Fig. 3: 3D rendering of an area in Pretoria CBD

2.1 beer

Beer is one of the oldest alcoholic beverages in the world. Records date back to the 6th millennia BC in ancient Egypt and Mesopotamia (Fig. 4). From the earliest times, beer was produced and sold on a domestic scale. However, after the industrial revolution most domestic production ceased and industrial production took over. Advances in technology such as the creation of hydrometers and thermometers allowed greater control and better understanding of the process, changing brewing for all time to come (http://en.wikipedia.org/wiki/Beer).

Fig. 4: Ancient Egyptian painting showing people drinking beer.

South Africa is no exception to this rich history and in 1658, a mere six years after Jan van Riebeeck landed on the southern tip of Africa, the first European-type beer brewed from South African barley was exported to Batavia and Holland. The story of brewing in South Africa as an industrial activity is largely that of three companies: Ohlsson's Cape Breweries Limited (established 1882), Chandler's Brewery (established 1884), and the South African Breweries Limited (established 1889) (PRETORIA 1962:271). Major milestones include the merger between the three dominant brewing companies in 1956 to become the South African Breweries Limited (SAB), and the recent merger between SAB and Miller Brewing to become SAB Miller, recognised today as one of the largest brewing companies globally.

Another significant (yet often overlooked) influence on the history of South African beer production and culture is one of indigenous knowledge (Fig. 5). Many local breweries, operated mostly by black communities, brewed forms of sorghum and maize beers long before any European settlements and many continue to operate today.

Fig. 5: Photo of people selling locally brewed beer.

Fig. 6: (Main image) Photo of a brewing kettle.

(Left) Major ingredients for brewing beer.

2.1.1 – Science behind brewing

In most cases the brewing process is similar for most breweries. The differences depend on factors such as the specific type of beer being brewed, the size of the brewery, and nature of the brewery operations.

When designing a brewery that allows different types of beers to be produced over different periods of time and of different quantities, the building should be of such a nature that it is able to adapt to the necessary conditions.

In a brewery the various functions must relate to each other in very specific ways. Throughout the different phases of production, specific raw materials and services need to be supplied to the relevant areas. Similarly, the waste products generated need to be appropriately disposed of and transported to the appointed destinations. Should the flow of services be disrupted, the brewery will not be able to operate successfully.

