



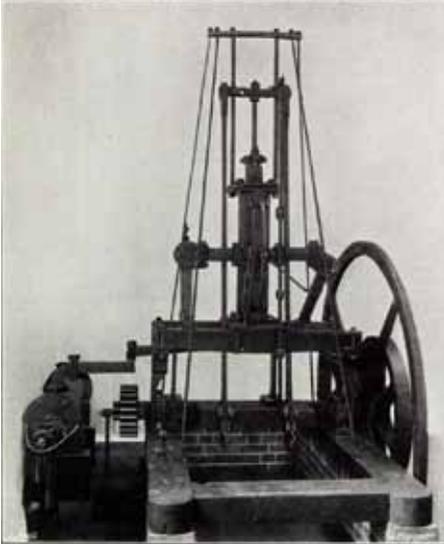
THE TREVITHICK SOCIETY

KOWETHAS TREVITHICK
NEWSLETTER 180 SUMMER 2018



Robert Metcalfe leading the AGM weekend walk around Wheal Owles.

REPUTED TREVITHICK ENGINE



Thanks to Peter Coulls, the request for a copy of *The Engineer* article (Volume 113, page 660 (21st June 1912) about the mystery *Reputed Trevithick High-pressure Engine* was successful. A copy of the article promptly arrived in the post and is reproduced here in full:

An Early High-Pressure Engine

Not for a long time has so interesting a relic been added to the unique collection of early steam engines at South Kensington Museum as the one lately presented by the Earl of Shrewsbury and Talbot, KCVO. It has been re-erected in the far left hand corner of the annexe to

the central machinery hall, and consists of a single-cylinder return crank engine of the vertical type, which there is every reason to consider it being one of Richard Trevithick's design. Whilst it bears no maker's name nor any means of direct identification, it presents so many well-known Trevithick features that it may be pretty certainly set down as a product of the ingenuity of the Father of High-pressure Steam. The engine was employed for over fifty years, down to 1882, at some salt works at Ingestre, Staffordshire, on the Earl's estate. Prior to that it had been used for the winding at a colliery at Brereton, near Rugeley, and is thought to have been built at Bridgnorth. It is known that Haseldine and Co, of that place, built many engines to Trevithick's design, under agreement with him. The engine is somewhat later than the other examples of his, close by, and is therefore of peculiar interest in enabling the course of gradual improvement to be easily followed.

Almost everything about the machine is of cast iron, and probably its original boiler was too. This, however, had long disappeared - they generally burst - steam having been supplied at Ingestre by an egg-ended boiler, 8.5 ft long by 3 ft in diameter, set with a partial wheel draught and working at 35 lb pressure. The cylinder is 7 inches by 24 inches, quite unlagged in any way now. Its bottom flange is one inch thick, held down by four bolts to a base-plate 7/8 inches thick at the sides, but thickened up immediately under the cylinder. This plate is attached by two bolts on each side to cast iron frames supported on the jaws of Y-shaped castings which support the whole. These frames

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are 20 inches apart, but should have been another inch or two, as they have had to be chipped on the bottom of the inner sides to permit the long return connecting-rods to clear them. They barely do it now. The connecting-rods are about 6 ft long or a little more, of round section 1.75 inches diameter in the middle, tapering to 1.5 inches at the ends. They are worked by a crosshead running in vertical guides bolted to the top of the cylinder. From one side of this guide depends a tappet rod, some 6 ft length and one inch diameter, on which are two adjustable tappets which strike the lever of a four-way cock. The tail of this lever has a leather strap fixed to it to limit its fall below the point when the tappet can again strike it. There is no governor, a stop cock on the steam pipe answering instead. There is a bridle for holding the four-way cock in its place and preventing it from working out. The exhaust steam passes to a feed-water heater, somewhat on the principle described in Trevithick's patent No 2599 of 1802, which shows that he even then appreciated the value of the latent heat contained in it. The feed heater consists of a cast iron casing surrounding about 4 ft of the feed pipe, which passes through stuffing-boxes at each end. Iron loops prevent the casing from shifting, but owing to exigencies of space the heater is placed about one foot in advance of its proper position.

