

The Castlemaine and Great Northern Breweries, Newcastle, New South Wales

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Historical archaeology may be defined as the investigation of the material remains of historically documented sites. The documentary record is used to interpret the sites, while the sites, in turn, expand the documentary record. In this paper, the remains of two nineteenth-century breweries in Newcastle, New South Wales, are investigated in the light of the written record and of documented nineteenth-century brewing technology. The author is a consultant archaeologist working mainly in the Newcastle and Sydney area.

With the possible exception of New Zealand, Australia, since European colonisation, is the most documented country in the world. Official records began with first settlement. Australia saw its first newspaper, the *Sydney Gazette* in 1803. As settlement spread, provincial newspapers were established, each vaunting local progress. It is this wealth of written material which causes some historians to doubt whether archaeology has any valid contribution to make towards the understanding of Australian history. The historical archaeologist, however, whilst acknowledging his or her debt to the documentary record, is concerned with the material remains of history. To him or her, the written record is but one of several means available to help in the interpretation of a site.

Two major nineteenth-century brewery complexes survive in Newcastle, the Castlemaine and the Great Northern, both in Wood Street (Fig. 1). Both are classified by the National Trust. Each is well documented. The *Newcastle Chronicle* and its successor, the *Newcastle Morning Herald*, made it a policy to record new or expanding industries in their city. However, a nineteenth-century reporter writing about nineteenth-century industry for nineteenth-century readers could assume some knowledge on the part of his readers. The result for twentieth-century readers, are gaps in the record which must be filled from outside sources, in the case of brewing, from contemporary encyclopaedias and journals.

Brewing in the nineteenth century followed certain established procedures. Beer was made of water and malted barley, to which hops were added to give its characteristic taste and bitterness. To malt the barley, the grain was steeped in water until it germinated, then spread on a floor until the shoot appeared, after which germination was stopped by kiln drying. The colour of the beer, pale, amber, brown, or black porter, depended on the heat of the kiln. The now malted barley was crushed and mixed with water in a mash tun at 52–57°C to convert the remaining starch. After 3–4 hours the wort (mixture of water and malted barley) was drawn off and the process repeated until the grain was exhausted. The wort went into a copper and was boiled along with the hops which were added at this point in the process. The longer the boiling, the stronger the beer. After boiling, the contents of the copper were run into a hop-back through a strainer which kept back the spent hops. It then needed to be cooled quickly to the fermentation temperature of 12–18°C or the wort went bad, the major problem in making Australian beer before modern refrigeration. After cooling, the wort was let down into a fermenting tun where yeast was added. After fermentation, the yeast was removed and the beer passed into store tuns where a secondary fermentation occurred. To control this, the store had to be cool and was often, as at the Castlemaine brewery in Newcastle, located in the cellar. The

beer was then ready to be barrelled. Since considerable power would be needed if these processes were performed on a horizontal plane, breweries, especially from the 1860s on, were built in the form of towers so that gravity feed could be used as much as possible.¹

With this knowledge, it is possible to interpret the way in which the two breweries considered here functioned, as described in contemporary newspaper reports.

Wood Brothers & Co., wine and spirit merchants of Bolton Street, began their business in 1867 and in 1869 became agents for Castlemaine ale and porter.² Demand increased, doubtless because the Great Northern Railway, which reached Murrurundi in 1872, opened a vast hinterland to be served by Newcastle's industries. By 1874, the *Newcastle Chronicle* was able to announce that:

'Messrs. Prendergast and Fitzgerald, of the Castlemaine Brewery, Sydney, in association with Messrs. Wood Brothers, of this city, will shortly erect a colonial brewery, on a site on the southern side of the Maitland Road, just beyond the Cottage Bridge . . . The walls will be of brick, built upon stone foundations . . . [and the] building will cover an area of about 7000 square feet [650 square metres] . . .'³

A well was sunk to ensure 'a first-class supply of water . . . of splendid quality' and by 1876 the Castlemaine Brewery, 'perhaps the most imposing structure in Newcastle', had been completed. It was capable of producing 250 hogsheads of beer each week which it distributed in casks steam-cleaned on the premises.⁴

Two years later when the brewery was extended, the *Newcastle Morning Herald* gave a detailed description:

'With its massive tower, arising from two extended wings, it disputes pre-eminence for place with the Custom-house and other public buildings of the city. Very extensive additions to the already large mass of building . . . have lately been made . . . The works in progress consist of a three-storied building. The basement story is a vast apartment, with a floor of concrete and cement, measuring 165 feet [50.30m] by 48 [14.60m]. There are four alleys, on either side of which are ranged great rows of huge puncheons. Gas is laid on; and a series of pipes, for the service of both cold and hot water, are placed so as to admit of a copious water supply at every conceivable point of vantage. Above, is a malting room, of the same roomy dimensions, and with the same kind of flooring, for the purpose of coolness. This part of the work is especially massive and complete. In the loft above, the malt will be stored;

