of this false bottom was packing, using beechwood shavings in particular. Beechwood shavings were used to add surface area for fermentation and were unique in that the wood did not add flavour to the vinegar.

These beechwood shavings were loaded in the tank to nearly the top. However, the wine (or other alcoholic liquid) only filled the tank in the volume below the false bottom. Therefore the packing was always exposed to air and never submerged with the wine/vinegar. Finally, the tank was designed so that a draught of air would be introduced into the tank right above the false bottom and at the bottom of the shavings. This draught of air would flow up providing continuous oxygen supply to the shavings. What happened next was surprising and in some ways extraordinary. All workers would need to do is drain the wine/vinegar from the bottom of the tank into buckets and then pour it through the top of the tanks so that it trickles down through the beechwood shavings to the bottom of the generator. This would be done multiple times per day.

Eventually the bacteria colonize the shavings and create a huge surface area for vinegar fermentation. Combined with the air draught, they soon produce so much vinegar that the tank heats up to 85°F (29°C) or even higher. This high temperature additionally speeds the reaction (85°F is the optimal temperature) and produces a rapid fermentation.

The typical average fermentation time actually ranged from 3–7 days in practice, depending on the amount of packing compared to the volume of wine. Not only is throughput increased by the short period of time, but by higher acidity. Rather than the typical fermentation which produces an acidity of 4–7%, the quick-process generators could achieve 10%+ acidity. Therefore, one could dilute a batch with one part water to one part vinegar and produce double the production volume of 5% vinegar for sale.

One year later, in 1824, a patent was issued in England to John Ham for a type of generator that incorporated a similar aeration vent below the packing, operated by bellows, as well as a new development: heating the vinegar by pipes under the false bottom to maintain an optimum temperature. While a year after Schüzenbach, it is unclear if he was aware of the invention in Baden. In his patent he states the vinegar generator can make vinegar in 15 to 20 days which is slower than the Schüzenbach packed generator. Part of the reason for inefficiency may have been that instead of wood shavings, he recommended broom-sized sticks. His method would become widely used for a time in Britain though the packed generator would eventually conquer the market globally except for Asia.

The effect of these inventions was transformational for the industry. Soon gone were the days of vinegar yards and slow-
fermenting casks. Soon large, well-capitalized firms would begin to consolidate the industry, improving efficiency, driving down prices, and shutting out the old artisan firms. Several large businesses emerged both in London as well as the Midlands, creating some of the largest vinegar breweries in the world.

In London, Crosse & Blackwell became a major player during the nineteenth century. While the firm had been around in some form since 1706, it seems that their entry into vinegar did not start until the mid-nineteenth century propelled not just by demand from retail customers but by their own internal demand for ingredients needed to manufacture their sauces and pickled food products. By the late 1800s, they were producing 500,000 gallons of vinegar per year at their brewery.9

The largest growth of vinegar brewing beyond London also occurred during this period. While Holbrook’s of Stourport has already been mentioned, three of the biggest vinegar firms in Britain were established in the Midlands in the mid-1800s. Hill & Evans was founded in Worcester in 1829. By the 1860s, it was the greatest malt vinegar producer in the country, with an annual output of two million gallons. Cambrian Vinegar was established in Leeds in 1865 by Jotham Chivers and his partner now known only by his surname, Mr Taylor.10 It developed into a major concern and also trained a young man, Edwin Samson Moore, to open a second factory in Birmingham.

Edwin Samson Moore had entrepreneurial aspirations and soon bought the vinegar plant he had helped develop, founding the Midland Vinegar Company. Eventually a new, larger factory was built at Aston Cross in Birmingham, which was claimed (like many others) to be the world’s largest. While a significant vinegar company in its own right, Midland eventually became known for an entirely different product, HP Sauce. This sauce was first concocted by a grocer, Frederick Gibson Garth, who sold the recipe to Edwin Samson Moore to settle a debt. After launching HP Sauce in 1899, it eventually became so big that Midland later changed its name to HP Sauce Ltd in the mid-twentieth century though the vinegar manufacturing remained for some time after.

There was also a major vinegar brewery in Scotland in the Leith area of Edinburgh. The locally owned manufacturer was the Edinburgh Malt Vinegar Co. Ltd of Ballantyne Road. It is unclear how old they were or the size of their operation but in
1903 they were bought by the London-based outfit Grimble & Co, which had been founded in 1840. They eventually moved the operations to larger premises on Jane Street, off Leith Walk.

