GOLDSMITH

THE PYRENEES HERITAGE PRESERVATION MAGAZINE

Edition 162 June, Aug & October 2021 Lake Goldsmith Steam Preservation Association Inc.

AN EARLY INVITATION TO THE LAKE GOLDSMITH MAY 2022 RALLY

1234 Lake Goldsmith-Carngham Road Lake Goldsmith Vic 3373

THE NOVEMBER 2021 RALLY HAS MOVED TO APR 30 & MAY 1 2022

REGRETFULLY THE 118th NOVEMBER RALLY HAS BECOME A COVID CASUALTY

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Our Mission Statement

To foster, nurture, encourage and demonstrate technical, agricultural and life skills associated with the Industrial Era.

To provide a quality environment where these skills may be used to educate and entertain members and visitors.

To run two weekend rallies each year, and be available at convenient time for other interested groups or individuals.

To conserve and develop a heritage collection.

Find us on the net at:- www.lakegoldsmithsteamrally.org.au

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Note:- The February and August editions are normally email only. (subject to Covid restrictions)

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Lake Goldsmith Steam Preservation Association Inc.

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COVID NOTE

It is with great disappointment that the Lake Goldsmith Steam Preservation Assn has had to cancel the 118th Rally scheduled for October 30 & 31 2021 Ed.

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Welcome to Goldsmith Edition 162 June 2021

All the stars lined up for a great turn out at the May 2021 Rally no 117. The bug stayed away and there were no lockdowns. The weather came up trumps, and so did the visitors. There was plenty on offer to a crowd that was let of the leash after spending 2020 in confinement. Thank you to all of our visitors, and the members that made such a success of the weekend. Unfortunately the November MADE in AMERICA rally has been moved to April 30 & May 1 2022 due to Covid restrictions & uncertainties.

The horse drawn or horse powered equipment theme was a big ask under the conditions, but it was good to see some spreaders turn up. The small engines were more manageable and provided a good show, thank you to all for the time and effort put into showing these prizes from our past to the visitors. You are welcome at any rally.

Covid and unpredictable timetables have limited the pictures from the last rally, and in the Queens Birthday event was just spontaneous, it seems that at times a formal cancellation is just not possible, so the non-event had a great turn out. Thanks again to those who were going to provide the steam and other exhibits on the day. The day had to be cancelled as all of the other events planed for Beaufort on the Queens Birthday were shut down. The visiting classic cars made a great show. Thanks to Ron and Linda for keeping the doors open, just in case, there are some pictures on the back pages.

The rerun planned for September also had to be cancelled, 2022 is looking better.

In the April edition we had a look at some of the science and instruments from the "Age of Enlightenment" and the way that they opened the Pacific to exploration and the mapping of the coasts of New Zealand and the Eastern Australia. The primary reason for Cooks first Pacific voyage was timed to observe the Transit of Venus from Tahiti, which provided enough information to allow scientists of the day to calculate the distance of the earth from the sun (the Astronomical unit) and thus determine the size of the known Solar System. A remarkable achievement in its day.

Travelling with Cook, at his own expense, was one Joseph Banks and his team who were on a trip to discover the Natural History of the places that they encountered on the voyage. Banks, like Cook, was in tune with the changes and opportunities of the times. Plants were his main interest, but so were the animals and people and their customs. Amongst his team were artists and draftsmen who recorded their discoveries and the events that took place on the voyage, particularly on Tahiti, New Zealand and Eastern Australia, although it was just New South Wales then.

Banks was a fascinating character, his interests ranged into many fields, particularly practical improvements in agriculture, including crops and Merino sheep.

Amongst his other interests were atmospheric steam pumping engines, particularly those developed by Boulton and Watt which he acquired for use in mines. See P 9


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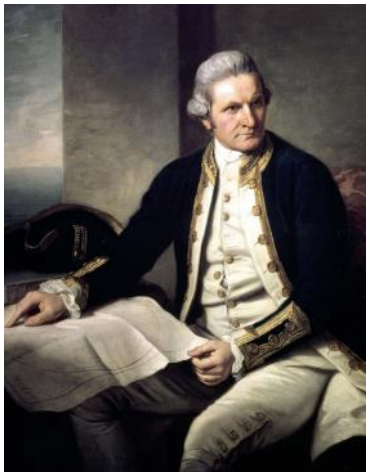
The Father of Australia

Sir Joseph Banks & Newcomen Steam

Joseph Banks and his team travelled with Captain Cook on his first Pacific voyage to observe the Transit of Venus on Tahiti in 1769, and the search for the fabled Great Southern land which was thought to exist to "balance" the euro/Asia land mass in the Northern hemisphere. They circumnavigated both islands of New Zealand to prove that they were not part of a large land mass, and then sailed West until they hit the East coast of Australia which was a large land mass in an unexpected place.
(see map at bottom of this page)

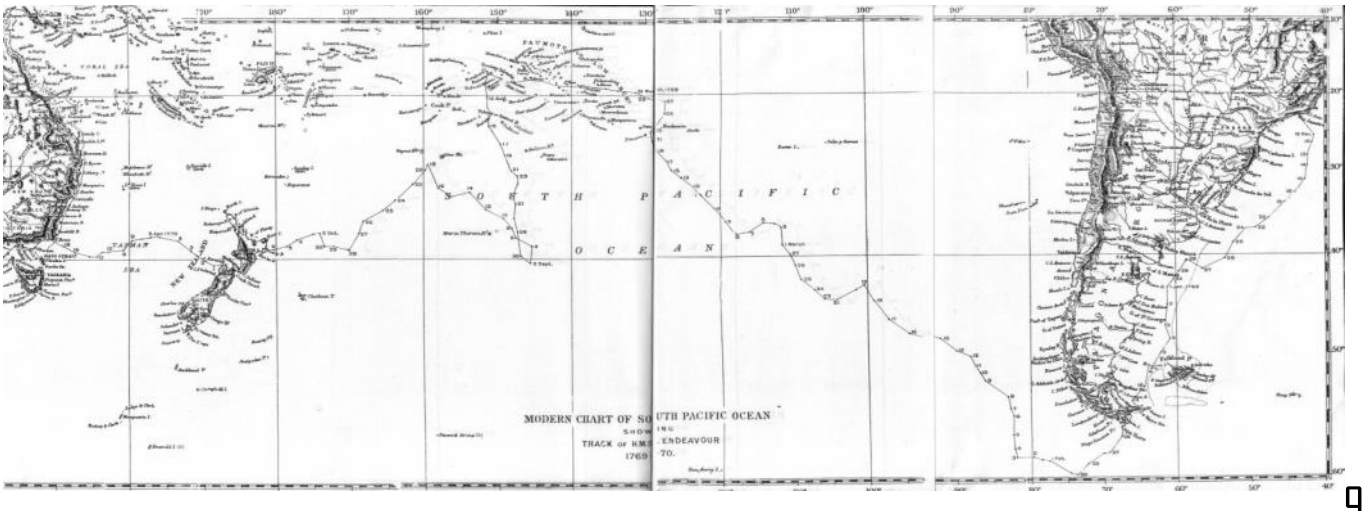
For Cook this would mean 2 more trips, one was close to Antarctica, and his last Pacific trip was in the North Pacific.



Banks was only on the first trip and he was very involved with the landings on Australia, and collection of flora and fauna specimens for display and cataloguing when he, and his team returned to England.

Banks made an enormous contribution to Natural History, and he was a great promoter of Australia, not only as an alternative convict settlement to those lost in the America's, but as an ideal settlement. His work with the Spanish Merino sheep proved a boon to the colony and his influence was felt in many ways, so much that he became known as the
"Father of Australia"

Much has been written about these exploits, so they will not be covered here, where a less reported side may be of more interest to those who have an interest in the engineering and the application of new technology to industry and agriculture



Banks was born on 1743 in Soho London, and his sister Sarah arrived in 1744. Their father was a member of the House of Commons, who owned an extensive property "Revesby Abbey" near Horncastle in Lincolnshire.

Revesby Abbey had its origins as a Deer Park & Cistercian Monastery founded by the Earl of Lincoln in 1143. Eventually the Monastery was sold off by Henry VIII and abandoned. After a series of owners Craven Howard built a "Country House" near the site of the old Abbey, and later in 1714 his son Henry sold the 2000 acre estate to Joseph Banks Snr for the sum of £14000 (worth over £250 000 000 today), who renovated it in 1718.

(see picture on the right)

Sir Joseph Banks father, William Banks inherited the property, and in 1764, 3 years after his fathers death, Joseph Banks inherited the property at the age of 21.

The house itself survived until 1843 when the contents were sold off and the stone was used by his surviving relative James Bank Stanhope to build the new Revesby Abbey (right) which has survived, via a rich history to have a Grade 1 listing, and restoration to its earlier days.

Young Joseph's education started at home and continued at Harrow and Eton before he moved to Oxford, where in order to study Botany he had to find and engage a lecturer (at his own expense). His father died during this period, so he did not complete the course. Following his fathers death in 1761, Banks mother moved to Chelsea, and he continued his botany studies as a personnel interest.

