Historic tobacco kilns in north-east Victoria

Introduction

In north-east Victoria, one of Australia's major tobacco growing areas, tobacco is grown on irrigated land within the Ovens and King river valleys and their tributaries, particularly around Myrtleford, and in the Kiewa Valley near Mount Beauty.

The landscapes associated with this activity include tobacco crops, which create a green and yellow patchwork across the rich alluvial river flats, and tobacco kilns - distinctive, tall, narrow factory-like structures, often of corrugated iron, but also red brick, concrete, or chock and log construction. They dot the valley floors, sometimes solitarily, but often in clusters.

For decades the tobacco industry in Victoria has been falling into decline. As a crop, tobacco is being replaced with alternatives such as wine grapes and chestnuts. The number of tobacco growers has not only fallen dramatically since the 1940s and 1950s, but areas where tobacco was previously grown, around Wangaratta and Greta, are no longer in use. The overall decline has accelerated within the last five years.

Naturally, these changes in the industry are having an impact on the industry's built heritage, primarily its tobacco kilns. While changes in technology have made many of the older kilns obsolete, the switch by many growers to alternative crops has caused whole groups of kiln buildings to fall into disrepair, simply through abandonment and neglect.

This paper provides a thumb-nail sketch of the history of the tobacco industry in north-east Victoria. This story is one of great turbulence, in which growers have dealt with huge market fluctuations and technological changes. Tobacco is also a story in which Chinese and Italian migrants have played an integral role. Having placed tobacco kilns in a historical context, I will provide an overview of various types of tobacco kilns, which have changed over time, particularly in terms of technology employed during the curing process. The paper concludes with a discussion of the cultural significance of these tobacco kilns, which I feel has as yet not been fully recognised.

History of the tobacco industry in north-east Victoria

When Chinese migrants turned their hands to market gardening at the end of the 1850s gold rush, they almost certainly became responsible for popularising tobacco, known as 'stinky', as a crop in north-east Victoria.

The big incentive, however, for north-eastern Victorians to start growing tobacco in larger quantities developed when the American civil war (1861-1865) interrupted the importation of tobacco into Australia from America's south. Temporarily, at least, Australia's tobacco industry was without its major rival and demand for local leaf increased dramatically.
Although there were many small growers, from the 1860s and 1870s onwards, the most common arrangement for growing tobacco on a larger scale saw European landowners growing on a share-farm basis with local Chinese growers. Examples of this system included Henry Kneebone, who commenced share-farming with Chinese growers in 1877, and the Rae Brothers, who similarly grew tobacco with Chinese sharemen at Gapstead from the 1880s onwards.2

Having made a study of the representation of Chinese in Australian literature, Ouyang Yu has pointed to a tendency to represent the Chinese as 'lower orders'—cooks, market gardeners and labourers.3 Certainly, in the limited literature currently available on the history of tobacco growing in north-east Victoria, the Chinese are frequently described as labourers or as unnamed 'sharemen'. Such a representation fails to recognise how significant Chinese migrants were to the tobacco industry in terms of labour and agricultural expertise. In fact, by the 1960s, the Victorian Tobacco Grower journal was able to reflect that Chinese growers had 'predominated' in the industry for most of its initial 70 or 80 years.4

Indeed, some Chinese were owner-managers of their own quite substantial agricultural enterprises. Henry Lim Son was one of the early settlers of the King Valley, settling near present-day Cheshunt in 1874 and eventually selecting 80 acres for growing tobacco.5 At Eurobin, the Panlook family grew tobacco and hops, employing many labourers. The hop garden they established, now known as 'Rostrevor', is still the largest in Victoria.

The leaf grown and cured by the Chinese was air-cured in long open sheds, producing a dark leaf suitable for pipe smoking. However, by the 1880s, this type of product was coming to be regarded as inferior in quality to the American product. The poor quality of the Victoria product, it was implied, was the fault of the Chinese, who had 'adopted cultural [i.e. cultivation] techniques aimed at maximum yield without regard to quality'; but, in fact, Australian tobacco consumers, like their American counterparts, had developed a preference for 'bright tobaccos', the type of which could only be produced using new varieties and a different curing process.6

In the face of American bright-leaf imports, the Australian industry fell into a slump. The bulk of Australian leaf was being sold for processing as sheep dip to treat 'scab'. In 1896, a Government committee of inquiry into the industry concluded that much of the fault with the Australian leaf concerned the poor techniques used for its curing, drying and sweating.7

Following this inquiry, an American expert Alexander J. Bondurant was engaged to instruct growers on improved cultural techniques and, most significantly, flue curing tobacco using enclosed kilns inside which temperatures could be regulated at each stage of the curing process.8 However, Bondurant's ideas would not be widely implemented for several decades. Once again the
Chinese growers were blamed for this lag in the adoption of new technology and practices, for it was said they were ‘notoriously conservative and resistant to change’.