Vinegar brewers began to organize themselves as an industry association as early as 1756 with successor organizations formed throughout the eighteenth and nineteenth centuries. The primary goal seems to have been production and price collusion in the early days. By the twentieth century a more modern organization had developed, called the London and Country Brewers’ Association (1901). This was superseded by the United Vinegar Brewers’ Association in 1916, which in turn was renamed the Malt Vinegar Brewers’ Federation in 1930, with a final version emerging as the Vinegar Brewers’ Federation in 1951. This last survives today.

MALT VINEGAR AND CUISINE

Malt vinegar’s uses seem to have been typical for any other vinegar. This included being a main ingredient in many types of sauces: Worcestershire sauce, HP sauce, ketchup, and more recently malt vinegar aioli (see recipes). It was also the essential ingredient for pickling and preserving, whether in the home or on an industrial scale. On the Continent, particularly in Belgium and Germany, it seems malt vinegar was the preferred vinegar for use with shellfish as opposed to the more common wine or spirit (distilled) vinegars.

As far as iconic uses for malt vinegar, few can replace the status of fish and chips. Modern fish and chips is believed to have started in 1860 with the establishment of the first fish and chip shop, Malin’s, in London’s East End. Over time various condiments came into use and, by the twentieth century, vinegar was common. Though malt vinegar was the obvious choice, it was by no means a shoe-in. In order to cut costs, fish and chip shops often used imported distilled vinegar or even industrially produced acetic acid that was coloured brown with the addition of food colour or caramel or placed in a brown-tinted bottle. This gave the appearance of genuine vinegar without paying for the actual article.

This ‘non-brewed vinegar’ (forced to change its name to ‘non-brewed condiment’ after a 1949 ruling, since it was not fermented vinegar) made from industrial acetic acid is still a staple in many fish and chip shops though it can’t be legally called vinegar. Besides quality, at times this acid was hazardous, as one incident demonstrates in the 1920s when a farm-hand, drunk after a night at the pub, drank an entire two-litre bottle of high-strength vinegar at a fish and chip establishment and died soon thereafter.

While malt vinegar was undoubtedly used, its consistency seems to have increased in the 1930s when malt vinegar was championed on patriotic grounds as being a domestically produced product while the cheaper vinegar or acetic acid was often imported.

In addition to regular malt vinegar, distilled malt vinegar, clear in colour, was also available, primarily for industrial or practical uses. Distilled malt vinegar originally was made by distilling the same gyle as regular malt vinegar to obtain a relatively pure mixture of water and ethanol that is then fermented to distilled vinegar. Modern processes usually boil malt vinegar under a partial vacuum and then condense and cool the gases to get a clear product.

QUALITY STANDARD AND ADULTERATION OF MALT VINEGAR

As the chemical industries developed and also as cheap vinegar made from sugar or imported distilled white vinegar became increasingly common, adulteration and fraud began to rear its ugly head across the industry. It became common practice for many firms to label as ‘malt vinegar’ a concoction of sugar vinegar coloured with caramel or malt vinegar cut in half with sugar vinegar to increase profits. Complicating this fact was the lack of regulation from the British government on malt vinegar. Malt vinegar was never explicitly defined in a legal sense even though vinegar itself was required to be at least 4% acidity. Frequent actions and petitions by the vinegar industry association, eager to snuff out small or unscrupulous competitors, went largely unheard. The government even refused to define malt vinegar in the 1938 Pure Food and Drug Act.
Though legal definitions eluded the industry, chemists concocted various tests to detect frauds. The most common was measuring the ash (trace mineral) content of malt vinegar. Sugar or other cheap vinegars had almost no ash content while malt vinegar always had ash content within a given range. While the cheats could be identified, as long as their base vinegar was brewed naturally they could call themselves vinegar.

MALT VINEGAR OUTSIDE OF GREAT BRITAIN
Malt vinegar has always been a quintessentially British condiment. Outside Great Britain, it is often only found where British settlement or cultural influence was great. Even when Ireland was still part of the United Kingdom, records indicate the majority of vinegar used there was not malt vinegar from Britain but rather imported wine vinegar from France. Since malt vinegar developed in Britain as part of the beer-brewing heritage, one would expect nations with similar fondness for beer-brewing to follow suit.