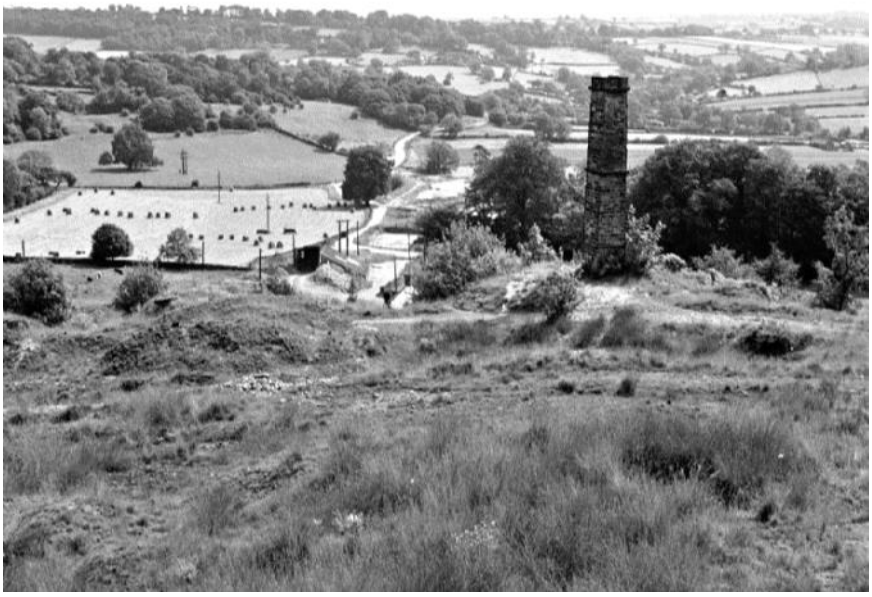
Banks mother and his uncle Robert Banks Hodgkinson were Josephs guardians for the 3 years between his fathers death and his 21st when he inherited the estate at Revesby Abbey and an annual income of £6000. Banks brought a house in London

and spent his time between London the University and Oxford in his pursuit of Natural History which was to dominate his life. Robert Banks Hodgkinson owned Overton Hall at Ashover near Chesterfield about 80KM to the West of Revesby Abbey, This 1000 (plus 1500 of "Commons") acre estate had been in use since 1293, and had been in the Hodgkinson family since 1556. The buildings had been updated over the centuries and are still in use as a nursing home. A major rebuild in 1877 is Heritage listed grade 2.

See the picture on lower right.

Lead ore in the area had been mined since Roman times and Robert Banks Hodgkinson was a successful mine operator and merchant, as had been his predecessors. The Overton mine (see second of relocated mine head picture on next page) was about 100 yards from Overton Hall. Neighbouring Raven Nest House, owned by the Gregory family was the home of the Gregory mine which ran from 1758 to 1803 and was producing about 1500 tons of lead per annum in the times that Joseph Banks was a regular visitor to Overton during his guardianship. Banks natural enquiring instinct combined with his uncles guidance in the ways of the business world and estate management were to serve him well in the future.

He retained a close friendship and business arrangements with his uncle until Roberts death in 1792

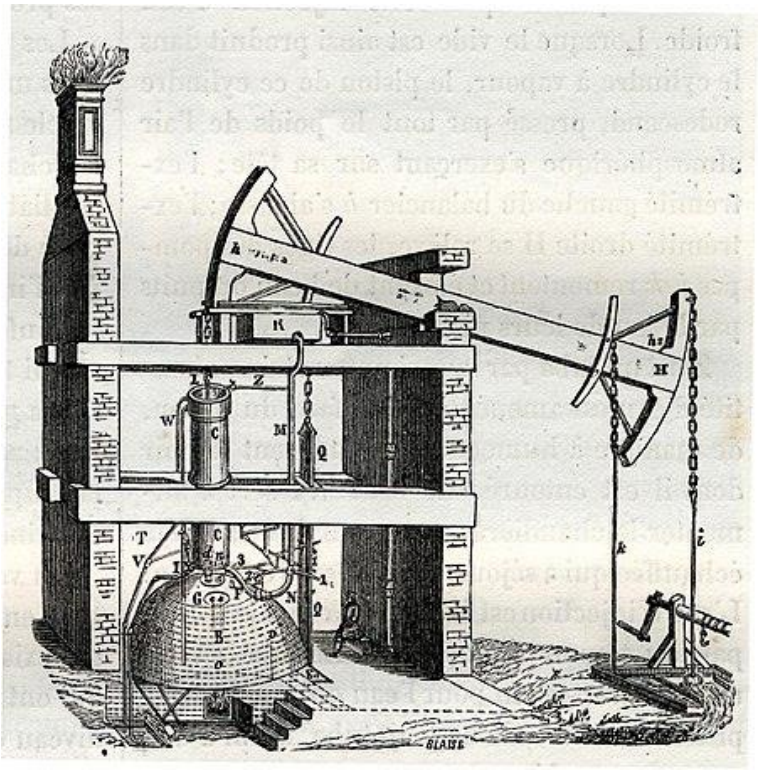


Up to 1768 the mines were worked from near horizontal Adits and water was drained from Soughs (near level mine tunnels) which allowed the mines to drain water by gravity. By the 1760's the ore seams were below the level of the Sough drains, which meant water had to be pumped, by hand, up to an existing Sough to drain out, and vertical shafts were used to raise ore to the surface using horse powered Whims. (below)

The Overton shaft (see right)(and apparently the Ravens Nest shaft) were connected to the main shaft of the Gregory mine at Cocking Tor (see chimney on top right picture) by a sough drain.

In 1768, the same year that Joseph Banks left with Cook on their 3 year trip to the Pacific, a second hand Newcomen style Atmospheric steam pump (from Old Millclose at Darley (see picture on top right P 13). which had been manufactured by the A. Raistrick dynasty of Iron founders of Darby and Coalbrookdale (London) and installed in 1748). This engine had become very expensive to run as coal had to be brought in on horse trains in pack saddle. In 1764 the mine flooded and it was closed (in 1859 it was opened again) This engine was modified and installed (at the Cocking Tor pump shaft) (now Old Engine farm) and operated by the mine's engineer Francis Thompson who had erected other engines in the area. Recorded for that year: "the Gear for Drawing Shaft on the Hill side was sunk. In the same year the first Steam Engine, called the

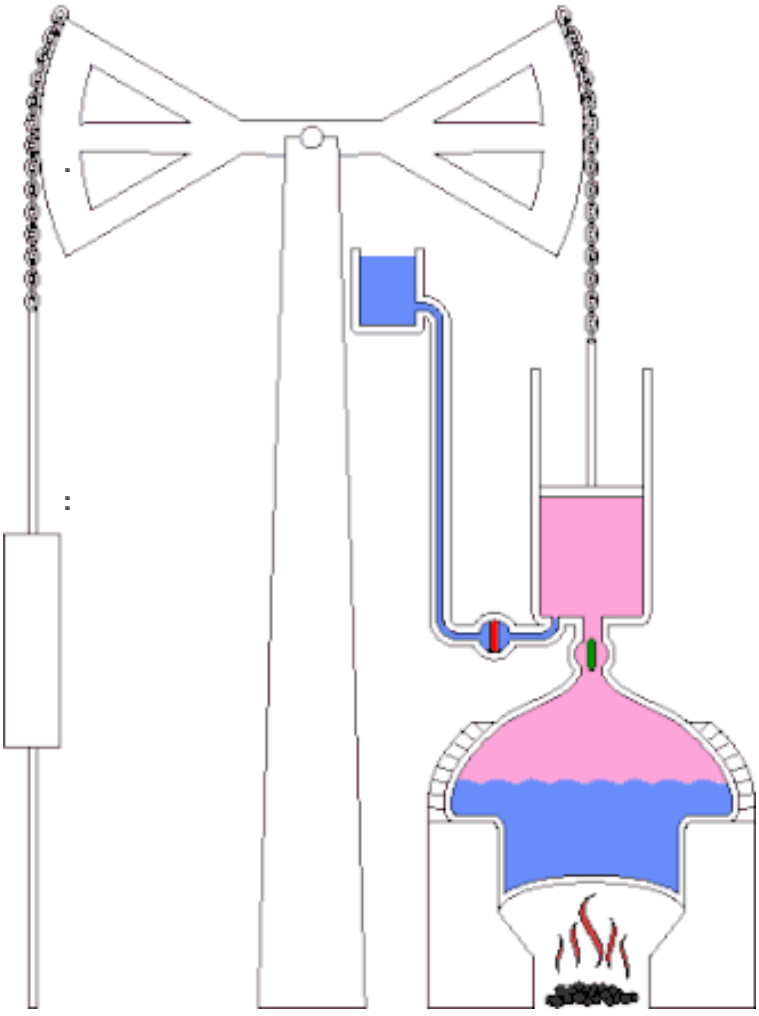
Old Engine (the Newcomem) below the Hill, was erected and lifted the water to the sough in one of the shafts sunk in or about 1763 by means of Slide rods, "there was a good deal of ore won before the Engine was set to work by means of hand pumping and drawing water by Horses" (using a whim see picture below). (Slide rods were used to transfer the vertical motion from the pump rod to Horizontal motion via a bell crank. They were used above and below ground in various mines, and often hung from low tripods via a swinging rod). I imagine them as the equivalent of belts which were used later when "Rotative Engines" were developed.



See pictures on right for typical Newcomen style engine with its cold water spray injecting into the cylinder.

This engine was apparently successful as the mine soon entered on its most prosperous period. In 1771 the engine used 323 tons of coal in a 14 week period.

The mine, which worked the Gregory Vein) was one of the most productive in Derbyshire. It was very productive in this period and soon reached the capacity limits of the "old" steam pump.