It is doubtful, however, that the cultural practices demonstrated by Bondurant could have been applied in north-east Victoria with complete success, having been developed specifically for American rather than Australian conditions. How efficiently information regarding the use of kilns was disseminated throughout the Chinese community, if at all, is also not known.

In any case, the turn of the century saw great advancements in the industry. Research commenced at a Department of Agriculture tobacco farm in the King Valley in 1902. Significantly, though, the most successful research would be carried out in conjunction with tobacco growers themselves. In 1916, in an agreement with the Department of Agriculture, experimental plots were put in at Arthur and Edgar Rae’s farm at Gapstead. New varieties were tested and, more importantly, the first serious experiments with the flue curing process commenced. Built on the advice of a Department of Agriculture expert Mr. Temple-Smith the first wood-fired flue curing tobacco kiln approaching the modern kiln design was erected on the Rae Brothers property in 1917.

Through the 1920s, flue curing was becoming widely adopted, almost entirely displacing the air-curing method. Flue-curing using kilns, along with the introduction of a tariff on imported tobacco, saw the industry slowly work its way out of its slump. By the end of the decade it was reported that up to half of all land owners along the Buffalo and Ovens rivers cultivated tobacco, with crop sizes ranging from 3 acres to 60 and 70 acres.

By the 1920s, at least one Italian family, the family of gold rush immigrant Battista De Piazza, were already included on a list of the region’s ‘most experienced growers’, along with Phillips and Kneebone, and the Rae Brothers. This decade, however, saw a new wave of Italian migrants join the industry. The Italian migrants of the 1920s – Remigio Cavedon, Guido Dalbosco and others – did not emigrate from one region, or from the north only, but from parts of Italy (Veneto, Calabria, Sicily) in which intensive agriculture was carried out. Generally speaking, they did not migrate specifically in order to grow tobacco, but opportunities for share farming presented the possibility of eventually becoming farm owners by intensively utilising family labour.

The Great Depression brought enormous market fluctuations to the industry. In 1931 the Scullin Government substantially increased the tariff on imported leaf resulting in an unprecedented 12,000 acres being planted for the 1931–32 season. However, while this season brought prosperity to growers, subsequent seasons were marred by blue mould, heavy frosts and market gluts. Then, in 1934, a change of government saw tariff protection reduced substantially.

Financial hardship became commonplace in the industry – and the Commonwealth acted. In 1936 the Statutory Percentage Scheme was introduced enabling manufacturers of cigarettes and tobacco who incorporated a
stipulated percentage of Australian leaf into their products to qualify for a concessional rate of duty on their leaf imports. Yield per acre was also given a boost through the introduction of benzol fumigation which eliminated blue mould from seedlings. Nevertheless, by the end of the decade, only 165 of the most capable growers from an original 1000 remained.

Throughout the Second World War, the Commonwealth Government regulated the industry through a new Australian Tobacco Board which appraised the grades of leaf submitted for sale (21 grades were created) and fixed the price of each lot.

In 1948 the Australian Tobacco Board was dissolved; the following season there was a return to the sale of leaf at open auction with prices for all types rising rapidly. Throughout the 1950s steady increases in the Statutory Percentage Scheme ensured that the total domestic production of tobacco was taken into manufacture and once again the industry boomed.

A Tobacco Research Station was established at Myrtleford in 1952. Information gathered at the Research Station regarding new cultural and curing methods was distributed immediately to growers by a team of extension officers. This system was highly effective in terms of improving the efficiency of the industry. Although technical progress initially remained slow, in 1956 the Tobacco Industry Trust Account was established, with growers and manufacturers contributing funds for tobacco research and extension in Australia. During the 1959-63 period, technology for controlling blue mould in the field was developed, based on the use of high clearance sprayers. This virtually rid farmers of the greatest threat to their crops. Industry optimism saw the area of tobacco under crop double across the state.

Still more Italians arrived in north-east Victoria after the Second World War; once again many of them were share-cropping or working in family partnerships. The Pizzini brothers, who emigrated to Australia between 1952 and 1957 from Italy's north, became business partners and pooled their finances to buy a tobacco farm at Eurobin in 1957. In 1959 they purchased more farms in the King Valley. With an eventual total of around 150 acres or more under crop, the Pizzinis became at one stage the largest growers of tobacco in the southern hemisphere. As the Chinese had been a few decades before them, Italians would eventually become the backbone of the tobacco industry, especially around Myrtleford where, by 1961, nearly three-quarters of the population were Italian born.

