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AN EXCAVATION AT WOOD'S FLOUR MILL, WHANGAREI

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Francis Wood's flour mill (N20/434) is one of the few surviving early industrial sites in Whangarei City. Land which contains the mill ruins was recently purchased by Whangarei City Council with the intention of preserving the site and presenting it to the public.

The walls need to be stabilised before public access is permitted, and inevitably this would disturb the ground surface in the near vicinity of the building. Therefore an archaeological excavation of the ruins was undertaken over a series of weekends between June and October 1987, to recover sub-surface remains and to add material evidence to the somewhat sparse historical documentation of the site.

Site Description

The mill ruins are situated on the southern side of Otangarei Stream, adjacent to Brewery Bridge Road (Fig. 1). They consist of a basement and adjoining wheel pit constructed of large hand-faced basalt blocks. The interior of the basement is approximately 10 x 5 m in area, and the walls originally stood 2.7 m above ground level (front cover, Fig. 2).

A small flat terrace, about 8 x 2.75 m, lies immediately above and to the west of the basement. It would have been level with the upper storey of the mill, which is presumed to have been constructed of wood.

Both local information and aerial photography indicate that the upper mill race ran along the western side of the stream (Fife pers. comm. 1987, Aerial photo 403/36). Water was probably diverted into the race approximately 250-300m upstream from the mill, near the present bridge.

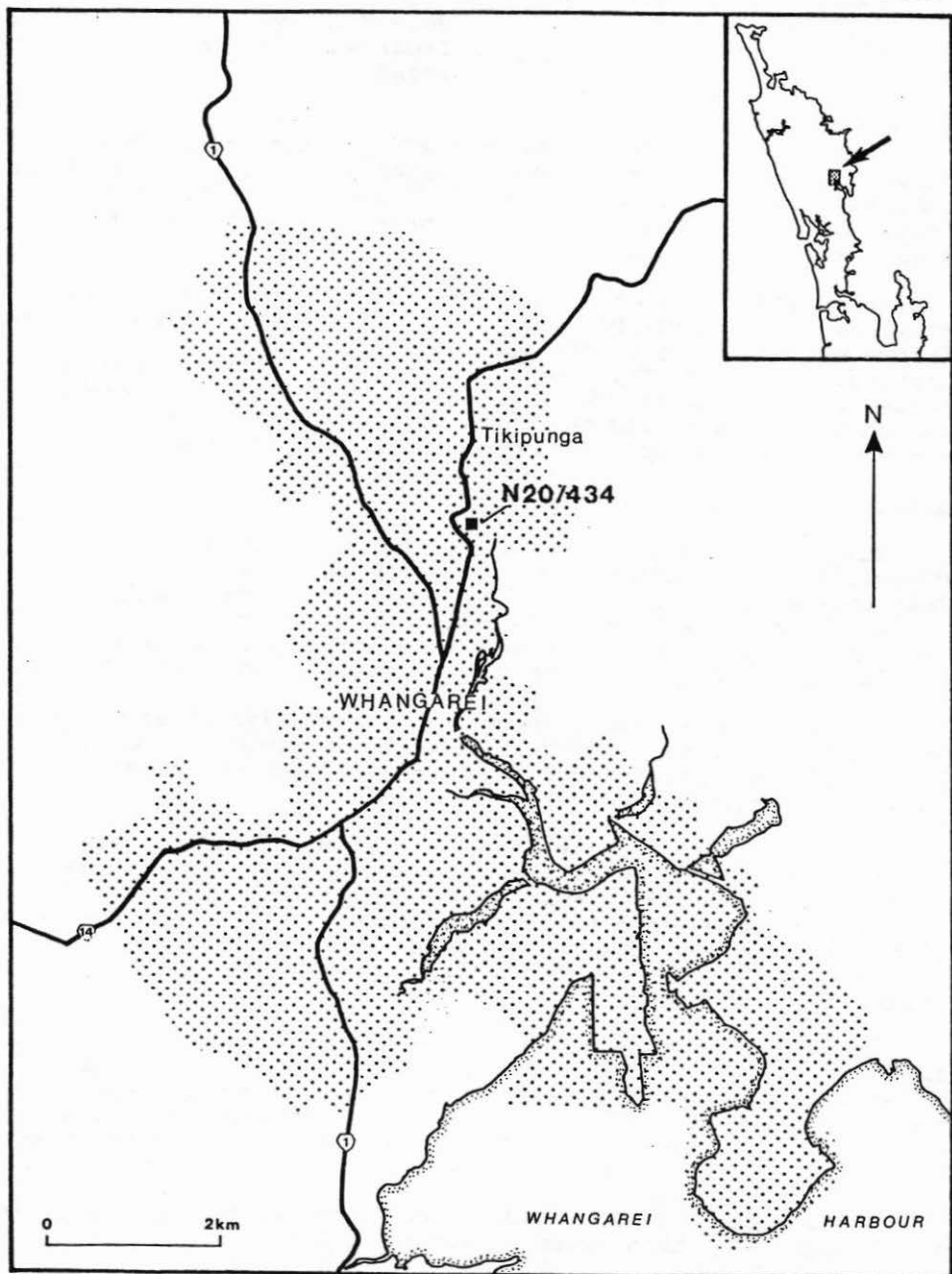
Historical Information

The mill was constructed in 1869 for Francis Wood, a Canadian miller. It was reputed to have been built on the site of Holman's flax mill and to have made use of his existing water wheel (Keene 1966:135). However a contemporary letter implies that it was near to the previous flax mill rather than occupying exactly the same location.