The driving axle, like everything else almost, is of cast iron. On its left end, as you face the steam port side of the cylinder, is a spur wheel about 14 inches in diameter having twenty-two teeth 4.5 inches broad. What this wheel drove is not now clear, but the plunger feed pump, 2.125 inches diameter by 5.5 inch stroke, is worked from a pin driven into the boss of the wheel. On the opposite end of the crank shaft are two wheels, that nearest the engine being a cast iron fly-wheel 8 ft in diameter, of characteristically Trevithick design, with only four spokes. These spokes are slightly tapered - 3 inches thick at mid-length and 2.5 inches at the rim. These dimensions include a web cast on the inner side. The rim of the wheel

is 2 inches thick and 3.5 inches deep, very roughly cast on the outer side. As a counterpoise a casting 3 ft 8 inches long and the same depth as the rim is attached to the latter outside, opposite the crank. Three bolts hold it to the rim, passing through the holes 1.5 inches long by 1 inch long (sic). In fact, there are four or five of these holes in the rim between each arm or spoke. Outside the fly-wheel is a spur wheel 3 ft 4 inches in diameter, with six broad spokes cast with an inner web. There are fifty-four teeth 1.25 inches deep, but at a later period an iron band 4 inches wide and welded in two places has been shrunk on over them, evidently for the purpose of driving something by means of a belt. The iron band is 0.5 inches wider than the wheel, so that the teeth could not catch anything. The crank cheeks and the wheel seats are 4.5 inches square, the portion of the axle between the bearings of the two connecting-rods being of the same size. These bearings have a raised circular cheek or web on each side and are 2.5 inches apart, leaving room for brasses of about that width. Between the faces of the inner cheeks is 15 inches. The axle bearings, 4 inches long, are at the bottom of the Y-shaped constructions which support the cross frames carrying the cylinder, these constructions consisting of two pieces each, cast with mortices, which assist the bolts to prevent any side movement.

To counteract the vibration and shake, and to keep the whole affair steady, holding down rods run from the top of the crosshead guides to the wooden beams on which the engine stands. These guy rods are of wrought iron, about 8 ft long and an inch in diameter, or round section. The wooden beams in question have been partly renewed, being much decayed in places. They rest upon dwarf walls of five courses of masonry, and are 9 inches wide by 5 inches thick. The space enclosed is 3 ft 4 inches wide by about 6.5 ft in length. An excavation had to be made on each side, one to take the lower part of the fly-wheel, the other the feed pump. A good deal, but not all, of the necessary piping remains,

and is of cast iron. The pipes have been joined with flanges having three bolts to each joint. They are thickened up for a couple of inches half way and are rather roughly cast. File marks are still very visible on them, and also on the side of the cylinder. The internal diameter of the pipe connections seems to be 2.5 inches, the area of both steam and exhaust ports in the four-way cock is 1.25 square inches.

The engine is, of course, only small, but with the exceptions of the absurd 8 ft fly wheel, pretty compact. It is supposed to have developed 5 horsepower at 45 revolutions per minute and 25 lb, effective pressure. The loss of heat from the cylinder and steam pipe, if they were really unprotected as they now are, must have been considerable, and makes it doubtful whether the two older Trevithick engines close by, both of which have a single cylinder sunk in the boiler, would not be more efficient. As an example of the extent to which cast iron could be used in machinery of this sort it is perhaps unique.

SURPRISING DISCOVERY



James Watt, the famously dour Scot, who made significant improvements to the Newcomen atmospheric engine, made a surprising discovery whilst in Cornwall before 1796. He discovered Lesser Centaury (*Centaurea pulchellum*) - a plant species that had not been recorded

in Britain before. He found it growing on the Downs at Port Owen [Port Quin Bay], near the sea.

Presumably he was there on mining related business. In that area there are a few lead mines such as at Gilson's Cove, and Trewetha Mine, otherwise known as Wheal Boys, which produced Antimony.

CNF

TREVITHICK DAY



The day dawned overcast with a chilly wind, so when we arrived on site in Basset Road at 7 am, we were glad of a topcoat. However, we soon started to warm up once we started erecting the tent and unpacking the display. Later the day turned warm and sunny and we were very busy, welcomed a number of members in for a chat and did very good business. During the winter a number of our display boards and fittings have been overhauled and updated and the general arrangement within the tent had been re-vamped. The tent has had two small leaks stopped with glue patches and both end panels have been replaced as the originals were showing their age, like a lot of us! We have also revised some of the stock lines we sell, hopefully to have greater public appeal. It was felt at our post mortem of the day that it was a success.

Volunteers who helped on the day were Dave Mann, Phil Porter and Barbara Tripp.