See next 2 pages drawing and notes from Engineer Thompson

In 1779 reports that the new type of engine made by Boulton and Watt was using far less coal May 1779 Robert Hodgkinson in London, wrote to Watts in Birmingham requesting costs and information regarding a new engine. Overton Hall was managed by another of Joseph Banks relatives, William Milne of "The Butts" Ashover (he was also a *(cont P16)*

ANOTHER EIGHTEENTH CENTURY PUMPING ENGINE.

In addition to the old atmospheric engine at Pentrich Colliery, which we illustrated in our issue of January 19th last, Mr. W. T. Anderson also referred in his paper to the Institution of Mining Engineers to an engine which was installed at the Gregory mine, near Ashover, in 1774. The accompanying illustration of the engine is photographically reproduced from an original drawing made by Francis Thompson, and still in the possession of Mr. J. B. Gregory, of Ravensnest. The document is inscribed "Multum en Parvo by Fr. Thompson, 1774—A Draught of the fire engine at Gregory's Mine, Near Ashover." The description, with its somewhat quaint original spelling retained, is given below. Whether Thompson at this time was a representative of the manufacturers, or was the actual designer, is not clear. He may have been both, especially as it was a custom of the period to pay for machinery by result, either in the form of a percentage on the quantity of minerals raised, or on the number of strokes recorded. It has been suggested that Thompson's 1774 engine was manufactured by Boulton and Watt, but this, Mr. Anderson thinks, is more than doubtful, as Watt did not go to the Soho Works until that year, the partnership between the two eminent engineers being arranged in 1775. The machine also was of earlier design than their standard type—without a separate condenser. It seems, however, that a few years later, namely, in 1782, heavy disbursements were made by the Gregory Company to both Thompson and to Boulton and Watt, probably in connection with a new engine and pump shaft. A certain association between the three men may therefore be considered established. An entry in 1768, of peculiar interest: "Mr. Brindley, engineer, demands for his trouble at Gregory, £4 4s. 0d."

A Description of the Engine for Raiseing Water by fire; whose Cylindor is 42½in. Diameter, and raises the water 61 yards a 12in. Boar.—Now, to Describe this engine, B is a large boiler whose water is Converted into Steam, C is the Cylindor. D a Pipe that joines C the Cylindor and B the Boiler togeather on the Lower orifice of which within the Boiler mooves a Broad Plate E by means of the regelator A, which keeps in or lets out the Steam occasionly the Steam of the Boiler ought Always to be a little stronger then the air that when let into the Cylindor C it may be a little More then a Ballance to the Pressure of the External air that keeps down the Pistorn F the Pistorn Being By this means at Liberty the Pump rod will by Its Great weight of about 10 or 12 tuns at one blow will Descend at the opposit End to fech a Stroak but as the Pistorn and Weights at the other end do not Exceed half that weight the End of the Leaver at the Pump will always Preponderate and Decend when the Pistorn is at Liberty then by Pulling back the Regelator Stops all Communication of Steam with the Cylindor then the Leaver Called the F must be Droped to turn the Injection Cock at G and that will Permit the water Brought from the Cistern H by the Pipe I to Enter the Cylindor at K which jet of Cold water being Driven all over the Cylindor Condenseth the Steam Into water again by Reason of its Coldness, and by this means its Bulk is become 14,000 times Less then it was when Steam itself makes a Vacum Suffisent for the Presure of the atmosphere

[*A Part of the Description*]—to act again unballanced and to Raise the other End of the Beam with its pump to Discharge the Water at L and this whole operation of opening and Shutting the Steam Regelator and Injection Cock being performed in Little More than 3 Seconds it will Easily Produce 16 Strokes in a minuet The Cistern H: Is Supplyd with water from a Cistern Near the pit N By means of a rod fastned to an arch of the Beam which Drives the water up the Pumps O to the housewater Cistern H. In the Chamber the *q* at the top of the Cylindor, is a Cup to hold the water that Lies on the Pistorn, which if it Chance to Be two full will Run Down the pipe R, to the hotwell at S, and this Cup is supply'd with water from a Cistern P. In the Chamber By the Pipe T. u Is a pipe that Comes from the hot well to Supply the Boiler with water which is wasted in Generating Steam; U represents 2 Gages of Differant Lengths to Prevent the Surface of the water from Being to high Which is known thus if the Stopcock of the Shorter pipe being opened Give only Steam and that of the Longer only Water all is right. But if both Cocks give Steam then the Surface of the water is to Low, or if Both gives water it is to high, hence the Cock which feeds the Boiler may Be opened to Such a Degree as always to keep the Surface of the water to its Proper hight. W Is the Eduction pipe to Carry of the water injected into the Cylindor to Condence the Steam; it is Carried to To the hot well which in the well had a Valve to Prevent the air presing up into the pipe which might hinder the Discharge of the water. X is the puffet Clack or a Valve to try the strength of the Steam which if it Be two Strong or Emoderatly Stronger then the air may Burst the Boiler; the methed of trying this Strength is to Lay a weight on the Valve, and If the Steam Shall raise up more then 15 pound weight to one Inch square which is the weight of air nearly on every Square Inch it is a proof that the Steam is Stronger then the air and tho it is of a variable Strength It is never on $1^{1}/_{10}$ Stronger or weaker than Common air, it haveing been found By Expearience that an Engine will work well with 1 pound weight on every square Inch of the Valve X a proof that the Steam is $^{1}/_{15}$ part Stronger then Common air. The Small pipe Z Is the Snifting pipe and serves to Let out the air Injected with the water which Precipitated Air is forced into the pipe as the Steam rushes into the Cylindor being a Little Stronger then the air; Thus you see a Chain fixed to an arch of the Beam figer the 2nd, at a proper Distance from the arch 3rd, to which Chain is hung a working Plug 4ft., which plug has a Long Slit in it and Several pinholes and pins for the Morvement of the Gears which we Call the F and Y By which the said Cocks are opened and shut as the Service requires it is Called the working plug or plugframe which Being Set a Going according to art This Engine is most harmless and manageable of all others.

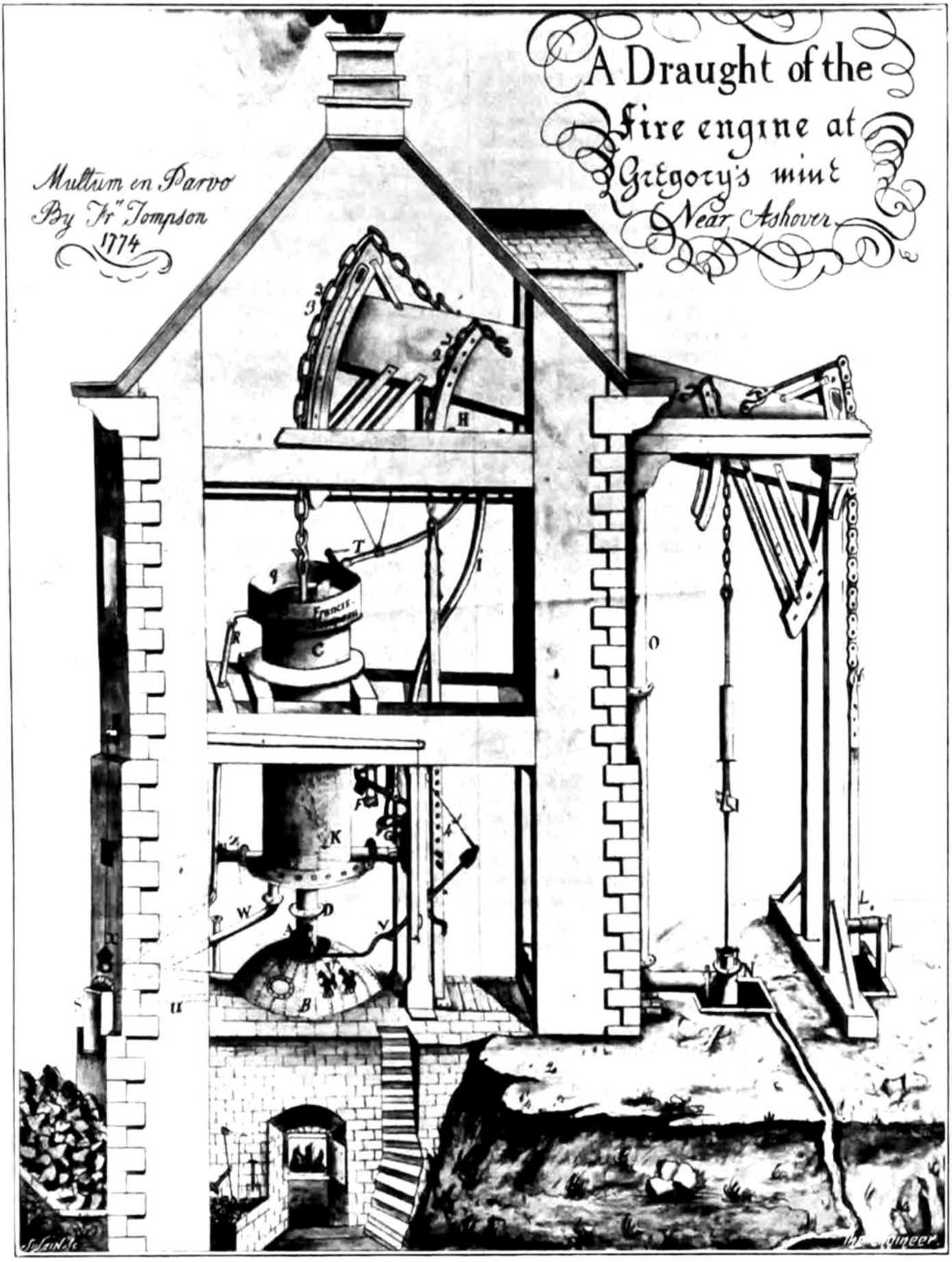
The Drawing on the following page was taken from "THE ENGINEER" Feb 9 1917 available from Graces Guide, as were the accompanying notes above on this page.