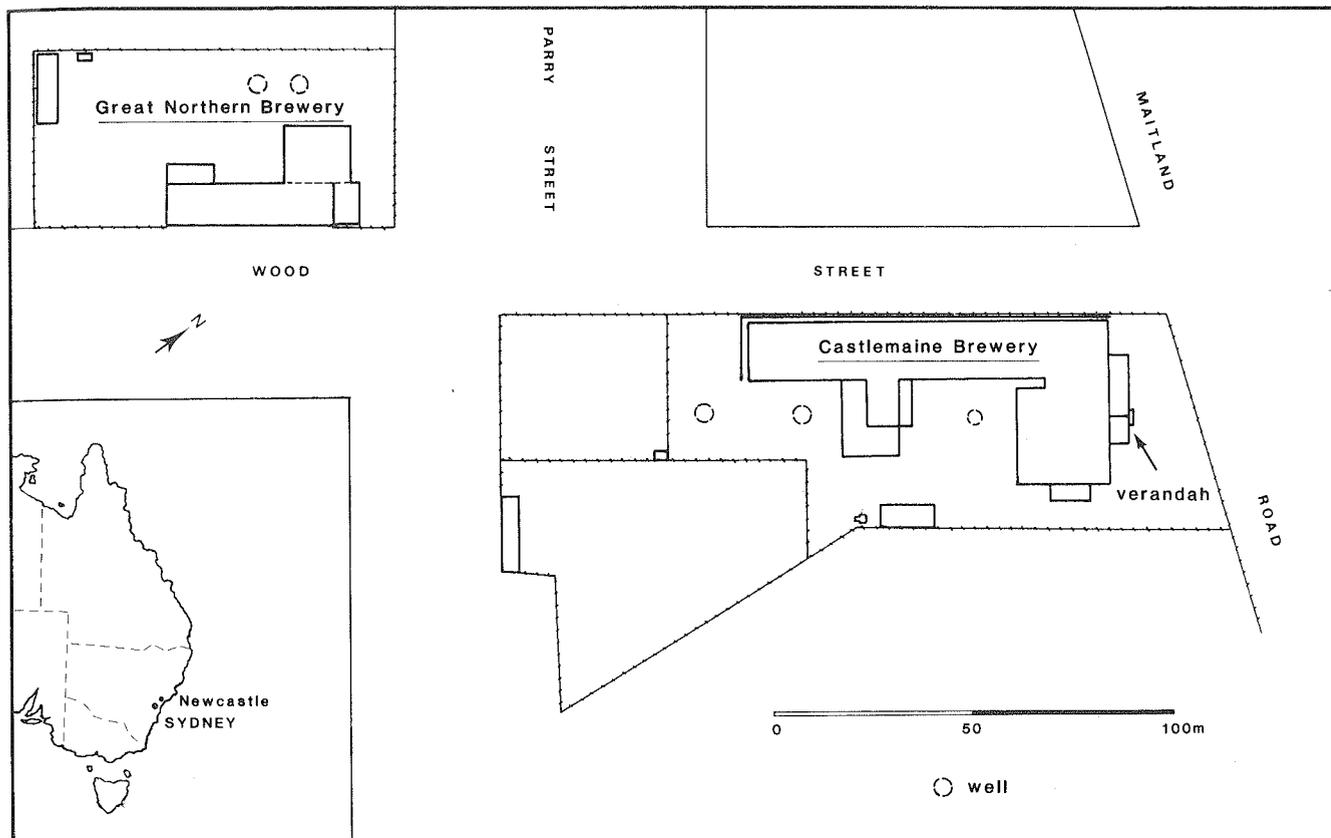


Fig. 1: Plan of the Great Northern Brewery and the Castlemaine Brewery in 1896.

and when the whole is completed, the brewers will make their own malt . . .

Passing the office on the front verandah, and descending a wooden staircase, we enter a flagged department under the tower. This measures 34 feet [10.36m] in length; on each side extend spacious cellars, with their trim rows of casks—each compartment measuring 43 feet [13.10m] long . . . When built it was thought this extent of cellarage would amply suffice . . .

After tasting the tap, we ascend into the tower. Here are huge tanks, in which the water is heated; it then passes into a spacious hopper, which is filled with the crushed malt from below, by an ingenious system of elevators. The whole then runs into the mash tub, a huge receptacle, in which a thorough mixing takes place, and whence it is drained off into the boiler. When boiled, it passes over the refrigerator; and this is the prettiest and most interesting sight in the whole process. The refrigerator consists of a series of 44 pipes, arranged in alternate convolutions horizontally one above another—forming a wall of piping some 7 or 8 feet [c. 2.30m] high. These pipes contain icy cold water, pumped from a deep well in the courtyard, and over their surface the heated wort falls in a beautiful cascade, the light playing with beautiful effect on the falling mass. The effects are twofold, for while the boiling liquor gets cooled by contact with the cold pipes, the water in the pipes becomes heated by the boiling wort; and pumping going on, the heated water reaches the reservoir at the top of the tower, and forms the material for the next days' brew . . . The cooled wort is then conducted to the fermenting vats, whence, when the requisite stage of fermentation is reached, it is allowed to descend to the long ranges of puncheons in the cellars below. In these it is allowed to stand to clear, and throw off yeast. The flecks bubbling from the bung-holes, looking like a mimic eruption of fleecy wool, forms not the least attractive feature of the whole

intricate operation. The puncheons are all made in the cooperage attached to the brewery, and are formed from English oak staves, with headings of Kauri pine . . .⁵

To this, the *Illustrated Sydney News*, in July of that year, added:

'The malt . . . is raised . . . to the top storey, in which are large recesses full of water, and also the mash-tun, in which forty hogsheads are contained. Both hot and cold water are laid on . . . and through the patent mixer they run with the malt into the tun, the temperature being regulated by the brewer with a thermometer. When the saccharine matter has been extracted from the malt, and a sufficient time has elapsed, the sweet-wort runs into the boiler, which in this instance is made of wood, the liquor into which the hops have been put having been kept at boiling heat by steam pipes. After the virtue of the hops has been extracted, the wort is evenly distributed over a vertical refrigerator . . . The liquor, whilst descending, is cooled to within two degrees of the temperature of the water in the well. It is then conveyed to the vats on the next storey, in which it is subjected to the action of the yeast. There are two of these vats, one of which has been enlarged to a capacity for 5,200 gallons [23,639 litres], and the other is being operated upon for the same purpose . . .'⁶

By that time, the top floor of the new west wing had been equipped with a 'steep, into which 200 to 225 bushels of barley will be put at once prior to being malted' and the brewery also had a turret-shaped kiln for malting barley built at the end of the new wing:

