RCEA
(SUSSEX)

An Association for Retired Professional Engineers

NEWSLETTER December 2016

President's Message

Welcome to the December Newsletter.

We have three and possibly four more talks between the New Year and Easter. I hope that the topics will be of interest to all of our members and also some of your friends who may have an interest in the subject matter. As you know our talks are open to both members and non-members.

We have recently welcomed some new members, but we need more to ensure that the RCEA has a long term future.

I would also encourage you to come along to our monthly coffee mornings. The dates are in the newsletter and are arranged on the third Thursday each month for members at the Spotted Cow, Angmering and for members and partners on the last Thursday in the month at the Swallows Return, Worthing. We have now included a Swallows Return coffee morning on Thursday 29th December this year.

May I draw your attention to the item entitled Newsletter Entries, as technical contributions from members add greatly to the value of the Newsletter.

I wish you and your families a Merry Christmas and a Happy New Year.

Derek Webb

December 2016

PROGRAMME OF EVENTS 2017

Thursday	**29th December**	**Coffee – with Partners at Swallow's Return**
Tuesday	**10th January**	**Talk - 'Ship Propulsion – from Paddles to Jets'**
Thursday	**19th January**	**Coffee – at Spotted Cow, Angmering**
Thursday	**26th January**	**Coffee – with Partners at Swallow's Return**
Tuesday	**14th February**	**Talk – 'Smart Metering'**
Thursday	**16th February**	**Coffee – at Spotted Cow, Angmering**
Thursday	**23rd February**	**Coffee – with Partners at Swallow's Return**
Tuesday	**14th March**	**Talk – 'Industrial Process Automation - a skim across the surface'**
Thursday	**16th March**	**Coffee – at Spotted Cow, Angmering**
Thursday	**30th March**	**Coffee – with Partners at Swallow's Return**
Thursday	**20th April**	**Coffee – at Spotted Cow, Angmering**
Wednesday	**26th April**	**Spring lunch – Northbrook College**
Thursday	**27th April**	**Coffee – with Partners at Swallow's Return**
Thursday	**11th May**	**Visit at 11:00am to Bluebell Railway**
Thursday	**11th May**	**Outing at 14:30pm to Sheffield Park with guided tour**
Thursday	**18th May**	**Coffee – at Spotted Cow, Angmering**
Thursday	**25th May**	**Coffee – with Partners at Swallow's Return**

All Talks and Meetings will commence at 2.30 pm and be held in the Chichester Room, Field Place, Worthing unless another venue or time is indicated.
Timings for visits and outings will be as printed in the detailed description of the activity.
Coffee mornings commence at 10.30 am.

Membership Subscriptions 2016/2017

Our thanks go to all members who have renewed their subscriptions. Those members not renewing should note that their membership will cease on 1/1/2017.

Website of the RCEA

Our website, **www.rceasussex.org.uk** carries the very latest information on all of our events.

New Members and Speakers for Talks

The RCEA needs new members and speakers to ensure that we can continue as a thriving organisation. Please think of appropriate people you know and encourage them to come along to our talks and hopefully join the RCEA.
We also need more speakers to give talks to us on Tuesday afternoons from September to March. We are aware that many members have the knowledge from their working careers to provide interesting talks. If you are willing to give a talk please let us know. Speakers from outside organisations are increasingly harder to find and often seek payment for their services.

New Members and Associates

M. J. Reeves, Eur.Ing, C.Eng, MIET

M. P. Lawton, I.Eng, MIET

M. J. Letton, C.Eng, MIERE

R. V. Edwards, BSc, C.Eng, MIET

Latest Member's Handbook

Would all members please check their entry in the Members Handbook which has just been issued to ensure that their entry is correct in every detail i.e. address, telephone number, e-mail address, etc. Any errors or omissions should be communicated to **Malcolm Hind, Membership Secretary** so that the appropriate corrections can be made to the master copy ready for printing the next Members Handbook.
Please check the Newsletter and website for up to date details of events.

RCEA Insurance

Members need to be aware that the insurance policy that the Association holds is solely for the protection for the assets and liabilities for the Association as an entity. The policy does not provide cover for personal injury or loss to individual members. Members attend the Association's events at their own risk; although under some circumstances there may be some cover from the insurance arrangements of the venue owner.

Newsletter Entries

If you would like to provide an article for inclusion in a future newsletter it would be very welcome as we are always looking for new material in addition to reports on previous talks and visits/outings. From feedback from our members we know that the newsletter is particularly appreciated by those who are no longer able to get to our meetings and visits, so if you are able to contribute in this way it would be much appreciated. Articles should preferably be Microsoft Word documents, although we can usually convert both text and pictures (even photographs) into a suitable format. Accompanying pictures are best supplied as separate files which will be embedded within the text during editing.

Brief Detail – Talks, Outings and other activities January – April 2017

Talk.
Tuesday 10th January 2017 - 'Ship Propulsion – from Paddles to Jets'
Antony Tomkins - Hamilton Jet

The talk will describe and illustrate the development of propulsion systems for mechanically driven ships. Earliest powered vessels were mainly paddlewheel driven, mimicking men with oars. Then followed a long period when the main propulsion system was by immersed screws with steering by rudder. In more recent times there have been some significant developments, including pod systems for relatively slow speed vessels and water jet drives for high speed, which give significantly improved and precise handling as well as some other operational benefits. The talk will touch on how modern electronics are increasingly involved, as with all of life today.