These notes seem to be a combination of comments by "The Engineer" author and a description supplied with the drawing done by Francis Thompson who had removed it from Mill Close and re-erected it with modifications at the Gregory mine in 1768.

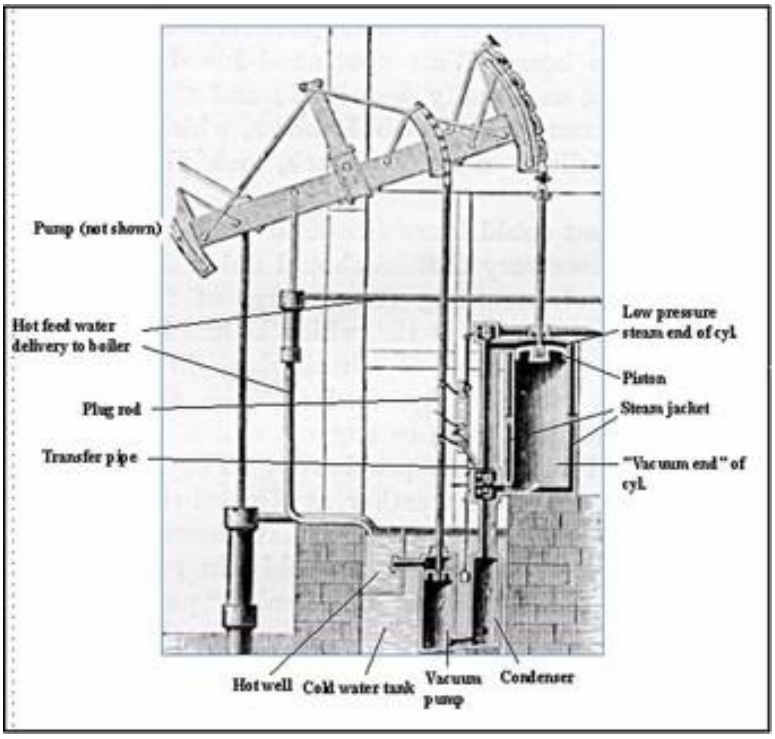
The 42.5"Ø cylinder gives about 9 Tons lift for a perfect vacuum. It could run at 16 strokes per minute, Some of the comments are interesting, particularly pressure and the boiler bursting under pressure or collapsing under Vacuum. Hot wells, regulators and water level try-cocks were in, but a Puffet Clack seems to have been superseded.

You may need to download the magazine:- www.lakegoldsmithsteamrally.org.au

EIGHTEENTH CENTURY PUMPING ENGINE NEAR ASHOVER



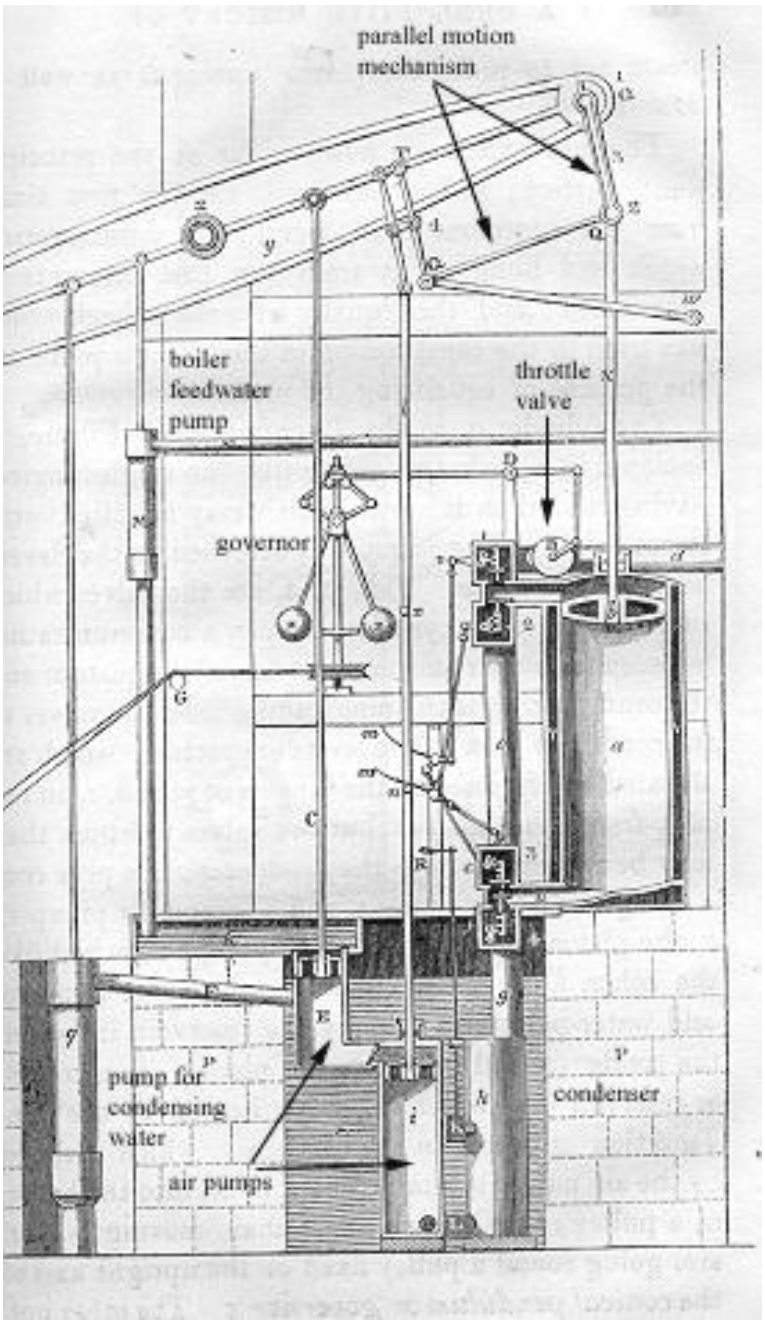
partner in the Gregory Mine as part owner of Sykes Milnes & Co (Lead Smelters) (with 11 of the total 44 Gregory Mine shares) with Joseph & Robert Banks (12 of 44 shares) and others). In 1780 he accepted an offer by Boulton and Watt for a new steam pump with more economical external condensing chamber for the mine. The pump was operational by July 1781 and it appears to have performed well. The pump shaft was now 888 feet deep (later to reach almost 1100 feet), and the new pump would raise water to the suction of the old Newcomen pump which would stay in operation raising water to the existing slough drain.



Wilkinson had only developed his boring machine in 1774 (prior to that they were hammered or scraped to a circular) and Watt had only developed his steam pump to a practical form in 1775, so this was a very early engine. It appears that Boulton and Watt did not actually sell you an engine. They provided special parts and provided an "erector" to supervise construction. Thomas Southern was the observer for Boulton and Watt, at Overton, and Francis Thompson was the local erector.

John Southern, Thomas Southerns son who also worked for Watts is believed to have been the inventor of the steam engine indicator which allowed the timing to be set effectively.

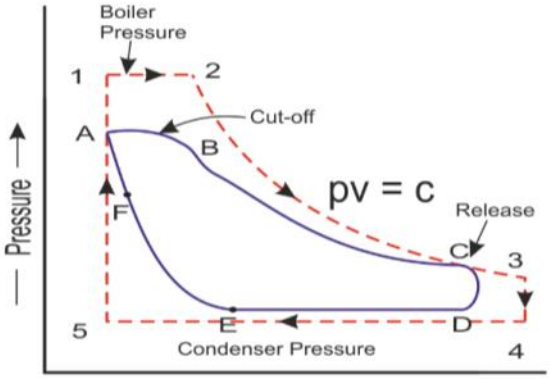
A model of the indicator and Watts Vacuum Gauge are shown on the centre right next page.

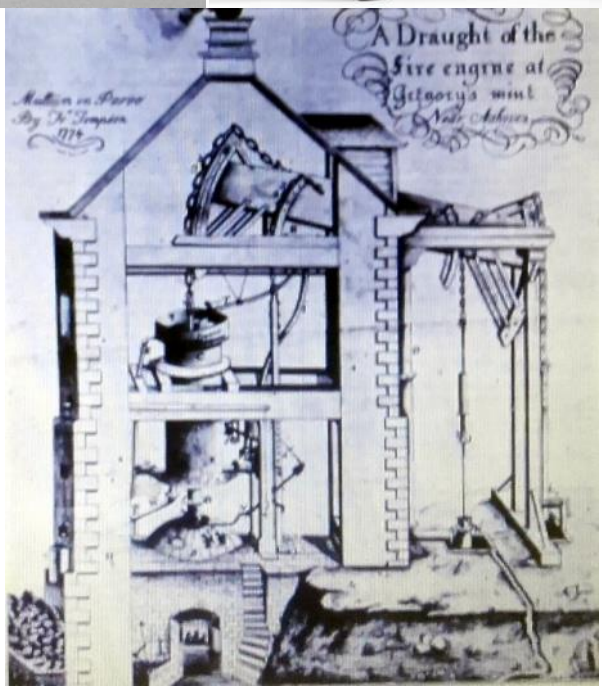


They made there money by charging a licence fee for a proportion of the money saved by using their engine which used about one quarter of the fuel of a Newcomen pump of similar capacity.