KJTR

TAVISTOCK STEAM FAIR

The Society attended with our show tent as usual and it turned out to be the busiest day we have ever had at this event. The weather was dry and turned to being hot and sunny in the afternoon.

One amusing incident was that a lady was examining our stock of geological core samples and eventually selected one to purchase. In jest I said to her, "I am sorry it does not have Tavistock written all the way through it!" and she replied, "I don't mind. I'm from Camborne!"

Thanks to Stephen Docksey and Phil. Porter for making it such a successful day.

KJTR

SOCIETY STORAGE

Members will know that for some years we have rented part of an old aircraft hangar at RAF Portreath. Unfortunately, the winter storms had wreaked havoc with the building, which had lost part of its roof and the main doors could not be closed nor the rear doors opened. As a result, the MOD condemned the building and gave the various organisations who rented space notice to quit.

We only had three weeks therefore to find alternative accommodation and then move all our bits and pieces including our lorry container. We found a local company who rented lorry containers at Pool for a reasonable price. By sheer coincidence the very day we rented the new container a chance visit was paid to Poldark Mine and the Cornish Heritage Collection. In conversation with the custodian and talking in general terms as to what was happening with the Society we were offered a home for our container which was gratefully accepted. The container has now been moved and over the summer period our belongings will be sorted and then moved again. Our show trailer will also be kept there.

Prior to our eviction, we had been sorting through the items stored with the idea of disposing of that which was not wanted or past saving, due to water damage. Site access had become a tiresome task due to the MOD computer system which controlled our entry repeatedly playing up, such that we could only have entry when the weather boffins declared the wind speed low enough to be safe. Consequently, we are now happier and have improved storage facilities.

KJTR

CARING FOR KIT HILL

Small voids are opening up on a much used foot path on the line for the calciner flue of Kit Hill United Mine on the summit of the hill.

It is proposed that turves should be removed from a length of the flue and the granite capstones revealed and cleared. The extent of the voids will then be assessed and the voids filled with sand and the turves reinstated. The supervising archaeologist will be Dave Williams.

Four days have been set aside for the work – 7/8th August and 14/15th August dependent on weather.

If any Society member wishes to take part in this minor archaeological exercise and learn more of Kit Hill you will be welcome. Tools, hot drinks and biscuits will be supplied but bring your own trowel, lunch and additional drink if desired.

For further information contact the Country Park Ranger Jenny Heskett on 07973 813843 or e-mail jheskett@cornacltd.co.uk

Stephen Docksey
East Cornwall Branch

2018 AGM WEEKEND

Friday 11th May. Praa Sands. Wind Southerly, Force 5 to 7. Rain. A few hardy souls emerge from cars; they are not mad but the brave Society members on Friday's Field Trip for the AGM Weekend. The destination was the cliff side engine houses at Wheal Trewavas and so after reducing the number of cars, some twenty members set off from Rinsey Head to Trewavas. And it rained and it blew but we got there and were able to look at this enigmatic site with guidance from Pete Joseph. We were also treated to a talk about the local Cornish Chough population by the Chough warden who was on site monitoring the nesting birds in the cliffs below. Ultimately the weather became too much and we set off back to Rinsey – annoyingly half way there the sky cleared and the sun shone.

Pete also delivered the Friday evening lecture on the packet ship, PS Cornubia. Built by Harvey, she started life plying between Hayle and Bristol and ended up as one of the Confederacy's most successful blockade runners in the American Civil War. Pete has researched and published her fascinating history.



Overlooking the engine houses at Wheal Trewavas.





Saturday morning had a choice of activities; with clouds gathering, most opted for the underground tour at Rosevale Mine, Zennor. Feedback from this was uniformly enthusiastic and full of admiration for the achievements of a small band of volunteers there. The Society is most grateful to Tony Bennett and his partners for arranging the tour. Those who opted for the alternative, a walk around Botallack and Wheal Cock with Pete Joseph, predictably got another soaking but considerable insight into this complex site where the remains of the notably unsuccessful working in the early 20th century disproportionately dominate the landscape.



Above and below ground at Rosevale Mine.





In the afternoon Robert Metcalfe led a walk around Wheal Owles. This mine is known to most as the site of one of Cornwall's worst mining accidents. Miners holed into a 'house of water' in neighbouring abandoned Wheal Drea. This was due to the plans of Wheal Owles failing to take note of variations in Magnetic North. Nineteen men and a boy died, their bodies were never recovered. Robert's walk opened eyes to the fact that Wheal Owles was a mine of some importance and a fascinating site with its diagonal shafts and undersea workings.