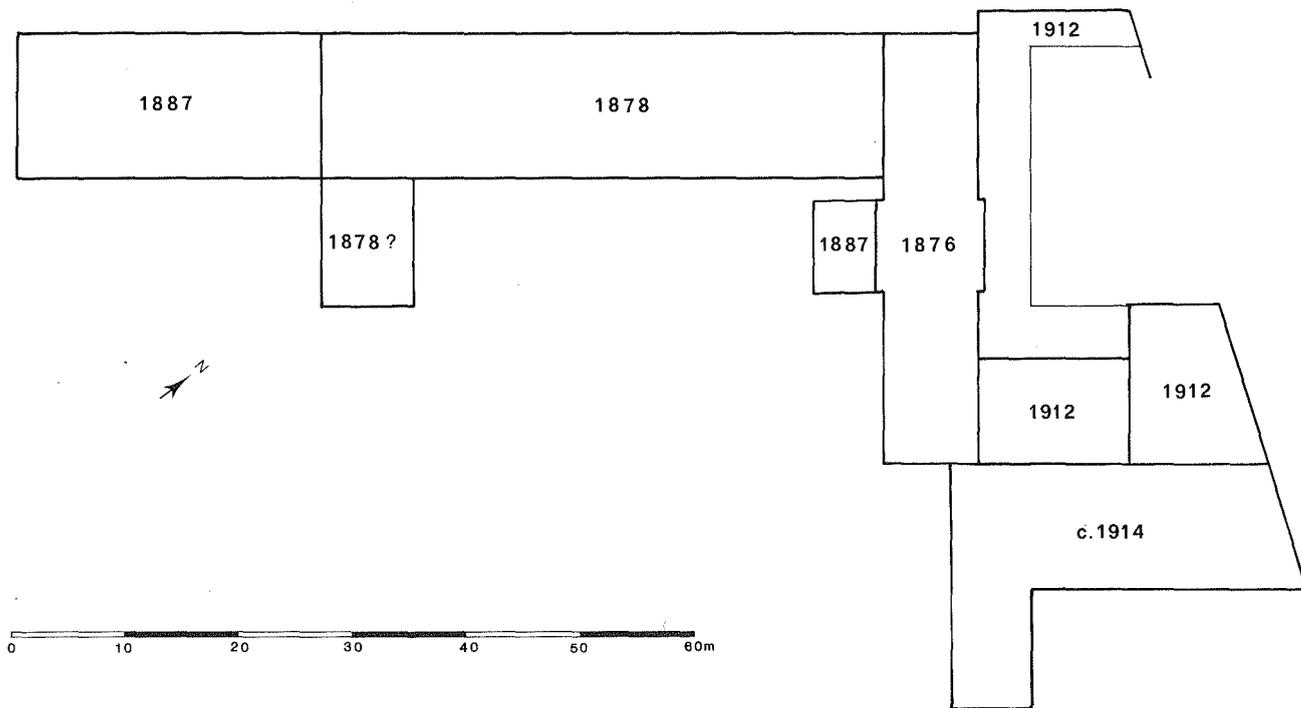


Fig. 2: Plan of the Castlemaine Brewery showing construction dates.