The existing Gregory mine "old engine" was trialled by Mr Logan Henderson on Sept 4 1779, and it was calculated that the new engine would be 3 times as good. (which presumably means it would use a third of the fuel) On July 29 1780 Milne writes to Watt stating that "The proprietors are impatient at Boulton and Watt not sending the materials" but by Sept 25 1780 he had agreed to the proposal for the Gregory Mine. By November 9 1780 Joseph Banks agreed with Watts calculation of the price of the engine, which was probably just as well as the carriers had set of for Wales (presumably for the cylinder from Wilkinson's) and to Soho works in Birmingham.

Actual **indicator diagram of steam engine** is different from the theoretical indicator diagram.In the picture shown below, drawn with firm line shows the actual indicator diagram and dotted line show the theoretical indicator diagram.





The engine (right) (see typical layout on top right last page) was single acting with chains connecting the cylinder rod and beam. The chain link on a radius beam end did not require a trunk guide (or Watts link, lower picture last page) guide for the cylinder rod. These came later, in 1782, following his invention of the "rotative beam engine" in 1781, when a double acting cylinder was developed, to allow the use of a connecting rod to allow the beam to be pushed and pulled to nearly double the output.

The cylinder had a bore of 45 inch diameter with an 8 foot stroke. The beam (presumably Oak at this time) had unequal lengths. (the ratio pump side to Steam side

seems to have been 3 to 4)

It was guaranteed not to consume more than 255 lb of coal per hour working at nine strokes a minute, and 'to work a pump of 13 inches diameter and go ?? yards high at the rate of 10 strokes of 6 Feet long each in one minute — and shall be able to give the necessary motion to 214 yards of dry rods'. This fitted the depth of 304 yd of the new shaft sunk to use it.

Letters dated 1792 included original and reverse drawings. (As an aside Watts had also developed a machine to copy correspondence, and a larger machine to copy drawings. At the time Robert Banks enquired about obtaining one from Watts, although they were not commercialised until after 1800 when James Watt Jnr took over from his father.

In principle a tracing, or translucent paper is pressed against a letter (written with copying ink) and an image of the ink is transferred to the back of the moist tracing paper. The image is viewed through the flimsy (18 g/sm) tracing paper, or looked at in reverse by viewing the back of the copy. This was the standard form of copying, used by many manufacturers until carbon paper and the typewriter were developed in the 1870.s

This little aside was just to explain the "original and reverse copies" of the drawings. The picture, above right, shows a Watt roller copier in the Powerhouse Museum in Sydney. By way of interest they also have a very early Boulton and Watt Rotative Steam engine which had worked in a brewery in London, it is the oldest know rotary steam engine know to exist, and something that should be added to the must visit list.

By 1791 the Boulton and Watt engine was in poor condition and was taking 300 tons of coal to 400 used by the Newcomen. Both engines were upgraded and they worked until the mine closed in 1803, due to declining production and thinning of the veins.

The Boulton and Watt engine was then moved to another mine at West Side.

In 1791 Joseph Banks Uncle, Robert died and (now Sir) Joseph became the sole owner of Overton Hall. He contracted John Nuttall to carry out a survey (at Banks expense) of the adjacent area and in particular near Alton (about 3 Km North East of Overton) to locate a Coal seam. A shaft and sough were sunk and in 1793 Banks inspected the coal seam, and in the company of Mathew Boulton and William Milne a sample of the

coal was taken to Overton and tried in the Boulton and Watt engine where it was "found to burn with much smoke and great heat ***but*** *very bituminous and caked a little". Records on this mine have not turned up to date.*

In 1777 Mr. Francis Thompson of Ashover in Derbyshire, engineer, erected an atmospheric engine at the nearby Yatestoop lead mine. The cylinder was 70 inches diameter, it drew water by two pumps, one 25 the other 14 inches diameter, these pumps drew the water up to a level situated 200 yards below the surface so that the engine worked with 200 yards on dry rods. The boiler house water was obliged to be drawn up all this depth from the level to the surface by 9 inch pumps in 4 lifts from one to another.

The Yatestoop mine had been in operation from the early 1700's and flooding led to the installation of the seventh Newcomen engine built in 1716 (the first was in 1714). The Winster Local History Group's 14th Newsletter published some information on this mine. By 1716 the mine had reached the water table and water was being raised using "rag and chain" pumps (see sketch below right from c1550) The No 1 steam engine had a brass cylinder 8' long with a 16" bore. The stroke would have been shorter than the cylinder. The beam was 12' long using oval linked chains at each end to support the Piston and pump rods. The Pump rods were 10' long timber 12' square which were joined by iron plates. They raised water 90' to the sough drain (see centre right picture) in 3 stages using 600' of dry

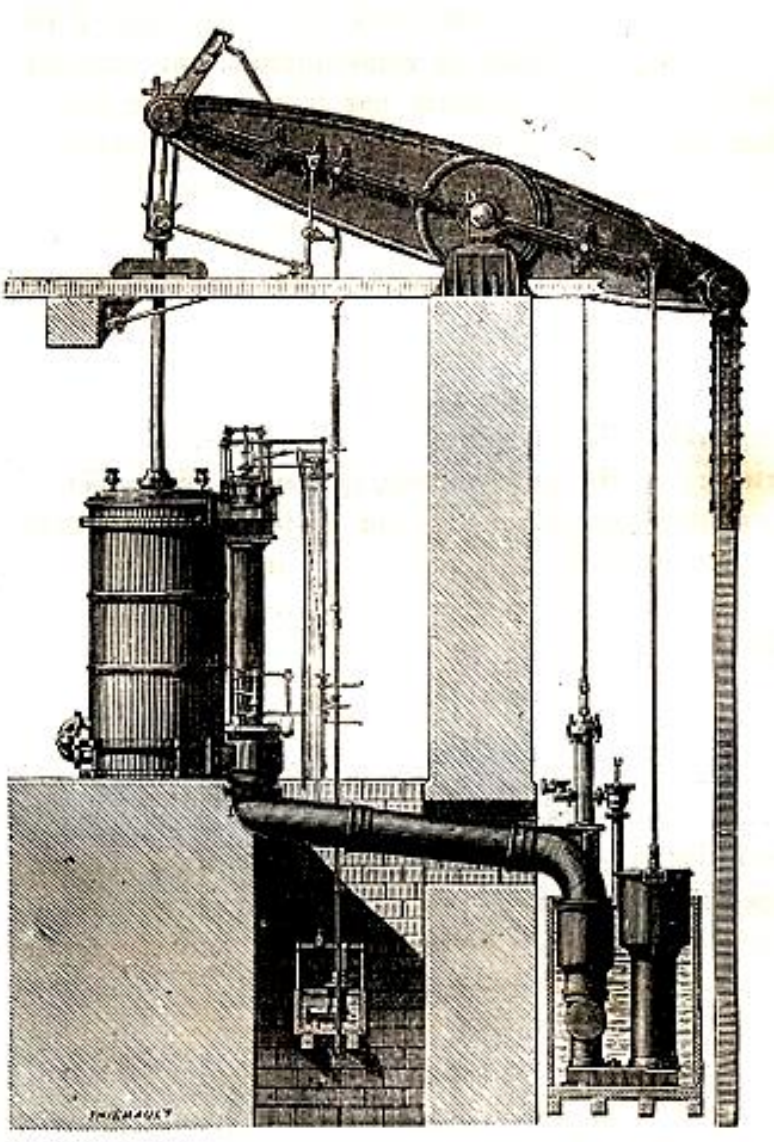
rods and 9”Ø pumps. The “Haystack” boiler was made of iron with a “lead’ top. (fusible plug not needed).

*The mining company was to sink a shaft for the pump and supply elm wood, 17” * 20” for piping and coal to fire the engine.*

The engine, engine house and boiler were to be erected and owned by George Sparrow who would receive one seventh of the lead ore got by working the ebgine. By default he was to pay £100 for each occasion that he failed to keep the engine working. This must have been quite a risk and demonstrated a high level of confidence for someone building the seventh steam engine in existence.

To cope with increasing water a new engine was added in 1717 and another in 1724.

In 1777 the engine described earlier was installed. This engine lifted water for the boiler 600 feet until 1782 when a No 5 engine was installed 400’ below the surface. The boiler was 20’ in diameter and burned 47 Tons of coal a week.