In May 1869 a local resident noted: "There has been a flour mill put up here this summer, near the place where Holman's old

LOCATION MAP OF WOOD'S FLOUR MILL, N20/434

FIG.1



Flax Mill used to be". The writer held reservations concerning the economic potential of the venture for he continues "if it was finished and at work I cannot see how it could pay, for there is very little wheat grown in the district and the consumption would not nearly keep it at work" (Burnett 1869).

But apparently it was a valuable innovation for the district and of benefit to many local people. Wheat was brought to the mill from as far away as Parua Bay. It was ground mainly for the growers' private consumption with the excess being purchased by Wood (Keene 1966:133).

Wood closed his water-powered mill in the late 1870s and moved to Cameron Street in the centre of the city, where he built a steam-driven mill (Pickmere 1987:140). Perhaps Burnett's predictions were justified, the initial concern may have proved uneconomical without ready access to imported wheat.

At the present time no documents have been discovered concerning the subsequent fate of the building. However several local people state with certainty that it was later converted into the brewery which lent its name to the nearby bridge. According to W.L. McKinnon, a previous mayor of Whangarei, the water wheel was still in use during this period (Vallance n.d.:65).

### The Excavation

The mill stite was excavated over three weekend periods in June, August and September 1987. The voluntary labour force included both professional archaeologists and local enthusiasts. A generous contribution toward expenses, by the Historic Flour Mill Committee, helped to make the investigation possible.

### Objectives

The major aims of the exercise were:

- (1) To clear the site of accumulated rubbish and fallen debris without disturbing structures.
- (2) To determine the type of water-wheel that was used, and if possible the orientation of the upper mill race.
- (3) To recover sub-surface artefacts and remnants of machinery.
- (4) To discover any subsequent functions of the building.
- (5) To extend present information concerning an early Whangarei industry, and provide additional data on 19th century flour milling in New Zealand.

## Methods

The ruins were overgrown with vegetation and strewn with rubble. Consequently the first weekend's excavation was largely a clearance exercise, although small areas of the basement floor were uncovered to determine its composition.

During the second period the wheel pit was investigated and the upper terrace was partially excavated.

The final weekend was spent in clearing the basement floor, continuing excavation of the wheel pit and terrace, and test-trenching above the stream bank to discover any remains of the upper mill race.

The excavation was accomplished with hand tools, except for a machine dug trench to drain the wheel pit and employment of a "come-along" to remove particularly large blocks of stone.

## Results

There were no surface remains of machinery at the site. Presumably these valuable assets would have been removed in the 1870s to Wood's new mill in Cameron Street. However, as in most excavations, sub-surface evidence provided some unexpected discoveries.

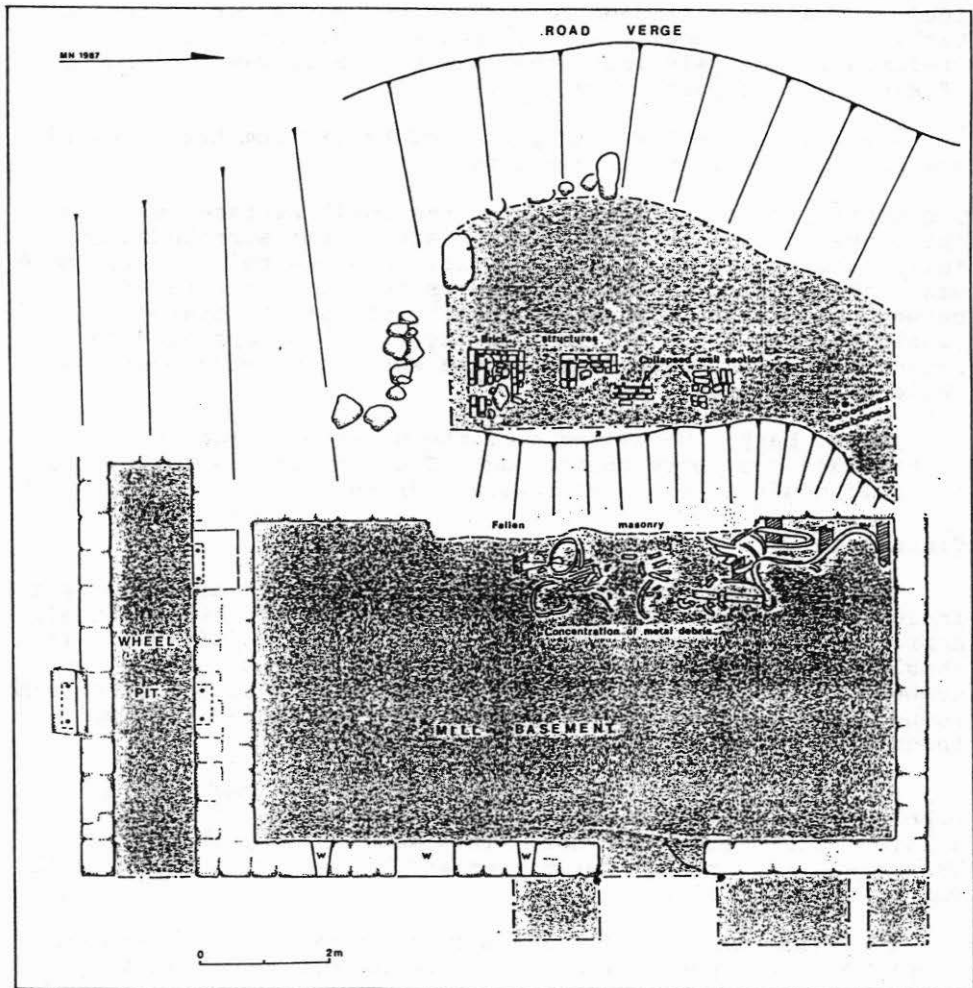
The mill basement: Clearance of the rubble within the mill revealed that a large proportion of the western wall had collapsed inwards.