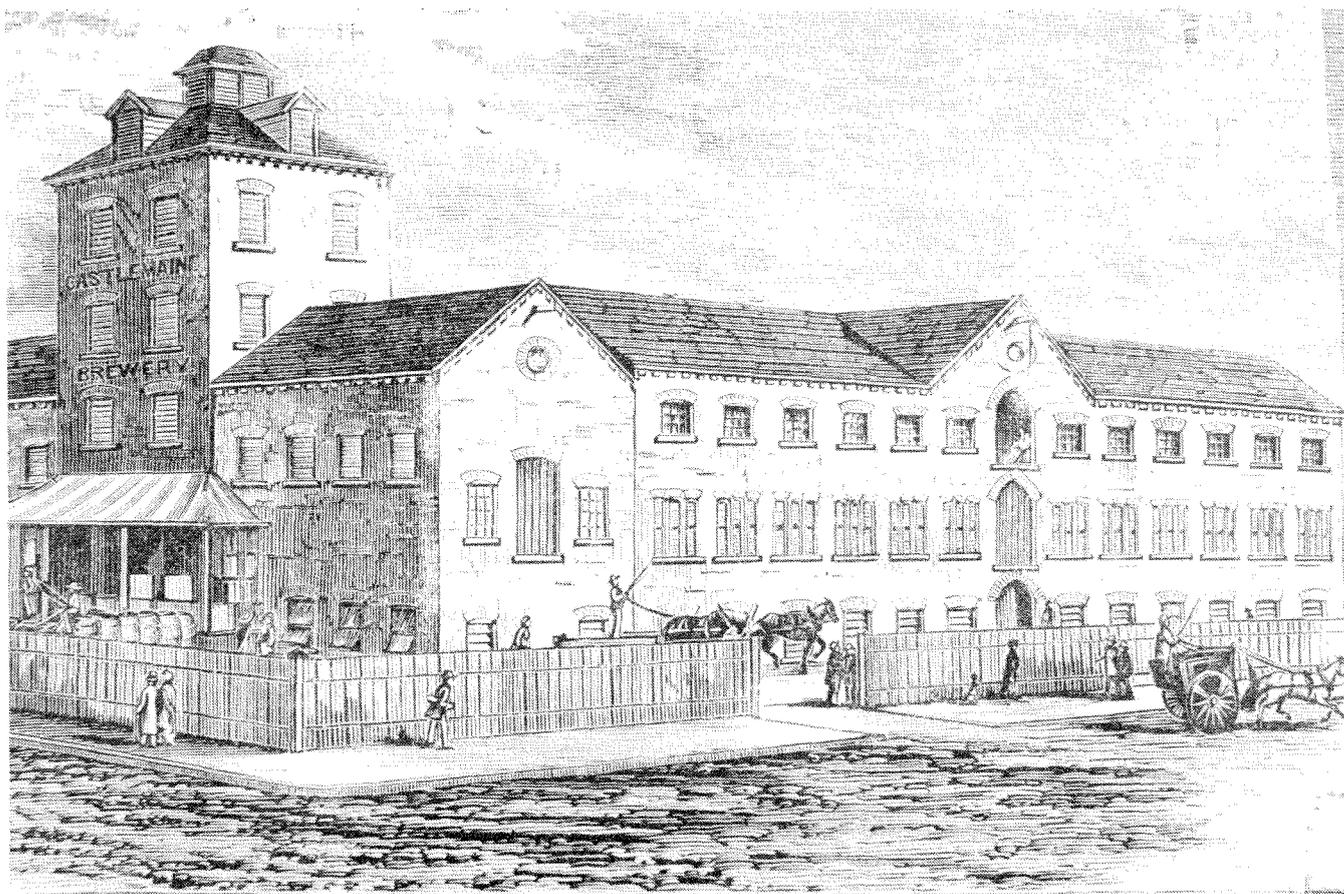
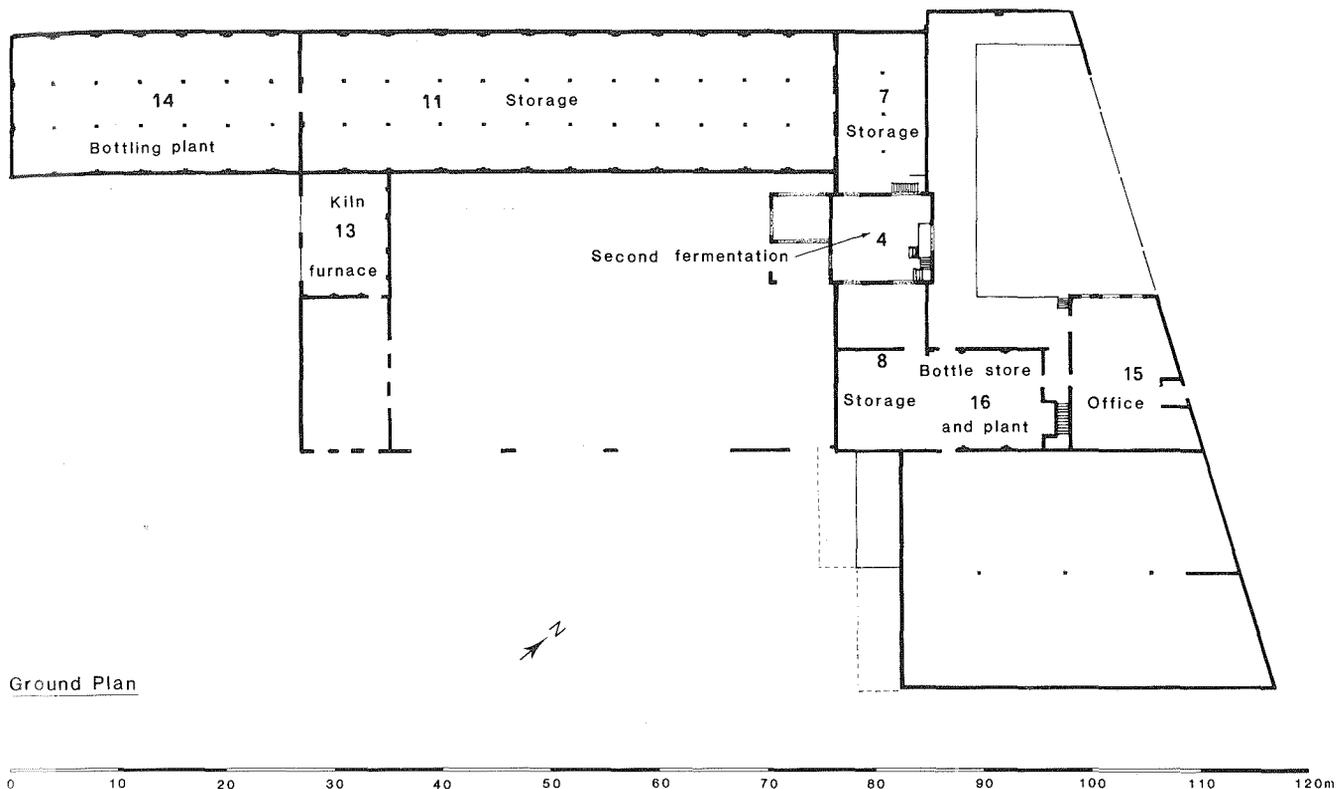
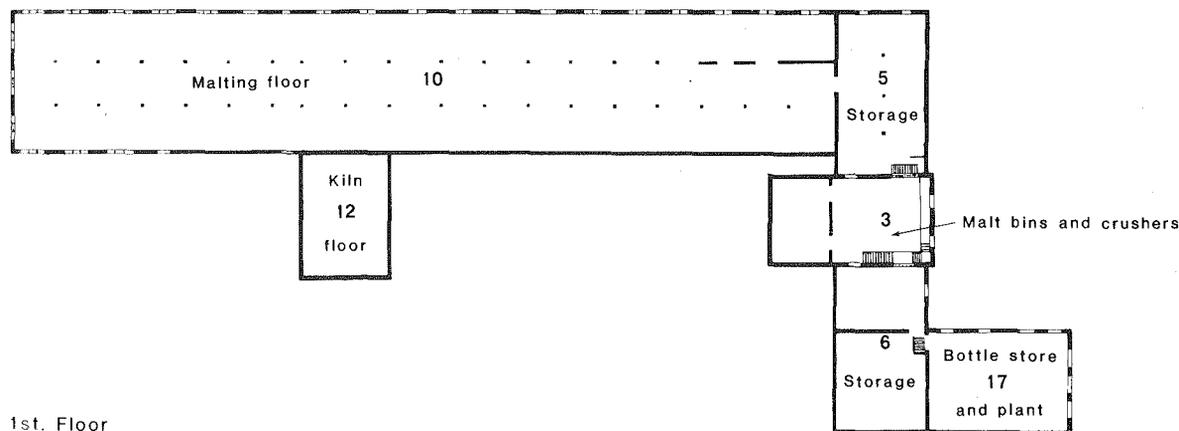


Fig. 3: 'Castlemaine Brewery, Newcastle'. This illustration was published in the Illustrated Sydney News on 13 July 1878.