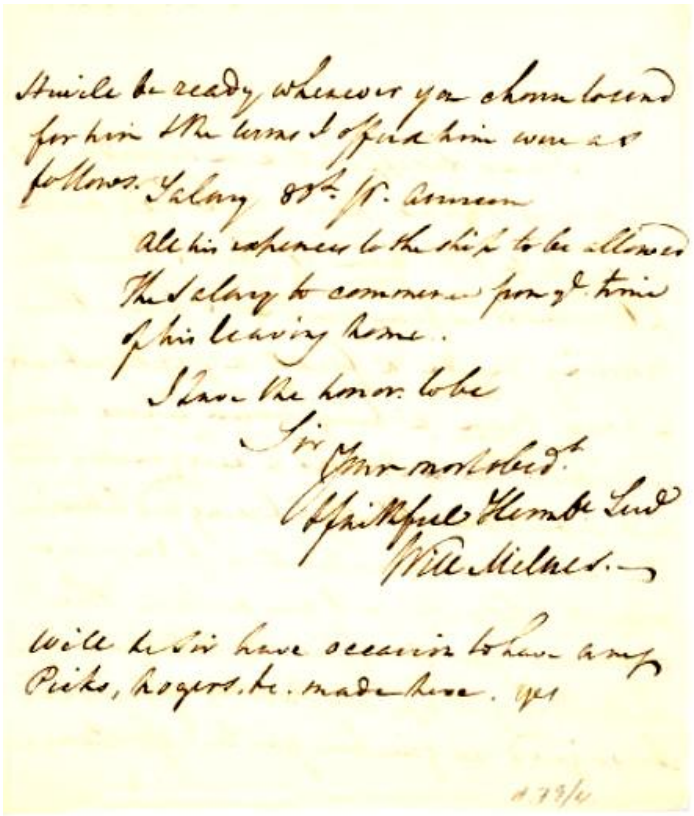


At this time pipe and pressure vessels (boilers (well almost kettles)) in use at the time were not reliable and were prone to leaks, or to just burst, which was the main reason that Watt did not use positive pressure in these early engines. These atmospheric engines used very low pressure steam of 3 to 5 psi to displace air from the system. The lead top, solder and spelter joints, and timber pipes were eventually superseded and positive cylinder, pressures replaced atmospheric pressure which allowed cylinder diameter to reduce. Trevithick (See picture right) and oth-

ers later converted many condensing atmospheric engines to positive pressure, but that is another story. The Boulton and Watts engine (above right on last page) was built in 1777 and it was the first engine to use an early cut off valve, we will return to this engine on page 18. The Drawings for the Gregory mine engine appear to exist, but to date I have not been able to locate them, maybe later with a bit of luck.

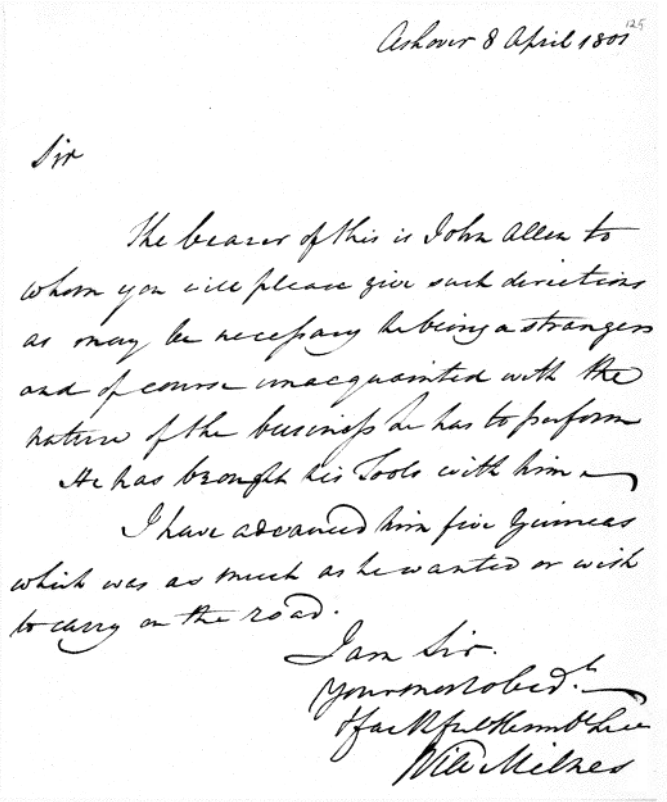
The Gregory Mine under Cocking Tor was one of the most productive in Derbyshire at the time which proved extremely lucrative for Sir Joseph Banks. The engines were upgraded in the 1780's and 90's and the mines were eventually worked out and closed in 1803. The engines were moved ato new mine at West side.

From a Royal Society report on an earthquake on Nov 18 1795, William Milnes reported feeling the severe shock of an earthquake at 11 15 PM that caused very much shaking in his house. At the Gregory mine the workmen "were so much alarmed by the noise and the sudden gust of wind that attended it, as to leave their work" The Earthquake was felt from Bristol to Leeds. The President of the Royal Society initiated a report. Sir Joseph Banks was well into his 40+ years as president at this time, although he did not carry out the survey, the 2 reports from Ashover came from is uncle.



Should be ready whenever you shou[ld] send for him the terms I offer him were as follows. Salary 80£ p. annum
All his expences to the ship to be allowed
The salary to commence from the time of his leaving home.
I have the honor to be
Sir
Your most obed.t
& faithful Humb.e Serv.t
Will.m Milnes

Will he sir have occasion to have any Picks, Augers &c. made here. yes



Ashover 8 April 1801

Sir

The bearer of this is John Allen to whom you will please give such directions as may be necessary he being a stranger and of course unacquainted with the nature of the business he has to perform
He has brought his Tools with him
I have advanced him five Guineas which was as much as he wanted or with to carry on the road.
I am Sir
Your most obed.t
& faithful Humb.e Serv.t
Will.m Milnes

Another export from the Gregory mine was a young miner, John Allen, who along with his family were miners in the Gregory mine. Unusually John was literate, and it seems he was looking for adventure. The above letters were written be William Milnes to Joseph Banks in response to his request to find an interested lad, regarding John Allen who went on the Investigator with Mathew Flinders on the first circumnavigation of Australia. His Salary was 80£ per annum from the time of leaving home, plus board

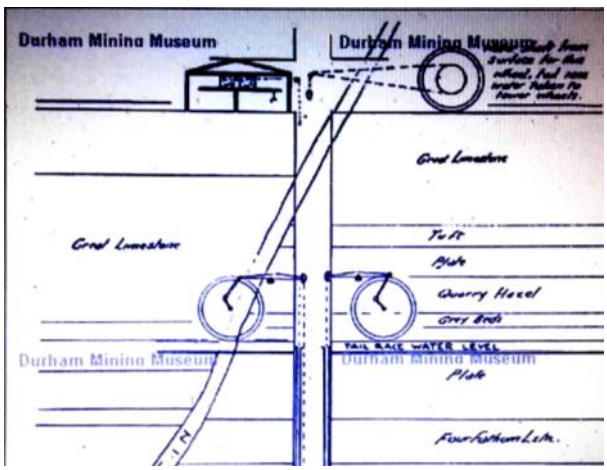
and keep. The second letter is confirm that the bearer is John Allen, and that he should be givin directions as he is a stranger. The 26 year old carried his tools with him and was given 5Guineas for expenses on the Road. It seems that his salary was raised to £105. He was part of the Banks Naturalist group on the ship, and he was expected to assist the mineralogist (who did not start).

Along the way they were shipwrecked and stayed on a sand bar of Queensland while Flinders sailed the small boat back to Port Jackson to get help. He had an Island, Allen Island in the gulf of Carpentaria named after him by Flinders. Eventually he sailed home via China and he was the first to give Banks a first hand account of the trip.

Writing to notify Banks of his choice on 4 February 1801, Milnes described Allen as "... a young man, a neighbour whose name is John Allen and who is an ingenious Lad and understands blasting and boring and likewise the nature and construction of Engines— upon ye whole he is I am certain the very man for your office....

For someone who stated work at 12 cleaning flues in a lead mine, it would have been an amazing turn of events. Flinders caught up with him in 1810 after his release from Mauritius where he had been imprisoned by the French as a spy.

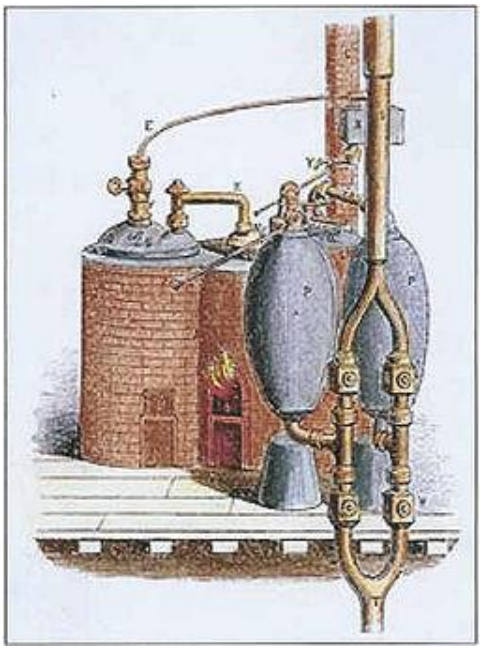
Coal was discovered in Australia in 1791 by William Bryant, a convict, near the mouth of the Hunter River at Newcastle, New South Wales (NSW). Sir Joseph Banks, in 1799, introduced drilling equipment to Australia when mining started. He maintained good contacts in Australia, but this yarn is about Banks and Steam, which it seems interested him as much as any other technology of the time. Not only was he interested in Science and Natural History in its many forms, he was also a believer that Science, Botany and Fauna should be put to good use and developed for the benefit of mankind. His phenomenal contacts, energy, knowledge and resources all combined in the age of enlightenment to accelerate the industrial revolution which began with the power of the Water Wheel, but stalled due to the need for extra water that nature could not supply.



