The Mill, Lundin Mill Farm. Drg. no. 2, Dec. 2018. John Band

Milling;- A brief history

The first milling stones were hand operated, known as "querns", derived from the Old English "cweorn".

The first querns which were in use for around 3,500 years were "saddle querns"

From circa 400 BC the "rotary quern" was used in England, spreading north to Scotland by the first century BC, these were much more efficient, a revolution in milling.

The Romans are thought to have brought the first watermills to Britain around the 1st or 2nd century AD. By the mid 18th century most of the developments in grain milling machinery had been made. The succeeding industrial period was to see an increased sophistication applied to such developments and more scientific & technical methods applied, such as analysis of waterwheel efficiency & gearing profiles. The millwrights job which had developed from the skills of carpenters & smiths in the late middle ages, became of necessity a more technical one.

Between 1750 & 1850 saw a great social change as Britain moved towards industrialisation. The period also marked by a huge increase in agricultural production and a massive rise in the population. At the same time the number of farm workers was decreasing. The growth of both crop yields & population led to a need for increased grain processing.

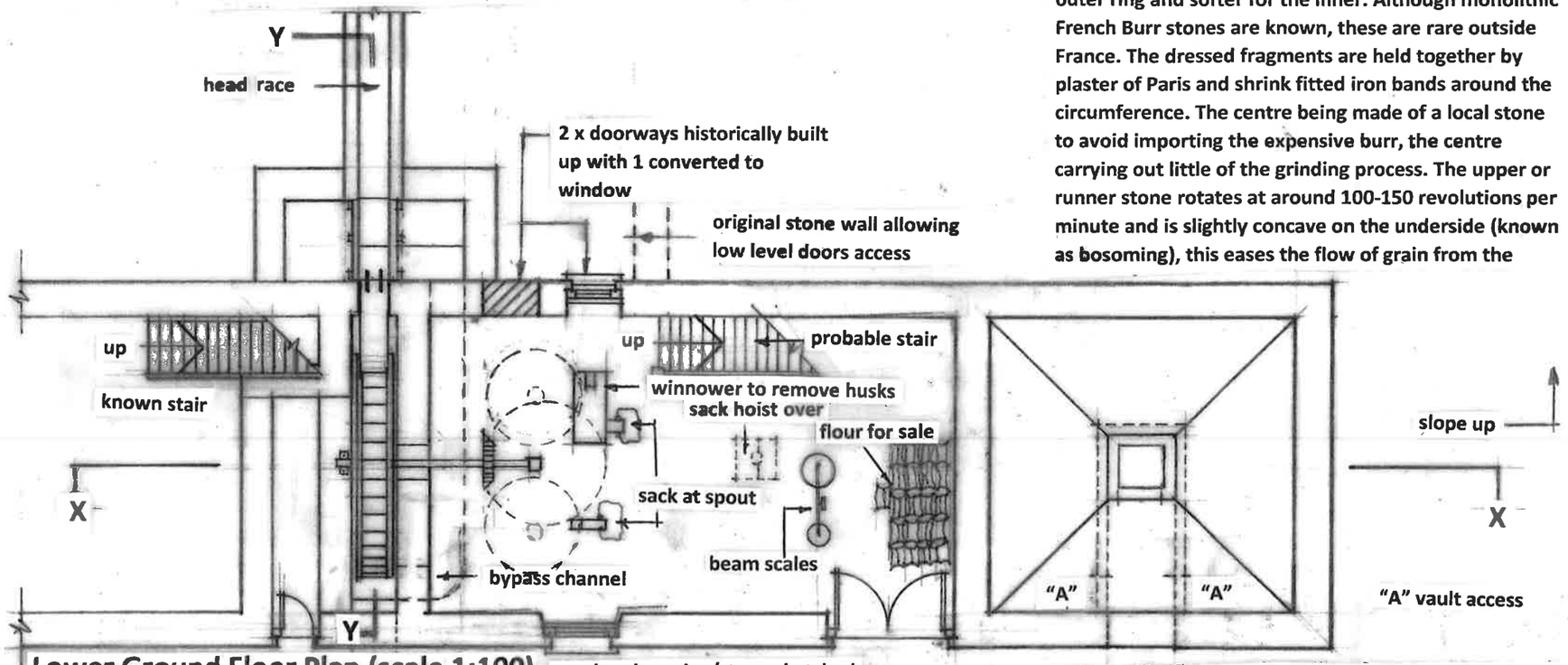
In 1825 French Engineer J.V. Poncelet invented an all iron waterwheel with close fitting breastwork & closely spaced curved buckets so that there was virtually no loss of the power by impulse.