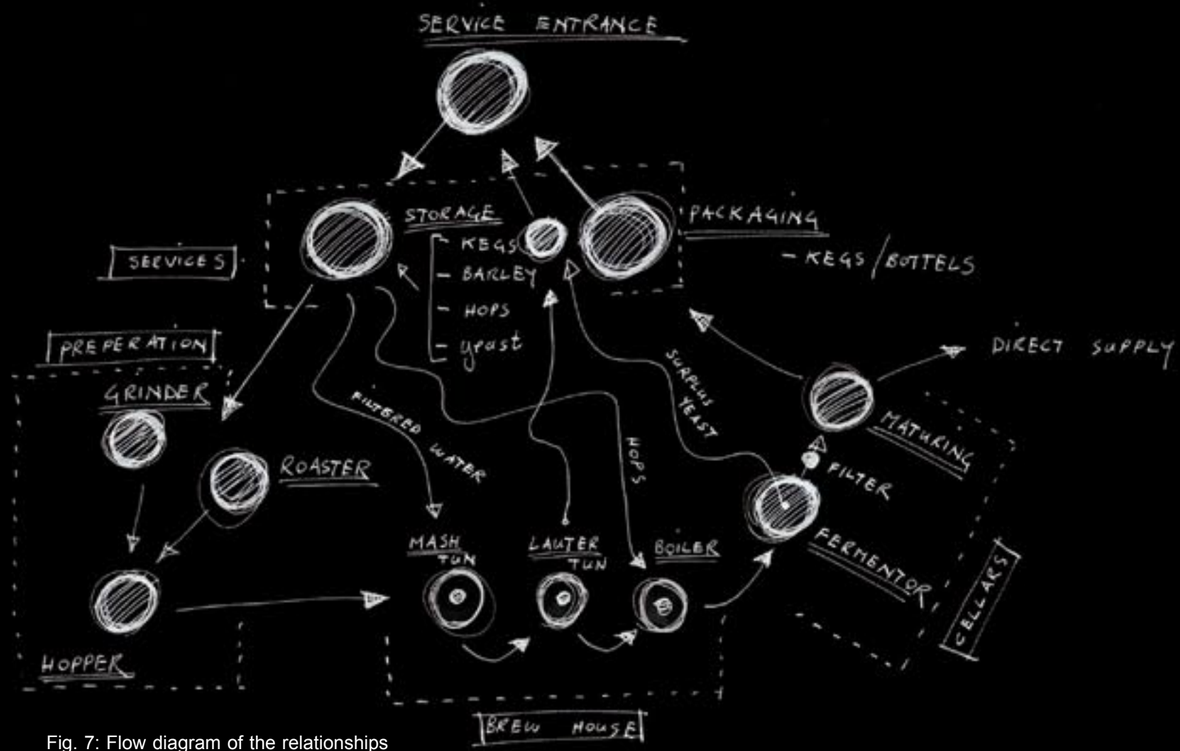


Fig. 7: Flow diagram of the relationships between processes in a typical brewery.

2.1.2 - Brewing process

Processing
Malted barley, known as malt, arrives at the brewery in an unprocessed form and is stored in silos. From here it moves to a grinder that grinds the malt to a desired texture. This is called grist and is stored in a hopper. Thereafter it may pass through a roaster before moving towards the first phase of production.

Mashing
The first phase of beer brewing takes place in the brew house. The processed grist moves though a circular mash tun and lauter tun made from copper or stainless steel and is mixed with hot water that has been filtered by the brewery. The tun has stirring devices inside of it, temperature controls, water and steam inlets, and control panels. The temperature of the water and grist mixture now known as wort, is raised to specific temperatures and then held constant for specific time moving through what is called a lactic acid rest, a protein rest, and a sugar rest. There after the spent grains are allowed to settle at the bottom of the lauter tun and the wort is drained. Boiling hot water is sprayed over the grains and mixed with the stirring devices inside. The grains are removed and stored to be sold later as live stock feed.

Boiling
The wort is piped into a circular stainless steel vessel known as a brewing kettle or boiler able to hold 600 barrels (15 000 liters) of wort. The boiler is usually dome shaped with a wide ventilating chimney connected to the roof. A heating coil inside the kettle boils the wort for several hours during which the second major ingredient is added being hops. Hops remove protein and add bitterness and hops aroma. After the boiling process the wort is drained and the hops and sludge left in the boiler is cleaned and discarded of.

Fermentation
The hot wort from the boiler moves through a cooler and is piped into cylidraconical stainless steel vessels. 250-350 grams of yeast is added to each barrel of wort to begin fermentation. After 3-4 days fermentation peaks forming kraesen foam. The temperature is then slightly increased, causing fermentation to slow down and the kraesen foam to collapse and form a bitter scum that needs to be removed. Temperature is then decreased for a final time and fermentation ceases entirely after 8-10 days. This is now known as green beer and is piped to the final phase. The yeast is recovered from the tanks and either sold as live stock feed or used again for brewing.
The fermentation phase is where alcohol and the carbon dioxide is formed.

Maturing
The green beer from the fermentation tanks is piped through a filter and into closed maturing tanks that are similar in size and shape to the fermentation flasks. The beer can age for 10 days to several weeks and are kept at very constant temperatures around 1 to 2ºC.

Pasteurisation
Large breweries pasteurise the beer they produce by means of heating it to specific temperatures so as to kill off bacteria giving it a longer shelf life. In micro breweries this is rarely done as the process may be compromised the taste.

Packaging
The finished beer is filtered and piped to a packaging room where it is bottled or kegged.