Ground Plan



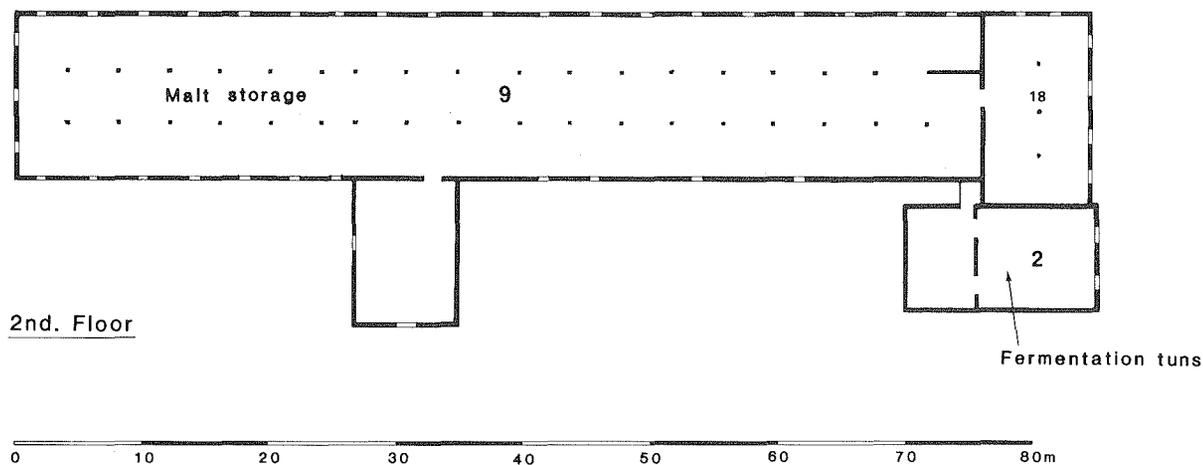
1st. Floor

'In the hot air chamber below are two furnaces, from which heat radiates, and the ceiling is formed of tightly drawn wire. On this the barley, after it has been properly germinated, will be placed and dried into malt. Over the roof are the escapes through which the steam given off will pass outside . . .'

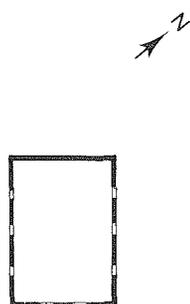
The records quoted allow both accurate dating of the extant buildings (Fig. 2) and the allocation of particular functions to particular areas. Firstly, it is clear that the earliest part of the complex is the north tower and its flanking wings. By 1878, an attached verandah (Fig. 1) housed an office. This can be seen to the left of an etching which illustrated the *Illustrated Sydney News*' report (Fig. 3). The tower, of four stories surmounted by a roof with a central lantern and four dormers to allow ventilation, was square in plan. It was the brewery proper. The top floor (Room 1, Fig. 5) contained the storage reservoir, the mash tun, and boiler, with the vertical refrigerator installed, doubtless, within the lantern and having

Fig. 4: The ground floor and 1st floor of the Castlemaine Brewery, 1979.

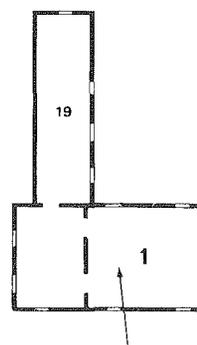
additional ventilation from the dormers. The fermentation tuns were on the 2nd floor (Room 2, Fig. 5) whence the beer was let down into puncheons on the ground, originally below ground, floor (Room 4, Fig. 4). This leaves the 1st floor (Room 3, Fig. 4) which, therefore, must have held the malt bins and crushers. The plans (Figs 4 & 5) cannot be taken as accurate in detail. At the time of inspection in 1979, the tower had been sealed off and other areas were inaccessible. Internal details shown are conjectural. The two-storied, flanking wings (Rooms 5-8, Fig. 4) were used for storage. Weight-bearing sub-floor foundations in the east wing (Room 8, Fig. 4) appear to be for condensers installed later in the century. Water came from a well, probably the northernmost shown in the 1896 plan (Fig. 1) since the boiler for the engine was located just north of this. An 8-h.p. engine powered the pumps and elevators.



2nd. Floor



3rd. Floor



Reservoir, mash tun, boiler and refrigerator

In 1878, the main section of the west wing was added (Fig. 3). Malt was stored on the top floor (Room 9, Fig. 5) and, presumably, barley since the steep to start germination was installed at one end. Beneath this was the malting floor (Room 10, Fig. 4) whence the fermented barley was taken to the kiln. In 1911, an office and laboratory were partitioned off at the northern end. The ground floor (Room 11, Fig. 4) is now divided into a series of interconnecting cold-stores. These are the result of later conversion. Originally this was a store which connected with the west wing of the original brewery. Towards the end of the century, however, provision was made to load from the east side.