Most British mills had at least one set of French Burr millstones, the best stone for milling.

Winnowing or grain cleaning machines were introduced in the late 18th century, the simplest being flat or slightly inclined sieves which were shaken as the grain passed over, a fan blew the dirt & dust away. Flour bolters separated the fine white flour from the bran, these were not common until the 18th century. Prior to this meal was sifted by hand powered machines.

Milling

Grain is fed from the hoper into the feed shoe. The shoe is agitated by a shoe handle running against an agitator (damsel) on the stone spindle (the shaft powering the runner stone). This mechanism regulates the feed of grain to the millstones by making the feed dependant on the speed of the runner stone. From the feed shoe the grain falls through the eye (the central hole) of the runner stone and is drawn between the runner stone & the bed stone to be ground. The flour exits from between the stones round the side. The timber stone casing prevents the flour from falling on the floor, instead it is taken to the meal spout from where it goes down the spout for bagging or returning to be further processed by the sackhoist The fineness of the flour can be adjusted by raising or lowering the runner stone. The phrase "rule of thumb" comes from this part of the process, where the miller would sample the flour between his thumb and finger to check for quality. If set incorrectly millstones could grind too hot and the flour would become cooked emitting a burning smell, occasionally catching fire. To avoid this the miller "kept his nose to the grindstone" to detect the temperature and condition of the meal. Also if the millstones ground to close and there was not enough power the mill would "grind to a halt"



Lower Ground Floor Plan (scale 1:100)

overhead gearing/stones hatched

Head race

Head race built from mid to late 19th century "frogged" bricks. This along with the historically built up doorways (part covered by the bypass sluice sump wall) and the remains of the stone wall on the east side of the doors may suggest one of the following historic alterations was carried out;-

(1) The original waterwheel was of the undershot type ie. did not require the high level head race.

(2) The headrace channel was originally timber built for a distance supported on timber pillars and did not require underbuilding for support.

Both of the above scenarios would have resulted in the built up doorways remaining accessible.

French Burr Millstones

Barely a mill in Britain was without at least one set of French Burr millstones.

Triassic period quartzite, quarried near Chalons, Marne Valley, northern France. Acknowledged the world over to be the finest stone for making millstones, based on the stones hardness and ability to grind much whiter flour by not breaking the bran of the wheat down to small particles but leaving them as large flakes which could be separated from the flour. This is due to the fact that the stone has natural pores of varying sizes with very sharp edges which cut the wheat rather than just grinding by abrasion. The stone was generally only found in small pieces, usually embedded in layers of clay, rarely large enough to make a complete millstone of the usual size 4-4 feet 6 inches dia. X 12-15 inches thick at the skirt & 15-18 inches thick at the eye and weighing ¾ ton. The number of pieces in each stone could range from 4-19. There are two rings of stone, a good millstone builder such as J. Smith & Son, 219 High St. Edinburgh would select the harder burrs for the outer ring and softer for the inner. Although monolithic French Burr stones are known, these are rare outside France. The dressed fragments are held together by plaster of Paris and shrink fitted iron bands around the circumference. The centre being made of a local stone to avoid importing the expensive burr, the centre carrying out little of the grinding process. The upper or runner stone rotates at around 100-150 revolutions per minute and is slightly concave on the underside (known as bosoming), this eases the flow of grain from the centre of the stones towards the skirt. The upper stone has an iron cross fitted known as the mill rynd, this is supported on the neck bearing of the driving or balancing spindle of the static bed stone. The underside of the bed stone is smoothed with Plaster of Paris so that it sits level on its base. To correct any uneven wear the bed stone would be adjusted by driving wooden wedges under it. In the late 19th century bed stones were often set in cast iron pans, usually at 4 opposite points adjustable pins were set to level the stone.