By the mid-1960s the industry had entered its first period of relative stability. The Commonwealth decided to match industry contributions to the Tobacco Industry Trust Account. In 1965 the Tobacco Stabilisation Plan came into being with the passing of the Tobacco Marketing Act. All growers were allocated quotas and could sell their quota at guaranteed prices.
Although it may be too early to say whether the industry is in permanent decline at the present time, it is certainly smaller than it once was. Mechanisation has meant that growing tobacco is less labour-intensive than it used to be, and consequently there are fewer growers. The industry, however, has been reduced in other ways. Between 1984 and 1985 the Commonwealth and Victorian Governments dramatically cut funding to the Tobacco Research Station (now Ovens Research Station), with the Victorian Government agreeing to fund more 'socially acceptable' research into alternative crops. This decade has seen a government buy-back of tobacco quotas, reducing the overall number of growers.

Figure 1. Oil-burning kilns on the Ovens Valley Highway at Myrtleford, owned by the Dalbosco family. (Photograph: Linda Lees)
The evolution of tobacco kilns and the curing process

As a product, tobacco requires curing before it can be smoked. In north-east Victoria all the varieties grown require flue curing. This is done by placing the tobacco in a kiln that is heated and can exhaust moist air through vents. Technological change associated with curing tobacco has been quite substantial, and the evolution of tobacco kilns can be traced.29

Natural convection stick kilns

The earliest kilns, widely introduced by the 1920s, were wood-fired flue curing 'stick kilns'. The tobacco leaves were tied onto sticks that sat on cross beams, eight to nine layers high inside the kiln. The kiln was heated by a wood fire lit in tunnel-styled furnaces on the side of, but external to, the kiln. Hot air circulated through natural convection. Vents to exhaust hot moist air, which commonly ran along the top of a gabled corrugated iron roof, were opened manually by chains. The leaf had to be loosely packed inside the kiln because the hot air was not under pressure. As heat was controlled only by the size of the fire, constant monitoring was necessary and results were not very reliable.

The first minor alteration to this system developed when kilns were heated with oil fires instead of wood, the fires still external to the kiln. However, these external fires were inefficient, as a lot of heat was lost, so the next development in design involved placing oil-burning units inside the kiln; the oil burners were fed by lines from an external tank. At this stage, kilns were fitted with slender chimneys through which the fumes and smoke from the heating units were exhausted. Later, these internal heating units were switched to gas, which was cheaper than oil.

Forced-air stick kilns

It was not until the mid-1950s that a major change in technology occurred. This was the introduction of the forced-air concept. By forcing air through a kiln, more tobacco could be dried, and the process was faster, resulting in better economies of scale. The first kilns to work on the forced-air principle were down-draft kilns. A ducted heating system external to the kiln, heated by a boiler and featuring a fan and a heat exchanger were fitted to kilns, forcing hot air to flow through the top of the kilns down onto the tobacco. However, when first designed, the dynamics of forced airflows were poorly understood and uneven drying of tobacco was common. Baffles to redirect airflow had to be installed. The fundamental flaw with these kilns was that they forced hot air to flow down. By the mid-1960s stick kilns had switched to an up-draft system, and many down-draft systems were subsequently converted. The ducted heating allowed temperatures to be controlled more accurately, and curing improved.

Forced-air bulk curing kilns

The final major improvement to kilns came in the early 1960s with the introduction of 'bulk curing'. With air now being forced through kilns,
increased densities of leaf could be dried. The tobacco leaves were no longer tied to sticks, and packed loosely, but instead placed in baskets or clamps that fitted together in two or three layers. This decreased costs by eliminating the labour-intensive step of hand-tying the leaf.

By the late 1970s, 'hot water curing' was introduced, with radiators replacing heat-exchanging units. Briquettes, cheaper again than gas or oil, were used to fuel the boilers that ran the radiators. The final improvement came with the replacement of clamps and baskets with boxes: larger containers which could be easily packed by hand and loaded by forklift in one single layer. Whereas loading a kiln had once been a highly labour-intensive procedure, one or two people could now carry it out. In order to retain more heat, the ducted heating system with the radiator and fan was moved inside the kiln, increasing efficiency.

**Modern kilns and the curing process**

The conventional forced-air modern tobacco kiln has a large access door on the front elevation for loading the tobacco. The boiler which heats the internally-fitted ducted heating system is located on the rear elevation. The ducted heating features a thermostat-controlled radiator which heats the air, and a fan driven by a small electric motor, both contained within the duct.