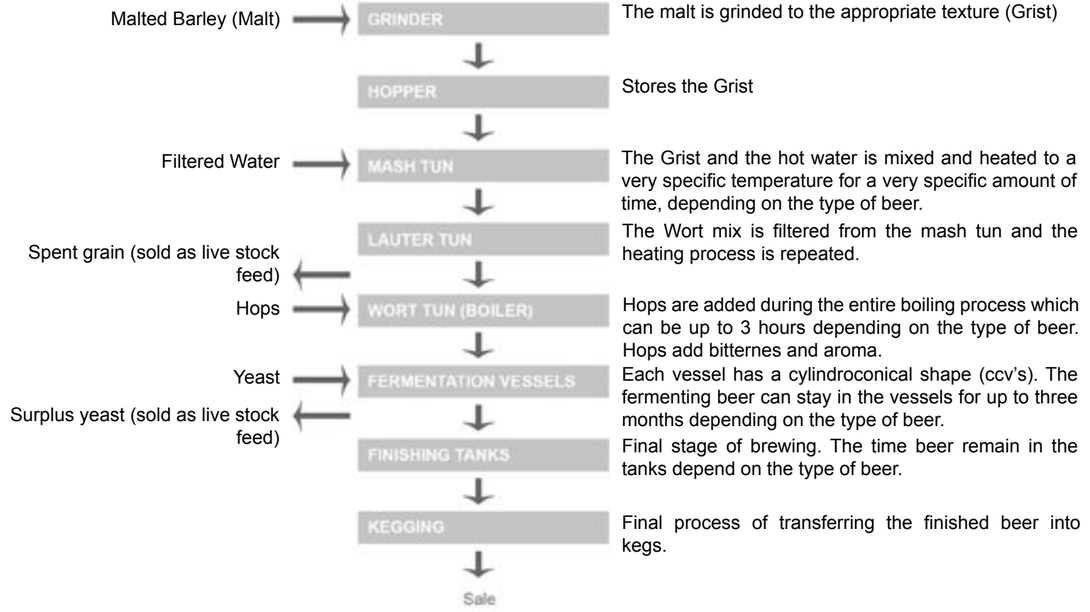


Fig. 8: Flow diagram of the brewing process.

2.1.3 – Polemics

Large brewing corporations dominate the international and national beer brewing industry in a monopolistic fashion. The problems arising from this situation are not that of quality as the beers produced by these firms are of the highest quality. Neither are there problems of limited variety in terms of numbers. Rather, because these beers are designed to appeal to a large number of people, the result is the absence of taste extremities. Craft beers, such as those produced by micro breweries, seek those extremities and open the market to an entirely different beer culture. The shortage of micro breweries in South Africa means that there are only a few craft beers available in a small number of liquor stores and pubs.

2.2 – Industrial developments

2.2.1 – Polemics

Industrial buildings are designed in direct relation to their functions so as to optimise efficiency. This often leads to tremendously large buildings and developments and can result in impractical city blocks. Oddly positioned and sized city blocks do not adhere to optimum urban principles. Instead urban 'blocks' are created that make it difficult for adjacent developments to penetrate the fabric and nearly impossible to pass through. In apartheid South Africa, the design of the cities was basically that of a typical segregated city (Fig.9). This was an attempt to separate the various race groups by creating buffers between the CBD of Pretoria and the satellite townships. [(Van Jaarsveld 1985:50–51). In simple terms, the philosophy behind this approach was to prevent the townships from developing inwards towards the CBD by using industrial sectors to serve as urban barriers due to their rigid urban fabric (Fig.12). The political history of South Africa has caused major shifts of needs and opportunities in societies. The vast increases in population have caused cities to grow and change as a result. These industrial barriers hinder development and add to the problem of uncontrollable urban sprawl seen in many parts of Pretoria, especially in the east. This has led to shortages of infrastructure and decreased population densities.