As expected there were few remnants of machinery connected with the flour mill, although bearing bolts associated with the wheel and drive shaft were still in position above the wheel pit, and a large cast-iron bearing block was found amongst fallen masonry near the west wall. An extensive collection of metal debris was also uncovered in the north-western quadrant (Fig. 2). This consisted of iron hoops and pipes, sections of copper piping, and copper alloy fittings which included bungs, valves and wheel valves. It is unlikely that these were related to milling and they are more probably the remains of brewing equipment, possibly a still.

The entire mill floor was scattered with fragments of glass, china, nails and wood. Some of the glass and the copper fittings were molten indicating that they had been exposed to intense heat of up to 1100°C. Most of the wood was charred, and debris throughout the building was mixed with charcoal.

The floor itself was partially covered in a rough concrete composed of sand and water-worn pebbles.

FIG. 2 PLAN OF MILL SHOWING EXCAVATED AREAS AND MAJOR FEATURES



- |   |   |
|---|---|
|  Excavated areas |  Slope direction |
|  Stone walls     |  Post            |
|  Cobble stones   |  Inset bolts     |
|  Charred wood    |  Window aperture |
|  Loose rocks     |   |

The wheel pit: Approximately 1.0m of mud had accumulated in the wheel pit over time. This contained a large quantity of worked wood. Several pieces were definitely part of the wheel including a large grooved section of the perimeter. Like the timber in the basement, most of the wood was charred. Preliminary analysis indicates that the wheel was constructed of kauri (Johns pers. comm. 1987).

A number of bottles and pieces of brick from the wheel pit are probably of 19th century origin.

The upper terrace: Excavation of the small terrace revealed the bases of two rectangular brick structures surrounded by fallen and mostly fragmented bricks. Beneath this debris there was a thick layer of ash and cinders mainly concentrated between and in the immediate vicinity of the structures. Basalt cobbles lay under the ash layer. These appeared to extend below the brick features and were continuous over the whole terrace area.

The stream bank: No evidence of the upper mill race was found in trenches dug above the stream. The area proved to have been severely modified by later sewerage drains.

#### Discussion

The topography of the land and dimensions of the wheel pit indicate that the mill was powered by a high breastshot wheel, approximately 18 feet in diameter (see Syson 1980:66-67). It should be possible to calculate the exact dimensions and the number of buckets from a large grooved section of the outer rim found during excavation. Other wooden remains may provide information on the form of wheel construction.

Evidence from the adjacent terrace established that a cobbled area lay immediately in front, or west, of the mill on a level with the upper floor. This would have provided an essential "hard stand" for horses and drays during Whangarei's wet winter conditions.

Confirmation that the mill was later used as a brewery was supplied by the presence of barrel hoops and copper fittings in the basement, and by the brick features with their associated rake-out of ash and cinders on the terrace. While heat was not employed in flour milling it was essential to the brewing process (Chambers 1860 Vol.1:807-810).

The brick structures appear to have supported a substantial chimney. Broken bricks covered almost the whole of the terrace area, and their fragmented condition suggests that the chimney was deliberately demolished. This may have been necessary after the upper floor of the brewery burnt down. Charred

timber and widespread molten glass and metal in the basement indicate an intensive fire which would have left the chimney in an unstable condition.

The content and condition of metal debris suggest that the fire occurred after the brewery was abandoned. Fittings were broken, they were surrounded by charcoal and the main concentration lay above charred timbers. It appears that some machinery was removed after the business closed down and the remainder heaped on one side of the upper storey. During the conflagration the flooring collapsed and the cache fell into the basement.

Further research may provide documentary proof and exact dates for this sequence of events.

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