

# BANCROFT

## MILL ENGINE TRUST

GILLIANS LANE, BARNOLDSWICK, BB18 5QR,

[www.bancroftmill.org.uk](http://www.bancroftmill.org.uk) Registered Charity no: 517795

**A Happy New Year to you all!**

It had been my intention to try to fill the void between last year's final steaming and this year's first steaming with a couple of newsletters. Alas I can report little from Bancroft but that doesn't mean that nothing goes on, the winter's routine and other similar work proceeds as usual.

### BANCROFT SUBSCRIPTIONS ARE DUE

The Museum's year begins in January, subscriptions are thus due any time now. If you are not a member, why not join and visit as often as you wish for no extra cost? Even the tea and coffee are "on the house" for members..... If you are already a member – you could pay Jim or Richard in person on a Saturday after 11.00am. at t'mill.

Otherwise, subscriptions should be sent to  
Jim Gill, Mean Moss Farm, Boulsworth Road, Trawden, Colne. BB8 8ST  
Tel: 01282 865626.

Adult membership is	£ 12.00
Pensioner concessions are	£ 10.00
Children, 6 – 16	£ 8.00
Life membership	£120.00

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### THE LANCASHIRE SOCIETY

Over the last three steaming seasons many of you have enjoyed the performances of the members of the Lancashire Society, usually led by Sid Calderbank and so we are pleased to tell you that the Society will again entertain us with song and dialect poetry on two occasions during 2013. We have always had a goodly number of complimentary mails following these performances, so we are sure that their popularity continues undiminished. Details with the

dates will be published well ahead of the event but one of the dates will be Saturday 7<sup>th</sup> September, a Heritage Open Day. Library pic., some of the Society in action at Bancroft, 2012



Meanwhile, those of you living around Lancashire have an opportunity to see them in action in the near future with two Evelyn Waugh concerts, the first planned for Saturday 2<sup>nd</sup> at 7.30pm on February at Adlington Community Centre 6 miles north of Bolton, and the second on Sunday afternoon 3<sup>rd</sup> February 2.00pm in The Barlow Institute, Edgworth, again near Bolton. Posters with full details of both these events are attached to this newsletter on pages 6 and 7.

### UK HERITAGE HUB

Bancroft is preparing a series of articles for the online magazine UK HERITAGE HUB. The magazine has, until lately, catered mainly for steam enthusiasts who tend towards railway locomotives but now it caters for mill engine enthusiasts too. The magazine has run articles from Ellen Road Steam Museum and the Anson Museum just lately and our first article is in the current number, issue 15.

You can see the magazine and our first article dealing with the early days of James Nutter and Sons on pages 24 and 25 at:

<http://www.72010-hengist.org/ukhh/index.php/ukhh-downloads>.

One illustration relating to the final paragraph has not appeared due to a technical problem but we will try to include it later.

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### THE WHITELEES BEAM ENGINE AT ELLEN ROAD.

There has been persistent information circulating for a while about the accuracy of alignment of this engine since it was rebuilt at Ellen Road Steam Museum, the committee there has been very concerned about its longevity, concerns exacerbated by the engine's great age. Visitors to the Museum will have seen the engine being dismantled and carefully examined in recent months. All the inaccuracies that were suspected have been accurately quantified and rectified during rebuild. I do not propose to go into more detail but rather to include below the complete and excellent article from J. K. Wilson of Ellen Road Steam Museum, **reprinted by kind permission of UK HERITAGE HUB and J. K. Wilson.**

### The Whitelees Beam Engine

In November 1841, John Petrie & Company of Rochdale delivered their forty seventh beam engine to Mr John Hurst of the Whitelees Mill, Littleborough. The engine continued steaming until, after long spells of day and night work, it finished operating in mid 1942. During this period the original Petrie engine works had been acquired by Holroyd Gear Works. The Whitelees mill, too, had changed hands and in 1957 was owned by the CWS who decided to dispose of the old engine. It was during this year that Holroyd's brought back the engine to its birthplace, re-erected it in a special annex to their factory and motorized it. The annex was glass faced and the engine could be viewed by the passing public.