These structures are all of brick on stone foundations. The present roofs are iron but according to an 1883 report they were originally shingled.⁸

Abutting the east wall of the 1878 wing at its southern end is a four-storied tower, later converted into a condenser tower. This is not referred to as such in the documented record and it is not shown in the 1878 etching (Fig. 3). There is, however, evidence to suggest that it was once of only two stories and had a lantern roof. In shape, this suggests a malt or oast house. Whilst alterations have obliterated apparent structural evidence, it is not unlikely that this was the 1878 malt kiln. The 1st floor (Room 12, Fig. 4), where fermented barley would have been spread to dry, is on the same level as the malting floor (Room 10, Fig. 4) and could have connected directly with it. If this conjecture is correct, the barley steep is likely to have been at the southern end of the west wing adjacent to the kiln. The kiln furnace would have been at ground level (Room 13, Fig. 4).

It is clear from the contemporary descriptions that the west wing in 1878 extended only 50.30 metres, that is to the centre of the southern gable (Fig. 6). In April 1886, the *Newcastle Morning Herald* referred to an 'intention' to enlarge the

Fig. 5: The 2nd floor and 3rd floor of the Castlemaine Brewery, 1979.

brewery.⁹ The extensions were completed by the end of 1887, as they are mentioned in the prospectus of the public company formed that year to take over the brewery and Wood Brothers' business.¹⁰ Though no further details were given, these appear to have been the southern extensions to the brewery tower and the west wing (Fig. 2). Both are constructed of the same materials as the earlier complex. The prospectus refers also to a bottling plant which may well have been installed in the extension to the west wing on the ground floor (Room 14, Fig. 4) adjacent to the storage area where an internal division suggests a change of function. The removal of the end walls of the 1878 wing on the floors above suggests the new spaces were used for the same purposes as the old.

Following the established success of the Castlemaine Brewery, the Great Northern Brewery was built in 1888 in Wood Street, diagonally opposite the Castlemaine (Fig. 1). Again we are indebted to the *Newcastle Morning Herald* for a description:

'The ground plan consists of cleansing room, 100ft × 31ft [30.48 × 9.45m], with the basement of tower 25ft × 30ft [7.62 × 9.14m], all having cemented floors and extensive drains and sumps. The front verandah is 20ft × 30ft [6.10 × 9.14m], and has fitted on same offices and entrances. Adjoining, on the right, is the very large machinery shed, 45ft × 45ft [13.70 × 13.70m], in which is erected the motive power for driving all the machinery, and the base of the large and ornamental chimney stack. The shed is of wood and iron. On the same side, at the rear, is a large open shed, 45ft × 15ft [13.70 × 4.57m], for general work—bottle-washing, storage, &c.



Fig. 6: The west side of the Castlemaine Brewery, 1979.

This is also constructed of wood and iron. On the first floor is the material and bottling room 100ft \times 31ft [30.48 \times 9.45m], and adjoining the fermenting room, 25ft \times 30ft [7.62 \times 9.14m]. On the second floor plan is a storeroom, 69ft \times 31ft 8in [21.03 \times 9.65m], and leading into refrigerating room, 26ft \times 31ft [7.92 \times 9.45m]. On the third floor plan are storerooms, 69ft \times 31ft 8 in [21.03 \times 9.65m], leading into the boiler floor, 31ft \times 26ft [9.45 \times 7.92m]. On the fourth floor plan is the mash-floor, 31ft \times 26ft [9.45 \times 7.92m]; and on the fifth floor plan is the water-store, 20ft \times 24ft [6.10 \times 7.32m], and is covered by the ornamental and circular roof. Easy access is given to each part of the upper floors by means of easy going ladders and steam lift, which works up and down in one of the corners of the building, and runs as far as the roof. The three upper floors are trimmed for extensive vats and tubs. The main buildings are constructed of brick, with cement facings, on a concrete foundation, iron roof, the walls in the lower part being 2ft [0.61m] thick. The main building breaks the skyline in three parts. The front, which is the tower, is 62ft [18.90m] high to the top of the brickwork. It is then surmounted by a domed roof, 16ft [4.88m] high, neatly finished off on the top with a lead flat and iron balustrade. Access to this flat is gained by an iron ladder from the centre back circular dormer window in the roof . . . The part of the building adjoining the tower, and immediately behind it, is three storeys high, and is 46ft [14.02m] high to the top of the brickwork, being surmounted by a hipped roof 10ft [3.05m] high, having on the top a louvre ventilator 42ft [12.80m] long, 8ft [2.44m] high, in keeping with the general style of the roof. The hindermost part of the building is two

storey, and to a height of 24ft [7.32m] in the brickwork and capped by a similar roof as described above. The chimney stack has a flue 3ft 6in [1.07m] clear inside square, and the altitude of it is 86ft [26.21m], being square up to 20ft [6.10m] of the top, when it takes octagon form, and is finished off with neat and bold cemented cornice. Copper rods, as lightning protectors, are fitted up the stack. The outbuildings, consisting of stables for six horses, cartsheds, cooperage sheds, &c. &c., are chiefly of wood and iron, but are the model of convenience . . . The ventilation of the building is remarkable in all its points, and centre pivot-working louvre windows are freely interspersed amongst the glass windows. The building is acknowledged by experts to be a modern brewery, and constructed in the latest and best-known way for the brewing of beer on scientific principles . . .¹¹

The stack and outbuildings have gone, as has the verandah which must have faced Parry Street since the brewery is recorded as fronting that street and the width of the verandah is that of the north wall of the tower. Weather-marks on the west face of the tower, (Fig. 7) whilst seemingly in the general area of the machinery shed, must relate to a later structure. The distance covered is greater than the depth of the machinery shed and the mark covers a strip of cement render which runs from ground to roof on the south-west face of the tower. This, it is suggested, probably covers the remains of the guide rods of the steam lift. There is no evidence of a lift inside the building and it is more likely that an industrial lift of this



Fig. 7: The west side of the Great Northern Brewery, 1979.

period was an external cage. Whilst not 'in one of the corners of the building', it is at the corner of the tower. The main brick structure has been reroofed, has new windows and has been altered internally to accommodate technical students. Otherwise it remains as it was in 1888 (Fig. 7).