Industries are typically, and understandably, designed to maximise efficiency. Designers usually invest minimal or no focus on user comfort and the result is an undesirable environment for the people operating within them. Unfriendly environments are problematic for the morale of the workers and the performance of the company, and can disadvantage the entire market.

white residential

non-white residential

industrial sector

other

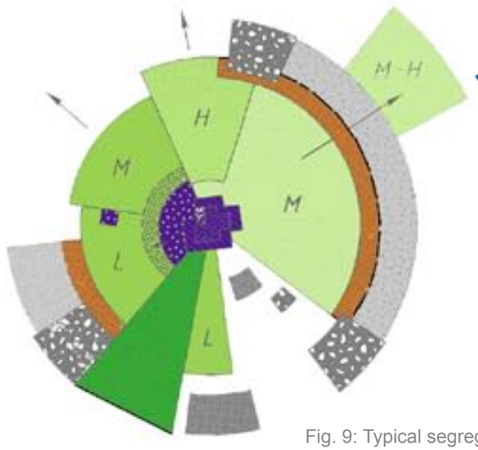


Fig. 9: Typical segregated South African city.

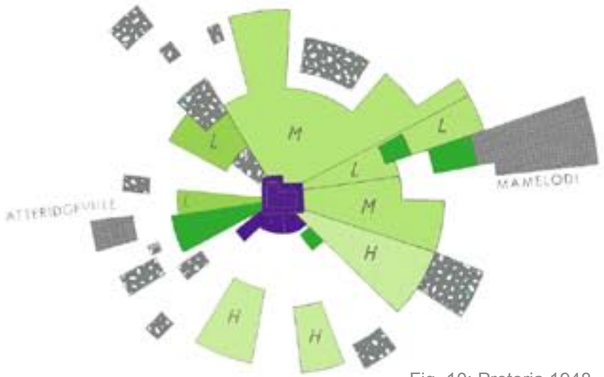
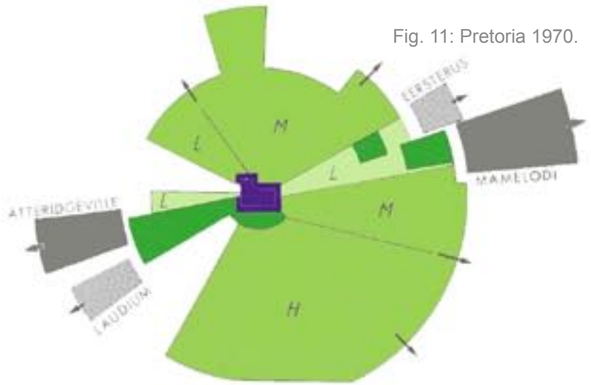


Fig. 10: Pretoria 1948.

Fig. 11: Pretoria 1970.