The increasing demands of industry put pressure on mines to go below the water table which meant that pumps beyond the capabilitiues of

man or horse were needed, Where water was available it was used above ground, as in this 22 metre diameter at Laxley on the Isle of Man (previous page) which transferred power to a lead mine by reciprocating rods and raised 250 gallons of water per minute 1500' up the mine. In other mines water wheels were used above and below ground for lift and pumping.

Water wheels and wind mills were the only form of powered rotary motion until Watt developed his rotative engine. Early markets for Savery/Newcomen and Boulton & Watt reciprocating engines were in mines where these massive beam engines were ideally suited to pump water up a vertical shaft. In places where mine dewatering lowered the natural water table existing water wheels and canals had to operate with a reduced source. Pumps such as the Boulton & Watt engine (top right) was originally built at Smethwick in 1779 to provide water for the canal at the Soho Foundry.

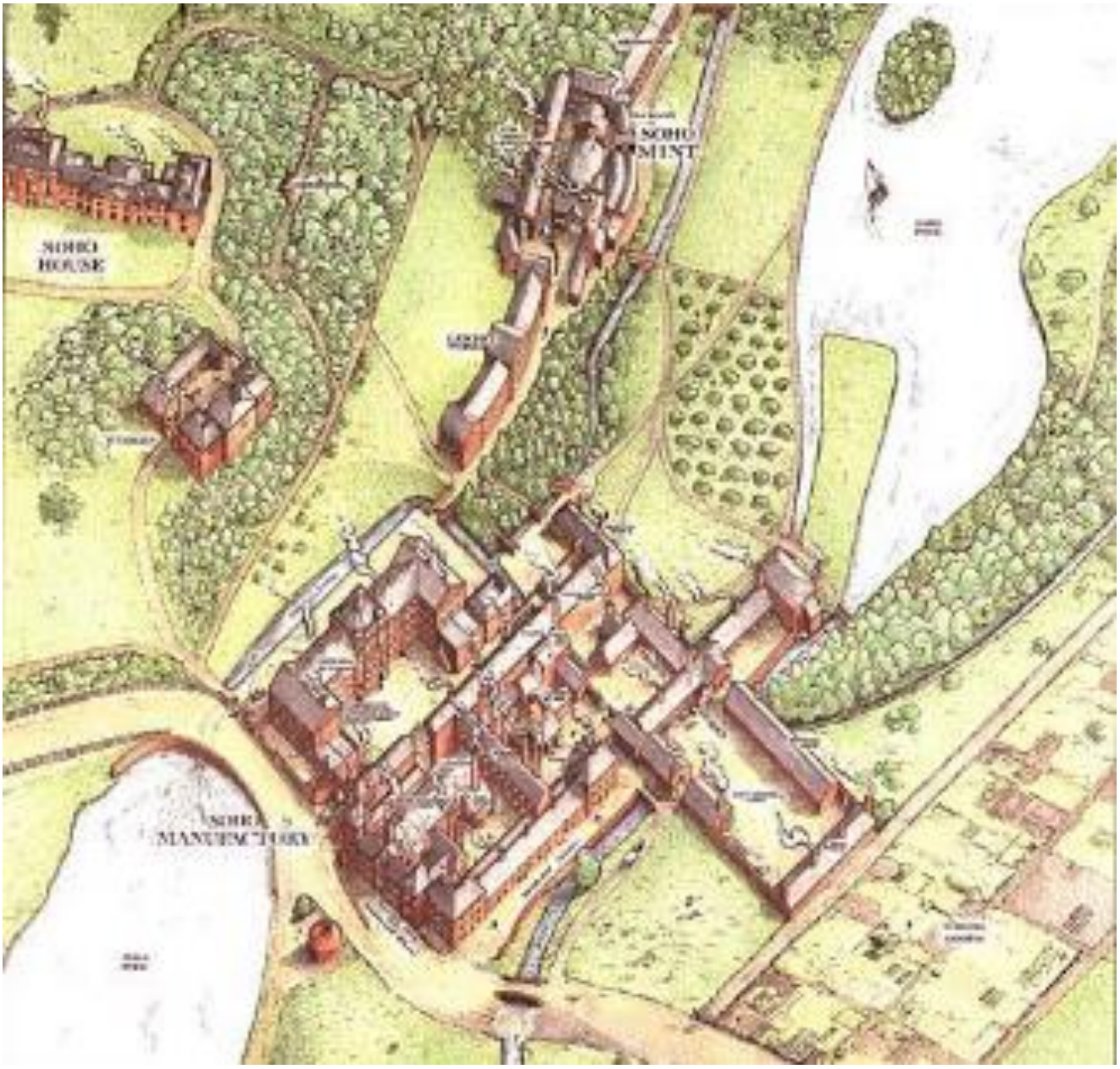


To increase the output of factories powered by water Wheels Water Returning Engines were installed downstream of the water wheel to return used water to the supply upstream of the wheel.

Mathew Boulton's Soho Manufactory at Birmingham which started in 1762, was powered by a waterwheel, The need for increased capacity led Boulton, to build a new factory in 1765, and the lack of water led him to firstly, to trial a "Horse Works" of some type to be followed by an experiment with a Savery pumping engine which needed an operator to open and close the valves. (See picture on right) to return water for reuse by the wheel.

Limitations of Savery's design led to his association with James Watt who at the time was erecting Newcomen engines while developing his own condensing engine at Kinneil House in Scotland. Boulton came to an arrangement with Watt, who then brought the engine to the "Soho Manufactory" where it was operating by 1769.

Following the success of this engine Boulton and Watt was formed and a larger (33" Ø) second water return engine was added in 1777.(see picture top right P 20). This engine remained in use until the factory closed in 1848. In addition to its water returning it was also the first engine that Watt used to try using an early cut of valve to use expan-



sive action. As fortune has it, it was saved for historic reasons (believed to be the first) It was eventually donated to the commissioner of Patents for the Patent Office Museum which became the Science Museum where it can be seen today

The pump had a 24" bore and a 6'1" stroke (it could be increased to 7') It was nominally rated as 30hp and it raised water 24feet for its near 70 year working life.

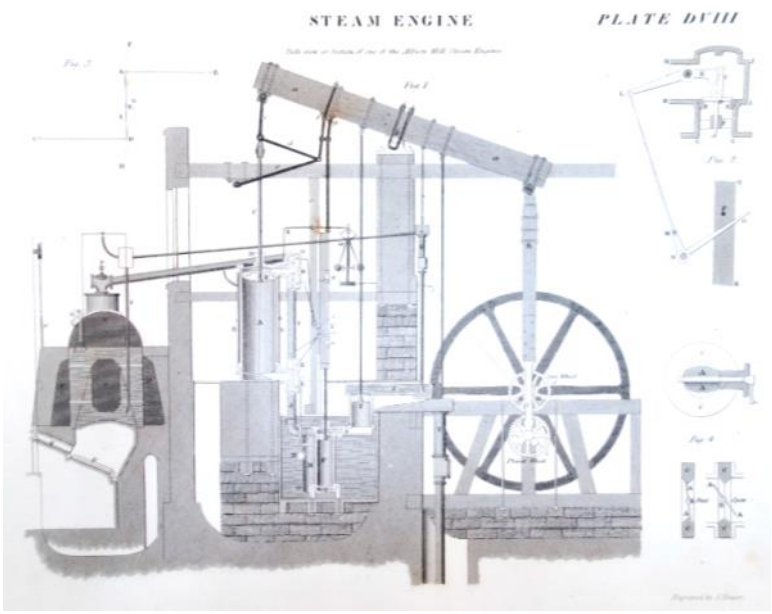
It is quite an insight that what we now call " Pumped Hydro " was such an early application of steam power to replace the Kinetic energy taken by the water wheel.

It seems that Joseph Banks new Boulton at this time as he had purchased gifts to be given to people that they encountered on his world circumnavigation with James Cook in 1768 and 1770.

The Soho Manufactory manufactured produced small metal pressing for Buckles, Buttons, Cutlery amongst other things, from steel and precious metals. Parts for the Steam engines were made there until a new factory was built on a separate site.

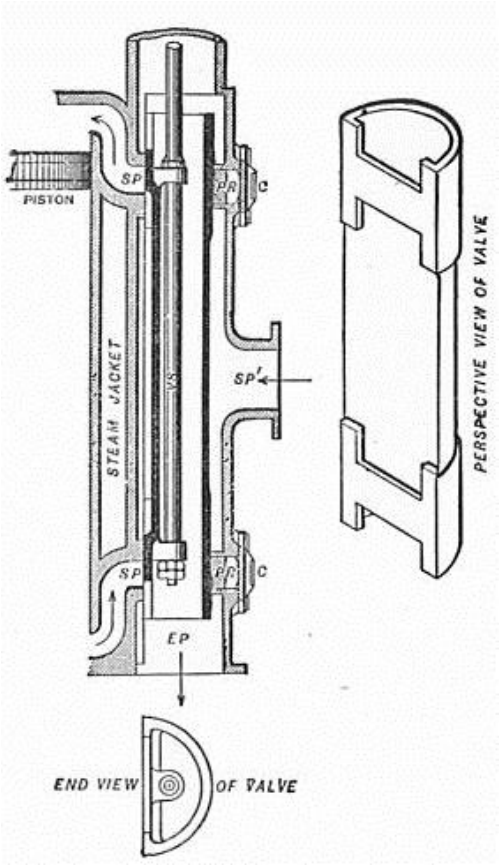
The site view on the previous page appears to have been drawn after the water returning Engines were installed near the water wheel building at the end of the water race, the two smoking Chimneys are a give away, as are the chimneys on the Mint which was built in 1788 after Watt had developed his Rotative engine to power the presses which would eventually produce over 600 million coins.