The layout of the Great Northern Brewery differed from that of the Castlemaine. The top floor of the tower (Fig. 8, 5th floor) contained the reservoir below which was the mash tun (Fig. 8, 4th floor). The wort was then gravity fed to the boilers on the 3rd floor (Room 1, Fig. 8) from which it was again fed by gravity to the refrigerator on the 2nd floor (Room 2, Fig. 8). Presumably the refrigerator was not dissimilar to that at the older brewery, though the Great Northern relied on windows to the north, west and east for ventilation. Gravity was again relied upon to feed the cooled wort into the fermenting vats on the 1st floor (Room 3, Fig. 8) whence it was pumped to the storerooms on the 2nd or 3rd floors (Rooms 4 & 5, Fig. 8) for secondary fermentation in casks or tuns. Since full fermentation of a single day's brew took 6-8 days, fermentation could not have been confined to the tower. Two metal tubes run from the ceiling of the 3rd floor (Room 5, Fig. 8) through the floor to end in the centre of 3.5m inverted metal troughs in the 2nd floor ceiling (Room 4, Fig. 8). Though the new roof makes no provision for them, these appear to have been air vents, suggesting that secondary fermentation, which would give off gas, occurred on the 2nd floor. Draught beer must also have been stored on these floors. Doorways, now blocked or converted to windows, at the south ends of both east and west walls allowed kegs to be drawn in or out. A hoist for the purpose remains above the west door of the 3rd floor (Fig. 7). These areas and the floors below are supported internally by 25 x 25cm (10 inch) hardwood pillars on which lie mortised 1.52m (5 feet) beams of the same size. These in turn carry the single central floor beam 25 x 30cm (10 x 12 inches) on which 22.5 x 7.5cm (9 x 3 inch) floor joists are laid at 45cm (18 inch) centres. This

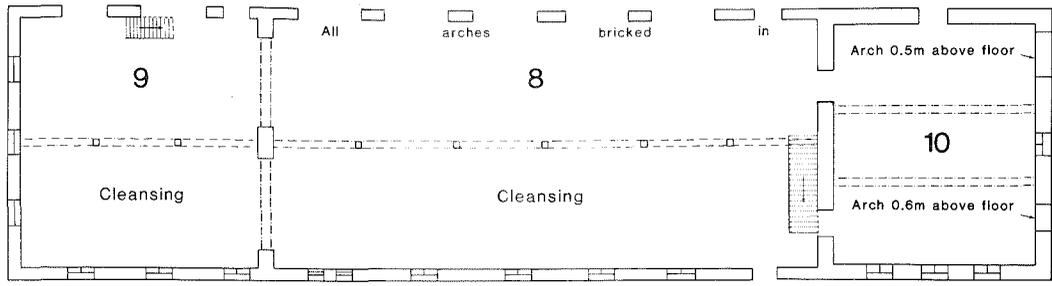
construction is capable of bearing considerable weight.

Beer for bottling was let down to the bottling department on the 1st floor. 'Material' (malt, yeast and hops) was also stored on this floor which is the top floor of the two-storied section. The total area, therefore, is divided into two. Since bottling requires comparatively little space and the materials are likely to have been located adjacent to the brewery tower, the former was probably in the southern room (Room 6, Fig. 8) and, indeed, the remains of a chute to run the bottles to and from the ground floor can be seen against the west wall of this room. This leaves the larger area (Room 7, Fig. 8) for materials.

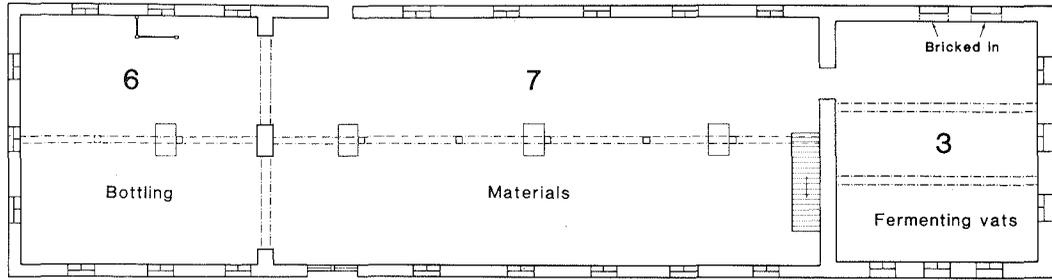
Large archways, mostly now bricked in, in the west wall of the ground floor cleansing area (Rooms 8 & 9, Fig. 8) gave easy access to the western courtyard and to the water supply (Fig. 1). The archways seem to have been fitted with sliding timber doors. One such remains in the southernmost arch.

No particular function was attributed in the 1888 description to the tower at ground floor level (Room 10, Fig. 8). It was described merely as the basement and it may well have been just a means of raising the floors above to allow continuous gravity feed. The functional plan of the tower makes far better use of gravity than did the Castlemaine.