Indeed one finds records of malt vinegar manufacturing in the Continent, most broadly in Germany, Scandinavia, and Belgium. However, in those countries malt vinegar was never the major type of vinegar, particularly from the nineteenth century onwards. Part of this was practical. The Schützenbach packed generators, as revolutionary as they were, were ill suited for malt vinegar production since the rich nutrients of the gyle would cause rapid formation of mother of vinegar clogging the packing of the generator in a process called ‘sliming’. In Germany, distilled vinegar made from a weak potato-based liquor was much easier to produce and much cheaper and this eventually dominated the market in most countries in Europe.

Second, wine vinegar was available from France and was the preferred vinegar for cooking or sauces rather than malt vinegar. Finally, many German breweries began to adhere to scientific brewing methods towards the end of the nineteenth century. In particular, the Danish mycologist Emil Christian Hansen introduced the pure yeast culture methods to the industry, starting with Carlsberg Brewery, that greatly reduced the waste and standardized beer production. This eliminated the surplus wort that could be diverted to malt vinegar manufacturing and most German vinegar-makers abandoned it entirely.

The greatest penetration of malt vinegar was thus where Britain ruled or had influence. In the United States, malt vinegar was popular for a time on the East Coast, particularly in cities like Philadelphia where some Anglophile merchant families had it specially imported.9 When Henry J. Heinz first began his iconic food-production company H.J. Heinz in Pittsburgh, he at first imported malt vinegar before developing his own internal operations to produce malt and cider vinegar for company use and retail sale. Heinz is still probably the largest manufacturer of malt vinegar in the United States. Retail is held primarily by Heinz as well as by a small number of private labelled brands. Still, malt vinegar has a relatively tiny footprint in America, dwarfed by the national favourite, apple cider vinegar.

Canada likewise seems to have produced malt vinegar at all of its major firms such as Lion Vinegar or the later conglomerate Canada Vinegars. It is uncertain how popular it was compared to apple cider vinegar which was also produced. Vinegar-makers in Quebec and Ontario often focused on apple cider vinegar, given the many orchards, so it is possible it was in a subordinate position as in the United States.

For parts of the British Empire where colonists were largely small minorities of settlers, expatriates and bureaucrats such as the Caribbean and India, malt vinegar never became the vinegar of choice and declined after independence. Partly this was due to the fact that malt vinegar was a higher cost due to having to be imported unless local supplies of malted grain or beer breweries were able to supply the raw material. Even in South Africa, where malt vinegar was being investigated for local manufacture early in the twentieth century16 it never seriously competed with the wine vinegar industry which predominated due to the plethora of wineries and their surpluses.

The most durable story for malt vinegar outside the UK was in Australia and New Zealand. As mentioned earlier, for
a while Australia was a chief export market for Champion's. Other firms took notice and began exporting and even setting up local manufacturing operations such as Holbrook's in 1919, to produce malt vinegar and sauces. New Zealand was the first to have a domestic company supply its market when the Dominion Yeast Company, formed in 1914 in Christchurch to manufacture compressed yeast, began fermenting vinegar from the resulting alcohol of the yeast cultivation process. Malt vinegar was soon added through the 'Acetomalt' brand. By 1960, vinegar had eclipsed yeast as the company's top product so the name was shortened to DYC.

Today the UK exports about £8 million per year in vinegar, the vast majority to neighbouring countries such as Ireland or France. It is unknown how much of this is malt vinegar versus bulk distilled vinegar or apple cider vinegar but there is a wide range of countries that import small but consistent amounts of vinegar from the UK annually, quite possibly malt.

THE CONSOLIDATION OF THE BRITISH VINEGAR INDUSTRY

The British vinegar industry was very fragmented and regional at the beginning of the twentieth century. However, this model consistently came under pressure. As James Brodie lamented at the end of his 1894 history of the Cambrian Vinegar Company: "To begin with, prices of the common qualities of Vinegar are little more than half of what they were a quarter of a century ago, while an expensive plant has to be maintained in the best working order." Slater's history of vinegar in the UK also indicates that the deflation had been going on even earlier and that from 1840 to 1860 the price of a gallon of malt vinegar fell from 3.7 shillings to 1.9 shillings. The vinegar industry began a rapid consolidation in the 1920s and 1930s.