In the evening over 30 members attended the AGM and Annual Dinner at Geevor.

The weekend concluded on Sunday morning in glorious weather, with a walk from Carn Galver Mine down the valley to the Bosigran stamps, a seventeenth century site of major historical significance with a rare collection of structures associated with tin dressing.

Graham Thorne



Cargodna shaft, Wheal Owles with the plaque commemorating the flooding disaster 10.01.1893





The view from Wheal Owles overlooking the Crowns engine houses.



The Wheal Owles engine house - inland from Wheal Edward.

PUFFING DEVIL

Trevithick Day 2018 proved to be a tremendous success. This year the crew was augmented by two up-country members - Ralph Ingham, who has helped at previous events and Daryl Tapfield.

We all assembled on the forecourt of Glasson's garage, where the engine had been parked overnight, at 06.30. Being the closest, living just a few hundred yards away, naturally I was the last to appear!

It usually takes at least two hours to unload the engine from its trailer and to get enough steam to be able to drive it up to the town; with the time needed for steaming affected by the strength and direction of the wind and the air temperature. This year 'all the planets were aligned' and we were able to drive to town ahead of schedule arriving before any other locomotive! John

Woodward steered the engine on its long ascent into the town and Sean Oliver was the driver. The rest of the crew clung on to the rear.

As in the two previous years we had Basset Street to ourselves and could enjoy driving up and down this long straight street, with its newly resurfaced tarmac, all day long, in the sunshine. There are numerous examples of us driving up and down on Youtube and one on the Trevithick Day Facebook page.

We were also joined by Billy Brookes, who continued his filming of the engine for his undergraduate project at Falmouth University.

Two descendants of Richard Trevithick made themselves known to the crew (one from Australia and the other from Vancouver) and were keen to know more about their ancestor's locomotive.



Ralph Ingham steers the Puffing Devil along Basset Street.

Daryl Tapfield drives the engine with Sean Oliver steering.



Camborne's Trevithick Day is a very diverse, free, community-led street festival, dedicated to Richard Trevithick and his invention of the higher pressure steam engine in the town. In addition to the Puffing Devil (the replica of the locomotive that drove through the town on Christmas Eve 1801), Basset Road is filled by traction engines and elsewhere miniature locomotives, vintage vehicles and stationary engines give tribute to Camborne's industrial heritage.

Elsewhere in the town there is an amazing array of stalls, exhibitions, shop displays and several stages hosting choirs, bands and musicians, whilst street entertainers punctuate the flow of thousands pedestrians through the traffic-free streets.

For many the highlights of the day are the two processional dances and the parade of steam which brings the

festivities to an end. The Children's Dance features the local primary schools, each with their own costume depicting miners and bal maidens. Led by Camborne Town Band, the dance itself depicts the motion of the Puffing Devil as described by the song "Going up Camborne Hill, coming down".

The parade of steam no longer re-enacts Trevithick's historic 1801 run up Camborne Hill. Instead the route takes them past the Trevithick statue and then along the two main shopping streets where many thousands fill the pavements. We follow the tail of this procession for a small part of the route, and then take a detour past the town clock and make the return journey to Glasson's garage. Without doubt, Trevithick Day 2018 was a wonderful day for one and all.

CNF



The window display in Rowe's the bakers.



The parade of steam.



The Children's Dance.



Driving back to Glasson's Garage with John Woodward steering.

MINING ON SHETLAND

Tim Bucknall, whilst visiting the Shetland Isles, came across an information board at a small visitors centre at Sandsayre Pier, Sand Lodge, near Sandwick. He was heartened to see the reference to Richard Trevithick and has kindly transcribed the text (with some minor spelling corrections!) which is reproduced below:

Copper mining began in Shetland in 1789 when Alexander Creighton of Tynemouth and London discovered copper ore on the coast east of Sand Lodge and at Garth's Ness near Quendale. He formed a partnership with Thomas Williams of Llanidan in Anglesey to exploit the finds.

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By 1800 Creighton was in partnership with Robert Redman, a Londoner. By October 1803 a shaft had been sunk to a depth of 22 fathoms (40 metres) before very hard rock had stopped the digging despite the presence of plenty of iron and copper ore. Water was also encountered and was dealt with by a steam engine by Richard Trevithick. However they ran out of money and Redman suffered a nervous breakdown.