To heat the kiln, the fan draws air through the radiator and circulates it to an area beneath a perforated false floor. The hot air rises through the floor and is drawn back through the ducted system at the top of the kiln. Humidity is also controlled. A fresh-air intake vent is situated on the rear elevation, opening into a space between the fan and the radiator inside the kiln. When this vent is opened up, the fan draws air into the kiln. As fresh air enters, hot moist air is exhausted through another vent located high on the front elevation, which opens automatically due to air pressure created by the incoming air.

At the beginning of the curing process the tobacco leaves are placed inside the kiln, which is heated at 28–30 degrees Celsius, with relative humidity at 98–100 per cent. The leaf changes colour from green to yellow and chemical changes occur: chlorophyll is broken down, starches are converted to sugars and some of the sugars are burnt. This process lasts three days. The first day the kiln will be completely closed up, the second day it will be opened slightly and some moist air will be exhausted, and the third day the kiln will be further opened.

Next, the temperature is slowly raised to 35 degrees Celsius, with relative humidity maintained at not less than 95 per cent. At this stage the leaf obtains full colour, although the buds and stems are still slightly green.

In the following stage the colour of the leaf, a yellow-golden colour, is fixed. The temperature is raised again to 40–45 degrees Celsius, with relative humidity falling slightly to 90–95 per cent. The temperature cannot be raised above 45 degrees Celsius at this stage, as this would caramelise the sugars in the leaf.
turning them black. This process takes a further one and a half days. The kiln is still being progressively opened up.

After leaf colour is fixed, the mid-rib and stems of the leaves are dried. For another one to one and a half days, temperature is increased from 45 to 60 degrees Celsius and relative humidity drops substantially.

Figure 2 Concrete wood-fired kiln built in 1920 by the Rae family at Whorouly East. Note the two brick furnaces. (Photograph: Vicky Rathman)
Finally, the heat is switched off. The leaf is still quite brittle, so in order to condition it the kiln is closed up and a fine spray of water is circulated through the kiln to allow the leaves to become slightly pliable again.

Construction materials

Although it should seem that the earliest kilns would be built of the most primitive materials, and progressively be built using more permanent materials, this is not the case. Some of the earliest kilns, such as those built by the Kneebones at Everton around the time of the Rae Brothers' first kilns, are built very solidly of brick. The Rae Brothers had early kilns built in concrete (Figure 2), but very rapidly progressed to corrugated iron, which would eventually become the preferred material with which to build kilns throughout the 1950s-1970s.

In many cases, kilns were simply built with whatever materials were on hand. As late as the 1950s the Pizzini Brothers built intricate chock and log kilns with corrugated iron roofs using trees cut from the forest on their block (Figure 3). Sagazio notes how the earlier Italians in the Myrtleford area also built a number of interesting tobacco kilns, including a concrete tobacco kiln built in 1927 by Guido Dalbosco, '... it bears the date 28-1-30, when he rendered the kiln, and records the words "Mai Paura" [Never Afraid].'

Cultural significance

Tobacco kilns and tobacco farming landscapes of north-east Victoria are of state significance. A massive cultural change has occurred in the way we view tobacco as a product. Tobacco kilns remind us of this cultural shift, and of an

endnotes

2 K. Robertson, Myrtleford, Gateway to the Alps, Melbourne, 1973, p. 123.
6 This paragraph generally, F. L. French, op. cit., p. 10.
8 K. Robertson, op. cit., p. 126.
9 F.L. French, op. cit., p. 12.
14 Back to Myrtleford Souvenir, Myrtleford, 1929.
15 Ibid.
16 C. Sagazio, Italian Craftsmanship and Buildings in Victoria, Victoria, 1990, p. 27.
19 K. Robertson, op. cit., p. 130.
21 F.L. French, op. cit., p. 4.
23 K. Robertson, op. cit., p. 131.
25 Ibid.
industry that has undergone substantial booms and busts, and moved from being highly labour intensive to highly mechanised.

Many kilns are historically significant as representative examples of rural technologies which are either no longer in use, or in declining usage. Rare examples include early experimental kilns, significant for the manner in which they call attention to the involvement of local farmers in research and the pioneering of technological change.

The tobacco kilns and farms are also of social significance for the strong associations they have with Chinese and Italian immigrants who formed the backbone of this industry in Victoria, and whose massive contribution to regional economies and culture in north-east Victoria is still ongoing.

Dotting the valley floors like small lighthouses along imaginary shorelines, the tobacco kilns also have significant aesthetic values. They are distinctive components of the complex cultural landscapes of north-east Victoria’s rugged mountainous heart. Some are of unusual and particularly beautiful construction. Clearly, they impart a strong sense of place to the region.

It is hoped that now tobacco kilns are in declining usage they will be increasingly valued for their cultural associations and aesthetic qualities.

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