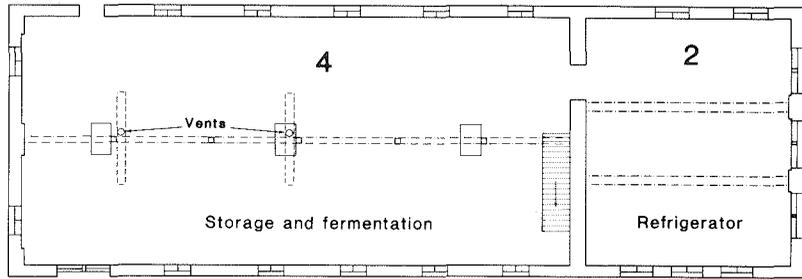
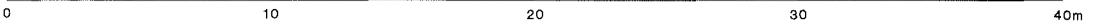
The Great Northern Brewery did not survive for long. It has been suggested that it was bought out by the Castlemaine Brewery in 1891 but there is nothing in the annual reports of the latter Company to indicate this. Certainly it ceased to operate, probably having fallen victim to the depression of the Nineties. By 1897, the Castlemaine had taken over. In that year a bacterial growth invaded the old brewery and brewing was shifted to the Great Northern while the Castlemaine was cleaned, the cellars reconcreted and the yards asphalted. The old brewery was then re-equipped with new



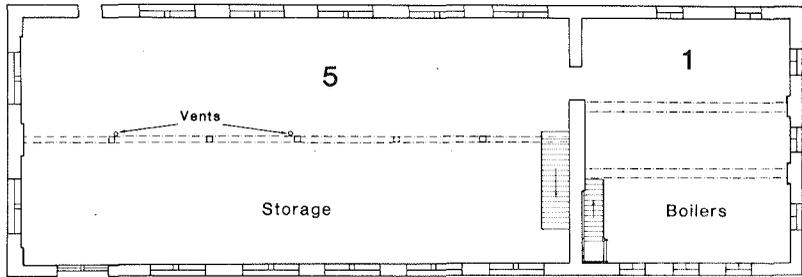
Ground floor



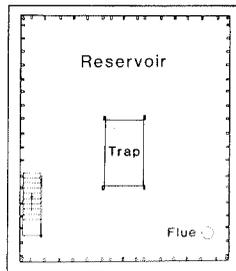
1st. floor



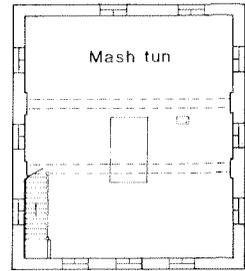
2nd. floor



3rd. floor



5th. floor



4th. floor

Fig. 8: Floor plans of the Great Northern Brewery, 1979.

vats, boilers, mash tuns and refrigerator but, apart from some storage sheds in the Castlemaine yard, there is nothing to suggest that either brewery was changed structurally.¹² After this, the Great Northern was abandoned again so far as brewing was concerned, though it was used for laboratories. All machinery and equipment were removed, the timber and iron structures were scrapped, and the stack demolished.

It is not proposed to deal in any detail with the later history of the Castlemaine Brewery nor with its technological development. However, as the complex today is the product of that development, it cannot be ignored completely.

From the time of the Sydney to Newcastle rail link in 1889, Newcastle's industries received increasing competition from the giant Sydney concerns. By the turn of the century, most of the Hunter Valley breweries had gone and the Castlemaine was finding it difficult to maintain its markets in the face of Tooths and Tooheys. In 1911, 'drastic alterations' were made to modernise the brewery:

'A new plant, and a new system of brewing . . . necessitated important structural alteration, and a great increase of engine, boiler and refrigeration power . . .'

By the end of the following year, a new office and bottle store had been built on the Hunter Street frontage (Fig. 2; Rooms 15, 16 and 17, Fig. 4). The latter necessitated alterations to the ground floor of the east wing of the 1876 brewery (Room 8, Fig. 4). The bottling department was re-equipped with new filling and washing machines, an automatic corker, a wiring machine and a pasteurising tank. Soon afterwards the bottling department was extended east (Fig. 2). New skimming vats and a refrigeration plant required structural alterations in the 1878 wing and it appears that the same period saw the conversion of the old malt kiln, if such it was, into a condenser tower. The north courtyard was enclosed by the erection of a wall along Wood Street. The loading dock of the 1876 brewery was enlarged and covered with an awning roof running around three sides of the court.¹³ As these were the only years of major building in the first decades of this century, it would seem that the top floors were added to the 1876 west wing at this time (Rooms 18 and 19, Fig. 5).

The chairman's reports to the shareholders announce the success of the new operations. Nevertheless, in 1921 the

Castlemaine Brewery was sold to Tooths. Brewing continued until 1931 when, the Great Depression at its height, it ceased 'temporarily', never to recommence. Machinery was removed and the premises used as a store and depot for the distribution of Tooth's Sydney products.¹⁴ As a building, the Castlemaine Brewery provides an archaeological reminder of the process of centralisation that has concentrated the brewing industry in Sydney.

NOTES

1. Hunt, R. (ed.) 1878. *Ure's dictionary of arts, manufactures, and mines*, 7th ed., London; Loudon, J. C. 1846. *An encyclopaedia of cottage, farm, and villa architecture*, London; Parsons, T. G. 1971. Technological change in the Melbourne flour-milling and brewing industries, *Australian Economic History Review* XI: 133-46.
2. *N.M.H.* 12/11/1887; Turner, J. W. 1980. Manufacturing in Newcastle, 1801-1900, *Newcastle History Monographs* No. 8, Newcastle: 58.
3. *N.C.* 14/5/1874.
4. *N.M.H.* 24/6/1876.
5. *N.M.H.* 21/1/1878.
6. *I.S.N.* 13/7/1878.
7. *ibid.*
8. *N.M.H.* 29/12/1883.
9. *N.M.H.* 20/4/1886.
10. *N.M.H.* 12/11/1887.
11. *N.M.H.* 8/11/1888.
12. *N.M.H.* 30/10/1897, 3/8/1898.
13. *N.M.H.* 1/11/1911, 1/11/1912, 11/12/1912, 13/5/1913.
14. *N.M.H.* 6/10/1973.

ABBREVIATIONS

- I.S.N.* *Illustrated Sydney News*
N.C. *Newcastle Chronicle*
N.M.H. *Newcastle Morning Herald*