The single vertical cylinder has a bore of 25.5 inches and has a stroke of 5 feet. The valves are round-seated with a twist of movement to eliminate the scoring of valve faces. The engine has a single condenser with air pump, a flywheel diameter of 18 feet, a Porter governor and Watt's classical parallel motion in the beam above the cylinder.

The parallel motion mechanism was the device of which James Watt was most proud. Parallel motion is an assembly of rods and links situated on the end of the beam above the steam cylinder. This allows the piston rod to rise and fall in a straight line in spite of the end of the beam describing an arc as it moves up and down. This elegant device was used uniformly in beam engines and is shown to good effort above the main cylinder of the Whitelees engine.

The flywheel of the Whitelees engine is 18ft in diameter and has a series of gear teeth around its outside rim. In the Whitelees Mill, drive was transmitted from a spur gear in mesh with the flywheel to a bevel gear, then through a transmission shaft that was arranged vertically into the mill. Due to the gear ratios in the mill line shafting as well as the engine room, a shaft speed of 300rpm was obtained for driving the mill machinery.

In 1986, the Whitelees Beam Engine was acquired by the Ellenroad Trust and erected in the former boiler house at Ellenroad in 1992. Apart from the age of the engine, the most notable feature is that in all main respects it is in its original from having escaped the almost uniform practice of compounding, popularly known as McNaughting.

At the beginning of the year, after a detailed evaluation, we made a start on what we expected to be a "heavy maintenance overhaul"

For some months before we had become concerned about the way it was running and the way it had been installed 21 years earlier. Now we are now having to undertake a heavy general overhaul and the 1842 built Whitelees engine has had to be 90% stripped down as more problems came to light as we worked our way through the engine.

The detailed evaluation exposed the extent of the installation faults:-

The basic but critical geometry of the engine was to say the least, inaccurate. A beam engine, unlike a beam pumping engine, is pivoted about the centre of the beam, therefore all measurements, component parts, locations and fixings are established from the beam and its rise and fall movement.

At the steam cylinder end of the beam, the cylinder and piston rod were found to be 2.5/16ths of an inch (59mm) out of correct alignment with the vertical rise and fall of the beam. The concrete plinth on which the cylinder sat was discovered to be 2.1/8 inches (55mm) too low, this caused the piston in the cylinder to make an unequal stroke either side of the centre of the cylinder, coming nearer to the top and so nearly closing off the top steam port. The central pivots and bearing housings at either side of the beam were not set level, they were found to be 3/32 inches (2.5mm) out. This may not seem a lot but it meant the beam was tilting sideways and this tilt was transferred to the 16 foot (5m.) long connecting rod and hence the connecting rod did not hang truly vertical, causing problems with attached components and their bearings.

When one of our members put the principle dimensions of the beam engine onto Cad-Cam, it was discovered that at the connecting rod end of the beam the crankshaft and geared flywheel were 2.3/16 inches (56mm) too high from correct level, and 1.1/16 inches (27mm) away from its true central position.

In the absence of original drawings or notes kept during its assembly in 1991 it was essential

that we obtained accurate measurements/ positions for parts when we came to assemble the engine again.

In order to inspect the crankshaft bearings and to subsequently lower them to the correct level, a lifting beam was assembled through the flywheel spokes allowing us just enough lift to clear the shaft from its bearings. This done we could inspect the bottom half of the bearing shells, and lower the concrete base the bearing housings and base plate they were sitting on.

The split bronze bearings on the outside of the flywheel were found to be in reasonable condition and only required a small amount of scraping and fitting, the bearings on the

crank side of the flywheel were found to be very badly worn and the bottom half shell had a 150mm long crack in it that you could see daylight through. It also showed us that the crankshaft and flywheel were not at right angles to the rest of the engine. It was decided to replace the complete bearing and we were lucky in finding a cast bronze tube of the correct size that could be turned down to fit and then slit in two, the housing for this bearing was found to be slightly oval and this was also machined true to suit the new bearings.