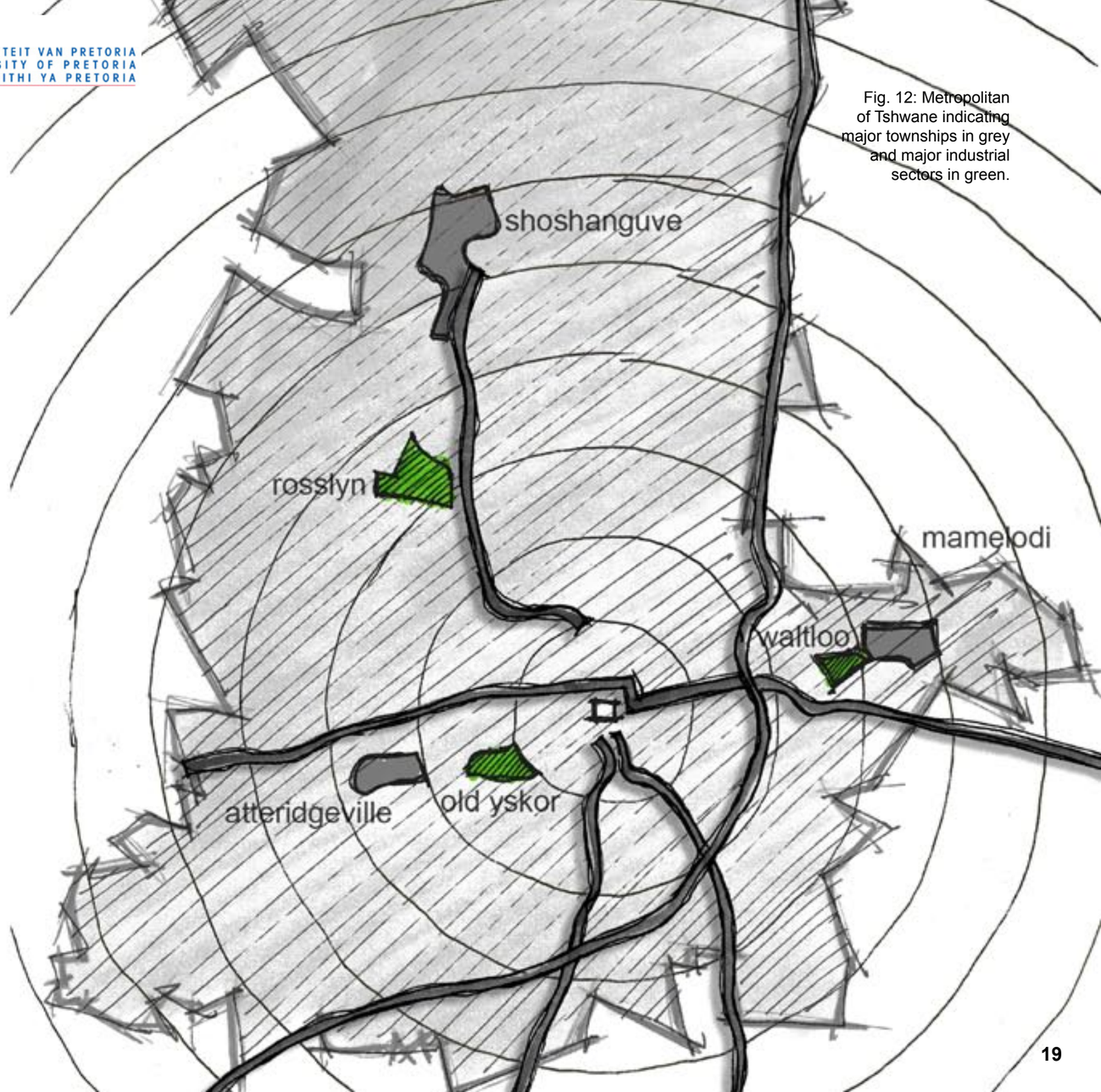


Fig. 12: Metropolitan of Tshwane indicating major townships in grey and major industrial sectors in green.

2.3 pretoria

It is not clear who the first people were to settle in the area that is known today as Pretoria as written records only go back to 1855. In that year, Lukas Bronkhorst, a Voortrekker making his way north, set camp opposite the stream that became known as the Apies River (Jordaan 1987:ch.1 2.1).

The original design for Pretoria is based upon a Roman town principle called urbs quadrata, a town divided into quarters by the intersecting cross of the kardo and decumanus. Derived from Latin, kardo refers to the cosmic north south axis, and decumanus refers to the east west axis. In Pretoria, these major axes became Church Street representing decumanus, and Market Street (now called Paul Kruger Street) (Jordaan 1987:ch.1 2.1), representing kardo (Fisher et al. 1998:62). The intersection between these two axes identified the centre for the town and was named Church Square. The conscious decision to identify a city edge that would distinguish between the ordered inside versus the chaotic outside, led to Church Square being placed between four prominent natural borders. To the north lay the Magaliesberg, to the south lay Salvokop, to the west was a small stream known today as Steenbok Spruit, and to the east a major river known today as the Apies River (Fig.13).

2.3.1 – Polemics

Today, Pretoria faces a totally different environment – politically, socially and physically. Upon investigation, the original borders of the city can be identified vaguely, yet its essence has arguably been lost (Jordaan 1987:ch.2 1.1.4). Through the decades multiple transformations have led to the edge of the city fading away and its framework becoming nothing more than just another bend in the grid. What was originally a key factor in the design of Pretoria has regrettably become an obstacle in the minds of many and as a result is often hidden from its residents.

Fig. 13: Old map of Pretoria showing major axes and bariers.