First, in 1928 Beaufoy purchased Grimble, renaming themselves Beaufoy, Grimble & Co. Grimble itself had gone on an acquisition spree in the first decade of the twentieth century acquiring not just the Edinburgh Malt Vinegar Co. Ltd but Hutchings of Bristol, Bird of Malvern, and Ballard in Cambridge. Next, in 1929 Crosse & Blackwell purchased Sarson's as well as Champion & Slee. Soon after, in 1932, the vinegar industry consolidated into a huge nationwide conglomerate, British Vinegars Ltd, which combined Crosse & Blackwell, Beaufoy, Grimble & Co. (which was then the oldest extant brewer in the United Kingdom), Dufrais & Company of London, and several regional brands such as Leeds' Cambrian Vinegar and Bristol's Panter, Woodward & Co. British Vinegars was at first led by George Maurice Beaufoy of Beaufoy & Grimble, a direct descendant of the original Beaufoy founder.

Beaufoy's leadership, as well as his family's vinegar heritage, were tragically cut short. In 1944, during the Blitz, George Beaufoy was killed by a bomb that hit the Beaufoy vinegar factory premises where he was staying in a residence he had on site. His was not the only tragedy of World War II as his French counterpart, André Dessaux, of the oldest, largest and most famous vinegar manufacturer of Orléans, Dessaux Fils, died soon after the end of the War having been interned since 1943 at the concentration camp Buchenwald for his part in leading the regional French resistance.

By the middle of the twentieth century, British Vinegars Ltd comprised nearly the entire industry. After acquiring most other smaller competitors in the 1940s and 1950s, as well as Holbrook's Stourport vinegar factory in 1953, only a few independents remained. As with all consolidation, it began the rationalization and closing of many of the vinegar breweries across the country, concentrating production in a few large plants. In 1950, British Vinegars brewed 5 million gallons (190,000 hectolitres) per year. From roughly 1954 to 1979 Sarson's vinegar was also produced in the old Holbrook factory in Stourport. As a chosen flagship brand, Sarson's benefited greatly under British Vinegars and its later owners received large investments in marketing, packaging and distribution that catapulted it to first amongst British malt vinegars.

British Vinegars also initiated the modernization of the industry. After World War II, two Austrians, Otto Hromatka and Heinrich Ebner, invented a new rapid manufacturing process for vinegar called submerged fermentation. The units, subsequently commercialized by Frings of Bonn as 'aceticans', circulate vinegar
and inject oxygen from a bottom-seated impeller in order to rapidly ferment vinegar in one to two days. The efficiency and expense of these machines inhibited their adoption by smaller producers and promoted further concentration.

According to the history of the industry by Allgeier and Conner, published in 1974, the United Kingdom reportedly had only seven vinegar plants left. This seems to be a slight underestimate since in the same year British Vinegars had six plants alone: two in London, one in Middleton near Manchester, Leith, Stourport, and Penistone in Yorkshire (formerly the Penistone Pure Malt Vinegar Co. Ltd which was acquired in 1962). Other operations in Britain included Manor Vinegar of Burntwood near Lichfield, Ellsey & Co. in Wigan, HP Sauce and another smaller operation in Birmingham, and Thomas & Evans Ltd of Worcester, acquired by the Beecham family of companies. Of these other operations, only Manor Vinegar and Ellsey & Co. are still in operation.

British Vinegars itself ceased to exist as an independent entity in 1979 when it was acquired by Nestlé. By then, almost all brands had been phased out in favour of Sarson's. Nestlé sold Sarson's to Premier Foods in 2002. Finally, in 2012, as part of its expansion beyond its native Japan, Sarson's was acquired by the global vinegar leader Mizkan, who already controlled a large share of the American market. Mizkan bought Branston pickle from Premier Foods along with Sarson's. The Japanese company had already been in the UK since 2002 when it had bought Manor Vinegar. It was forced to divest Manor Vinegar to Baxters as part of the deal to buy Sarson's due to competition concerns raised by the Office of Fair Trading.

MODERN DEVELOPMENTS

Malt vinegar remains a major player and a well-known vinegar globally, though its production and distribution have fallen behind other non-white vinegars such as apple cider, wine, and balsamic.