Back at the cylinder end of the beam, the cylinder, valve chest, piston and Watts parallel motion all had to be dismantled in order to build a new plinth to the correct height and position. All the bearings on these items and those on the beam ends were worn unevenly due to their misalignment, all had to be hand scraped and refitted. The piston rod was badly worn in 2 areas because it had not been moving in a true vertical line and it was decided it had to be replaced.

As a result of the cylinder and valve chest being out of line, the condenser and air pump connected to the valve chest were also badly out of line. The top of the air pump is 21 inches across (533mm), when a spirit level was placed across, it was found to be ½ inch (12 mm) out of level over this distance. The consequence of this was that the air pump piston had not been acting in a true vertical path and was badly worn in 2 areas. The rod was also badly worn near the piston end and we could not remove it, so it was decided to “sleeve” the whole rod with a stainless steel tube.

The condenser and air pump are linked together by a “spectacle” shaped cast iron base, so the whole lot had to be dismantled in order to correctly re-align it with the valve chest and the engine beam above. We were aware of a crack in the neck of the cast iron condenser for some time but its position was always difficult to get to. Upon removal the crack was found to be more extensive and had been poorly filled and strapped. This was then cleaned out and refilled with a specialist cast iron filler as it was considered to be too dangerous to try to weld it and risk the crack elongating due to the heat and expansion of welding.

The drive to the valve chest valves is from a lattice type connecting rod, driven from the main crankshaft. The large diameter split bearing was found to be very badly worn on one side. The decision to replace the whole of this bearing was taken and a new pattern and castings were obtained and machined for us at Holroyd Engineering, Milnrow

Other works around the engine have been tackled as part of the overall rebuild/display. The inadequate maintenance gallery and stairs have been removed and replaced with one full length and at the correct height alongside the engine beam. All the bearings on the beam can now be safely reached and we will install an original cast iron stairs at one side, this being salvaged from another mill. A mid-level gallery has also been installed along with a new wider staircase to give easy access to the top of the cylinder and through to the top of the Lancashire boiler and engineering workshop.

When the beam engine was brought to Ellenroad it came with its original beam gallery, it was never fitted and was left in a pile until someone gave the order for it to be scrapped. The ugly brick wall and tubular steel railings along the front of the engine have been removed and will be replaced with original Victorian cast iron ones.

At the moment the whole engine is in the process of being thoroughly cleaned down, scraped and ready for repainting. During this process we discovered odd pockets of original coloured paintwork and we intend to use these to recreate its original colour scheme.

As a result of our detailed examination and photographic record of what we found over the last 9 months the consensus amongst our skilled volunteers and engineers is that the engine was poorly re-assembled with no one part of it correctly positioned either vertically or horizontally.

It is with some luck that the engine had only been used since installed for three or four, half-hour runs each month, on the Sunday steaming days. We are not expecting the engine to be back in full working order before the December steaming such is the extent of the works that now need to be carried out.

In fact the work required has been very extensive indeed and it is now hoped to complete the engine ready to run in March 2013. Picture below was taken during December 2012 and shows member Mrs. Renshaw applying paint to the flywheel. Picture: also by J. K. Wilson.



Stop press!

A further opportunity to hear Evelyn Waugh readings:

For one night only at 7.30pm on Wednesday 9th January at the Edwin Waugh Dialect Society, Jervis St Methodist Church, Rochdale the Tin Pot Poets (Sally James and Ron) will be reading their dialect verses and will hopefully be accompanied by violinist Julie Proctor.

**Further information about Bancroft Mill Engine Museum from 01943 602118 or  
[info@bancroftmill.org.uk](mailto:info@bancroftmill.org.uk)**

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