Watt patented the rotative engine in 1781, followed by the double action engine 1784 and the Watts linkage which allowed the parallel movement of the piston rod to drive the connecting rod & the rotate the shaft. The Governor followed in 1788 and his pressure gauge in 1790. The long "D" valve (below) was patented in 1799 by William Murdock, a long term member at Boulton and Watt in 1799.



Engine used to drive Lapping machines at the Soho Foundry

The Soho Foundry (centre right) was es-



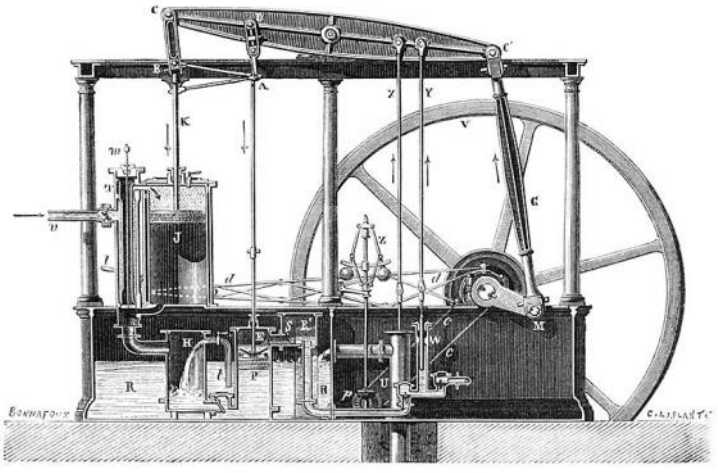


Fig. 59. — Machine à balancier de Watt.

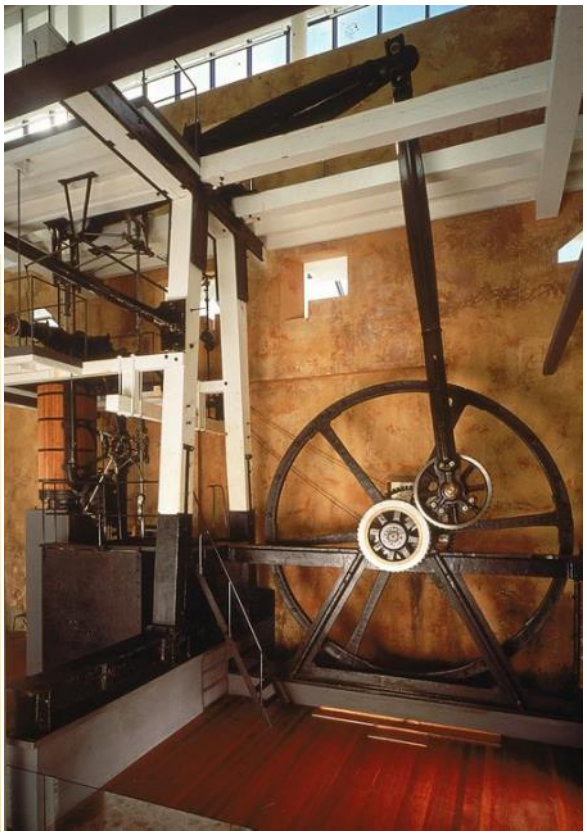
e. Tuyau de prise de vapeur; T, tiroir; J, cylindre; H, condenseur; PE pompe d'épuisement; WY pompe alimentaire de la chaudière UX pompe d'alimentation de la bâche B; p Z régulateur; od excentrique; ABGD parallélogramme; GM bielle et manivelle; V volant.

the tablished in 1795 to produce stream engines at Smethwick on the edge of the Birmingham Canal which allowed heavy material to move to and from the factory. This factory was well planned for efficient high production of machinery that was way

ahead of its time. In 1800 Watt and Boulton retired and their sons took over the business. Boulton and Watt were elected as Fellows of the Royal Society in 1795 and they were members of the more commercial Lunar Society. Sir Joseph Banks was president of the Royal Society for over 40 years prior to his death in 1820. He was not a member of the Lunar Society but he had close dealings with it and its members.

There are many letters of correspondence between Sir Joseph Banks and Boulton and Watt, about the engines at the Gregory mine and many other subjects from obtaining metal for coin manufacture and arranging coin showings with the king.

Banks is believed to have written over 50 000 letters (with a quill) and about 20 000 have survived in various collections around the world, many in Australia in the National Archives.



Australia has much to thank Banks for, in particular the Merino sheep that were spirited out of Spain to improve, initially Britain's sheep bloodline and which later became the backbone of Australia's wool industry.

Watts is also well represented here with a 1785 version of his Rotative engine which powered a London Brewery for over 100 years This engine started out as a single action machine and was upgraded over its early working life by Boulton and Watt. The resourceful Sun and Planet big end planetry gear is clearly seen, it avoided a patent for a simple crankpin arrangement, but doubled the engine revolution rate to 20 RPM.

The Boulton and Watt Rotative engine (above right) can be seen at the Powerhouse Museum in Sydney as can Watts Copying machine shown on page 18.

It is hard to believe that the world did not have a working engine crankshaft until 1781, about 80 years after the first practical steam engines were developed.

The Age of Enlightenment already had a brilliant glow, and the Industrial Revolution was about to turn up the fire .

The amount of information on Sir Joseph Banks seems endless, and this attempt to associate his involvement with the evolution of steam has been fascinating. Ed.

Sir Joseph Banks had two properties in London. On the right his London base was at 32 Soho Square(the tall colonnaded house near the left. This home housed his Library and Herbarium and was used for many meetings. The house was L shaped and went through to a rear street on the left. It was much larger than the deceptively small 18' frontage would suggest. It was demolished in the 1930's.

On the left is his country home " Spring Grove" in the county of Heston at Isleworth West of London. Banks leased this property for many years before purchasing it in 1806. As I understand it this 34 acre property was used to propagate his plant collection before they were used to establish Kew Gardens. It has survived much altered.

Soho square was Banks main base. Each year he visited Overton Hall and Revesby Abby where he spent 2 to 3 weeks in each place.

When Banks died he willed that he would not have a funeral and that no monument be erected for him. The church graveyard is known but the position is lost.

Mathew Boulton lived at Soho House at the Soho Manufactury on Soho Hill Birmingham. The house survived and is open to the public. (see above) After his arrival at the Soho Manufactury, James Watt lived at Heathfield Hall (Right) in Birmingham and he had a farm "Doldowlod House in central Wales. Soho is thought to be a hunting call from the 1500's, and it is coincidence that it appears in both Banks & Boulton's address, Ed.

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Timetable March to December 2021

The timetable below shows all currently planned open days. Please note that all dates are subject to change, potentially at short notice. More information can be found below. Please check here before you travel or by ringing our number for the latest information.

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Subject to change without notice due to fire regulations, volunteer unavailability, Covid-19 restrictions or other unforeseen events. Please check here or ring our number for up to date information before travelling from afar.

Month	Days	Date	Train	Remarks
March	Sunday	28		CLOSED
April	Saturday	3	Steam	Easter Gala
	Sunday	4	Steam	Easter Gala
	Saturday	10	Petrol	Alexandra Market
	Sunday	11		CLOSED
	Sunday	25		CLOSED
May	Saturday	8	Petrol	Alexandra 'Winter' Market
	Sunday	9	Steam	Historic Tractor display
	Sunday	23	Diesel	Malcolm Moore locomotive display
June	Sunday	13	Steam	Queen's Birthday Weekend
-	Sunday	27	Steam	Steam into Winter at the Timber Tramway
July	Sunday	11	Diesel	
	Sunday	25	Diesel	Kelly & Lewis Diesel Loco's Celebration Day (1935/36)
August	Sunday	8	Steam	
	Sunday	22	Diesel	
September	Saturday	11	Steam	Alexandra 'Spring' Market
	Sunday	12	Petrol	Heritage Machinery Festival
	Sunday	26	Diesel	Historic Photographic Exhibition
October	Saturday	9	Petrol	Alexandra Market
	Sunday	10	Steam	
	Sunday	24	Diesel	Volunteers Memorial Garden display
November	Saturday	13	Petrol	Alexandra Market and Alexandra Spring Show
	Sunday	14	Steam	
	Sunday	28	Diesel	
December	Saturday	11	Petrol	Alexandra 'Christmas' Market
	Sunday	12	Steam	Christmas specials

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Please check our website above for any possible COVID restrictions on the day.

1







Queens Birthday is normally a major event in Beaufort with many facilities open to the public, including the Artists studio on the opposite side of the railway line to the clubs renovated " Goods Shed " display which runs public events at various times throughout the year, including the Queens Birthday weekend.

For 2021 the whole event was cancelled when Melbourne was in lockdown with the Covid threat. As fortune would have it Ballarat was not under lock down which allowed a convoy of Vintage and Classic cars to make an unscheduled visit.

Thanks to Ron and Linda Harris for coordinating the Cancelled event in style.

QUEENS BIRTHDAY

2021

The Covid Lockdown in Melbourne was responsible for the formal cancellation of the event in Beaufort. Thank you Ballarat.

Looking forward to 2022