The primary markets for the domestic production remain the UK and New Zealand. Australia has largely migrated to wine and apple cider vinegar and although malt vinegar is regularly produced and easily available in the United States, Canada, and South Africa among others, it is not a primary category. Estimates by the author indicate the total production of malt vinegar in the United States ranges between 200,000 to 400,000 gallons per year. This compares to the production of almost 2 million gallons per year by Sarson's alone in Britain for a domestic population one-fifth the size of the US.

Malt vinegar has found particular niches, however. For example, in many bars or casual dining establishments in the United States, malt vinegar remains a key condiment. In addition, seafood restaurants and even some seafood fast-food chains such as Long John Silvers or Captain D's make malt vinegar widely available.

While malt vinegar will definitely endure, it is unclear how much future growth it can expect. Few opportunities for geographic expansion and relatively slow population growth in its main markets have limited its prospects. Also, it is very concentrated, with Sarson's having a majority market share, reputedly as high as two-thirds. Unlike apple cider vinegar, it

Figure 10: A modern acetator.
(Courtesy of Heinrich Frings GmbH & Co. KG.)
has no purported health benefits to fuel a health-related craze, nor does it command a premium amongst foodies like sherry or balsamic vinegars. Future categories such as organic or gluten free may exploit narrow market segments but will likely only mean marginal growth.

This has not stopped small, local entrepreneurs from trying to revive quality malt vinegar using traditional artisan methods pre-dating modern industrial techniques. Mark and Leonora Natrass of the Artisan Malt Vinegar Company of Cornwall have revived the slow Orléans production method in an old nuclear bunker. In Scotland, Grimble's has been resurrected as an artisan vinegar-maker as well. These artisan malt vinegar-makers can likely find a portion of the market that is profitable and hungry for authentic, local ingredients.

Whether in sauces or fish and chip shops, however, malt vinegar has secured an identity and following that has both huge cultural and historic import. If only for this reason, it is to be hoped this sour condiment will continue to have a sweet future for generations.
MALT VINEGAR
(USING LIQUID OR DRY MALT EXTRACT)

Dry or liquid malt extract
(type can be personal preference though barley-based ale extracts approximate to traditional recipes)

Water
Brewing yeast (ale or lager)
Live mother of vinegar

Mix quantity of extract with water to adjust the specific gravity to a level that can ferment up to 6% potential alcohol by volume (roughly 1.05). For liquid yeast, pitch in directly. For dry yeast, soak in lukewarm water for 15 minutes and then pitch in. Keep in a warm place and allow alcoholic fermentation to proceed to completion (when bubbling stops and specific gravity is 1.0). Add mother of vinegar. The quantity should be one-fifth of the volume of the ale. Cover tightly with cheesecloth or another covering to allow air in but to prevent fruit flies from entering the fermenting vinegar. Place in a warm (25-30°C) place away from sunlight for two to four months. A thick mother should form on the surface and an increasingly acidic smell should develop over time. Testing with a pH meter can guarantee safety once pH is below 3.5 but acidity can only be measured by sodium hydroxide titration. The vinegar should be at least 4% acidity before use. Once the vinegar reaches 4.5% acidity, you can stop and it is important to measure acidity frequently after this point since allowing fermentation to continue for too long can cause bacteria to metabolize the vinegar and begin lowering its acidity. Make sure the vinegar reaches 5% acidity before using in canning.

Titration can often be done at a wine laboratory if you are unfamiliar with the process. Once the vinegar is made, put the mother (with enough vinegar to submerge it completely) in an airtight, twist-top container for preservation and future use. For the finished vinegar, you may bottle and use at will. If pasteurization is desired to prevent future fermentation, pasteurize it on a stove in a stainless steel pot at 65°C for 15 minutes.

For added flavour and colour (similar to Sarson's malt vinegar), add liquid malt extract to adjust specific gravity to 1.015.

MALT VINEGAR (ALL GRAIN RECIPE)

Obtain milled malted grains and cook and sparge/mash as with regular wort preparation in order to reach a specific gravity of 1.06. Then follow the instructions after pitching the yeast in the previous recipe.

MALT VINEGAR Aioli

250 ml mayonnaise
60 ml (more or less, to taste) malt vinegar
2 cloves garlic, very finely minced or mashed into a paste
15 ml Dijon mustard
1 teaspoon (2.5 ml) dried tarragon, crumbled
Kosher salt and freshly ground black pepper, to taste

Mix these ingredients together.