In 1804 the New Shetland Mining Company was formed by Edward Redman and his brother, and a plan was made to sink a new shaft to intersect the lode at 40 or 50 fathoms (73 to 91 metres). A party of Cornish miners began the work in May that year and by July 1805 had reached a depth of 34 fathoms (62 metres). By

Mining at Sandlodge

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In March 1804, the Shetland New Mining Company was formed by Edward Redman his brother and a plan was made to sink a new shaft to intersect the lode at 40 or 50 fathoms (70 to 90 metres). A party of Cornish miners began the work in May that year and by July 1805 had reached a depth of 34 fathoms (62 metres). By December, the shaft was completed to a depth of 40 fathoms, and at a cost of £1,050, but flooding was again becoming a problem. A new steam engine was installed and by April 1806, three levels had been driven to intersect the lode, all through very hard rock requiring little support, but much hard work. But when they reached the lode, they found that the ore was sparse and not worth working. Mining ceased in August 1807 when the local housing ran out and by 1808 the mine was flooded and the pump had been dismantled.

In 1872, John Walker from Edinburgh leased the mine and installed crushing and screening equipment, sheds, machinery and plant and sank two new shafts. He also built the house 'XYZ' for John Hamilton.



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In 1872 John Walker from Edinburgh leased the mine and installed crushing and screening equipment, [new] sheds, machinery and plant, and sank two new shafts. He also built the house 'XYZ' for John Hamilton, the mine manager. A new jetty was constructed on the rocks below the east shaft, with 2 cranes, and a mooring buoy was positioned 250 metres from the shore which allowed large vessels to be loaded direct from the jetty.

The west shaft was sunk to a depth of 180 feet [30 fathoms] (55 metres) and a rich lode of haematite iron ore was mined and shipped for use in de-sulphuring coal gas. The east shaft was sunk to intersect the lode at 240 feet [40 fathoms] (73 metres) and then a further 60 feet [10 fms] (18 metres) down the lode. Between 1881 and 1929 10,000 tons of ore were mined.

In 1880 Walker sold his lease to the Sumburgh Mining Company who had nominal capital of £60,000. However the company went into liquidation in 1881.

In 1920 the mine was again pumped dry and more plant installed by the Shetland Exploration Syndicate Ltd. Tram lines were laid to Sandsayre Pier for where equipment and ore were transhipped to large vessels lying offshore. In 1921 Shetland Exploration Syndicate Ltd sold out to Sandlodge Mine Ltd. Mining continued sporadically until abandoned in 1929. The mine workings were finally demolished in 1931 and the process of reinstating the area began.

AWARD FOR SOCIETY

The Society has just heard that the Association for Industrial Archaeology has awarded its Voluntary Societies Publications Prize for 2017, value £300 to the Trevithick Society for our volume, The Tavistock Canal by Robert Waterhouse. This prestigious award will be presented during the AIA 2018 Annual Conference at the University of Nottingham in September. Congratulations to Robert for this richly deserved award.

Graham Thorne

AGM RESOLUTION

At the AGM those present unanimously voted to change the constitution to recognise those with fifty years of membership as honorary. As a consequence the Society now has the following new Honorary members:

Mr Robin Adams	London
Mr Michael Messenger	Cardiff
Mr Damien Nance	Athens
Mr David Adams	Newport
Mr Michael Graham	Stratford upon Avon
Mr Mike Cowley	Cole Hill
Mr Christopher Wiblin	Penzance

WILLIAM (BILL) NEWBY

As we go to print we were saddened to hear of the passing of William (Bill) Newby on Sunday 1st July. Bill was a long-standing member and one time Honorary Secretary. Our thoughts are with his family at this sad time.

KJTR

LEVANT REPORT

The Levant Whim is running well and John Woodward's refurbishment of the Hot-well piston has proved successful.

During the spring running of the engine a small leak has occurred in the condenser cistern. This is a wooden tank and it was renewed when the millennium refurbishments were completed in 2001. The leak is only about half an inch in diameter and could be plugged easily if it was accessible. Unfortunately it is at the rear of the cistern behind the condenser and it will require a midget to do the work! The cistern water level is replenished by a submersible pump in the Cooling Pond and this is coping with the leak at present. Any leakage of water is not wasted as it drains back into the Cooling Pond.



Friday the 15th of June was a big day for Levant. The Whim was presented with an Engineering Heritage Award by John Challenger of the Institute of Mechanical Engineers (IMechE) so we now join the prestigious company of King Edward Mine, Crofton Engines, Tower Bridge, Concorde, the Falkirk Wheel and the E Type Jaguar amongst many others. Over 50 people attended and it was good to see past and present volunteers and ex-National Trust staff and custodians. Pasties, cake, tea and coffee were provided by the NT and I would like to thank everybody that made

the day a success. Even the weather could not have been better.

Ron Flaxman



Ron Flaxman himself!



PUBLICATIONS

As indicated in the last Newsletter, our Wheal Trewavas book was launched at the AGM weekend and is now generally available, price £10.00.

Also as announced at the AGM, the Society has decided to mark the centenary of the Levant Disaster with a book. This will be in the nature of an anthology; it will include material on the disaster but we also see it as an opportunity to publish recent research on the history of Levant. We are therefore appealing for hitherto unpublished material about the mine and any recent research or work in progress, which authors feel appropriate to such a volume. We would also welcome proposed articles which could be ready for a publication date of autumn 2019 for

discussion. I am happy to say that my appeal at the AGM has already borne fruit with a number of suggestions. I know that October 2019 seems a long way off but we need to start planning now. It remains a Society ambition to publish a definitive history of Levant in due but that is still some way in the future.

Our autumn offering returns to the Tamar Valley. William Woolcock was a Mine Captain at Devon Great Consols and we are publishing his diary spanning the years 1886 to 1900. Authors, Rick Stewart and Robert Waterhouse have joined forces to transcribe, edit and explain this most interesting picture of the final years at Devon Great Consols.

Graham Thorne



The photo is believed to have been taken when Taylor's Engine ceased working in 1954. Prominent in the picture are William Tregonning Hooper, Treve Holman and Jack Trounson.

SOCIETY MEETINGS PROGRAMME

KEM: 7.30 pm start at King Edward Mine, Tron, Camborne TR14 9DP.

Liskeard: 7.30 pm start at The Long Room, Liskeard Public Hall PL14 6BW.

Sunday 5th August

Kennall Vale Gunpowder Woods Visit.

Parking at SW754975 at 1100hrs. In Ponsanooth, turn in beside the PO and park at the start of the hill. It's a narrow lane and parking for just a few cars.

Saturday 8th September

Tour of Blue Hills, Behind The Scenes.

A tour behind the scenes at Blue Hills tin streams. The cost is £6.50 per person, which will be subsidised by the Trevithick Society. Meet at reception, Blue Hills Tin Streams, Trevellas Coombe, St. Agnes TR5 0YW. Contact Tracy to book.

Monday 8th October (Liskeard)

Cornish miners of the 21st Tunnelling Company.

by Ken Johns

Friday 9th November (KEM)

Cornish Lithium.

by Jeremy Wrathall

Monday 12 November (Liskeard)

Royal Albert Bridge – Accessing The Unreachable.

Kimble West and Mark Musgrave from XEAD will explore the specialist engineering techniques that are used to maintain the bridge.

Monday 10th December (Liskeard)

Plymouth Breakwater Tour.

£10.00 per person. Contact Tracy to book.

Monday 10th December (Liskeard)

Film – Building a Lighthouse

Friday 14th December (KEM)

Film – Building a Lighthouse

Contact:

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For up-to-date news check:

<http://www.trevithick-society.org.uk>

<https://www.facebook.com/trevithick.society/>

**Non members are welcome to attend.
Non-members £2.00 please.**

MEMBERS' BENEFITS

Trevithick Society members are entitled to free entry (on production of the membership card) to the following attractions:

- King Edward Mine
- Cornish Engines at Pool (East Pool Mine and Michell's Whim)
- Levant
- Geevor Museum
- Poldark – free entry to site and reduced fee for underground mine tour

Also:

- 10% off book purchases at Tormark.
- 20% off purchases at KEM shop.

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The Trevithick Society, a registered charity, is a recognised body of the study of industrial archaeology in Cornwall. Membership is open to all who are interested in the region's great industrial past, whether or not they live in Cornwall. The Society takes its name from one of Britain's foremost inventors and pioneers of the Industrial Revolution, Richard Trevithick, a Cornishman whose name is inseparable from the development of steam power. This newsletter is published quarterly and, together with the annual journal, is distributed free to members. Letters and contributions are always welcome and should be sent direct to the editor.

The views expressed in this newsletter are those of the authors and not necessarily those of the Trevithick Society.

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