Talk.
Tuesday 14th February 2017 – 'Smart Metering'
Ashley Pocock FIET, Head of Industry Change, Regulation and External Affairs at EDF Energy

Smart Metering is currently one of the largest of UK Government's major projects costing £12bn and involving the construction of a National Communications Infrastructure and the installation of some 100m devices into 30m plus homes and small businesses by 2020.

The talk will provide a walkthrough of the UK Smart Metering programme, how it was initiated and why Government has imposed obligations on the UK market to roll out smart metering, the policy and regulatory landscape, the actors, the end-to-end design and the technological roadmap to address obstacles to an economic, safe and secure deployment.

Talk.
Tuesday 14th March 2017 - ' Industrial Process Automation – a skim across the surface'
Dr David James, RCEA.

A chemical engineer might scale up the manufacture of a speciality chemical from lab scale to full production; a process engineer will design the process plant to manufacture the product, including sizing vessels, motors and pumps; a mechanical engineer might design the vessels and pipework; an instrument engineer will specify the sensors and transmitters needed to measure various physical quantities; and an electrical engineer will design the power supplies to motors, pumps and heaters. But it is the automation engineer who makes all these elements come together to manufacture the product. This talk aims to provide an overview of the automation of industrial production by briefly looking at some typical processes and examining the various parts that make up a process control system.

Spring Lunch – Wednesday 26th April 2017, Northbrook College, Worthing, 12.00 for 12.30

This occasion is not only an opportunity for new and existing members to meet socially, but also provides 'work experience' to chefs and waiters studying at the college.
There will be a bar for pre-lunch drinks, the cost to be settled individually by members and guests. The cost of the three course meal is £15 per head including a tip, which in the past has proved to be very good value. Applications should be made by 21st April 2017.
Should the numbers exceed the maximum seating allowed there will be a waiting list, as in previous years, so please book early to avoid disappointment. The committee look forward to seeing you there.
Booking form is at the end of this newsletter.
Contact George Woollard 01903 523640, e-mail Georgewoollard1@hotmail.co.uk

Visit.
Thursday 11th May 2017 – Bluebell Railway and Sheffield Park gardens.

We have arranged the option of two visits on May 11th and you will be able to join one or both visits.
In the morning, David Jones RCEA (who is also a volunteer with the Bluebell Railway) has kindly agreed to host a visit to see the restoration of the Brighton Atlantic locomotive currently underway at Sheffield Park. This is a special opportunity, as the Brighton Atlantic is not currently on view to the general public. David will meet us at 11am and take us across to the Brighton Atlantic shed. You will need to buy a Platform Ticket to get in to the station – currently this costs £3. Your ticket will also give you access to the locomotive sheds, where you can see some of the railway's locomotives and carriages, and to the museum. Although David's presentation is timed for 11am, you can of course arrive earlier if you wish (the museum opens at 10am) and stay on after David has given his presentation.

In the afternoon we have booked a tour of the nearby National Trust Gardens at Sheffield Park, hosted by one of their gardeners. The tour will start at 2.30pm and last for about an hour but, again, you will be free to arrive earlier and/ or stay later if you wish. The cost of this visit will be £13.10 per person (unless you are a member of the National Trust or RHS, in which case you will only need to pay £3).

Further details and a booking form will be provided in the Spring Newsletter.

Perry Eastaugh

Reports
Talk - Tuesday 20th September 2016 'Modern UK Tramways'
Ian Wetherell RCEA

We hope to be able to publish details of this talk in our March 2017 newsletter.

Talk - Tuesday 11th October 2016 – 'Mac McCairns – a Real Boys Own Hero'.
Mr. Dudley Hooley
(This talk was originally scheduled as 'PowerFrame- The Small Scale Tidal Generator – Generating Electricity from flowing water', which we hope to reschedule in the future. Our thanks are extended to Dudley Hooley, who stepped in at very short notice.)

Mac McCairns, DFC**, MM, Croix de Guerre

James Atterby McCairns was born in Niagara Falls, USA in September 1919; son of an English engineer, he came to England when he was 12 years old. In March 1939 he joined the RAF Volunteer Reserve and after his training was posted to No 616 Squadron.

In the early summer of 1941, No 616 was one of the Spitfire squadrons in the Tangmere Wing commanded by Wing Commander Douglas Bader and on July 6 the Wing was tasked with supporting six Stirling heavy bombers bombing a target in Lille, France. Unfortunately, McCairns was shot down and wounded, but was able to force-land his Spitfire on the beach at Dunkirk.

He was captured by the Germans, but managed to escape on January 22, 1942 from a prisoner-of-war camp, Stalag IXc. He was looked after by the Belgian resistance which arranged for his repatriation via Gibraltar, which he achieved with a Belgian colleague despite some hair-raising near-misses from both the Germans and the winter weather. 'Mac' never forgot the debt he owed to these resistance workers. In spite of not holding a commission, not being fluent in French and not having the normal requirement of 500 hours' night flying experience, he was accepted to train as a Lysander pick-up pilot to carry agents and resistance personnel into and out of French farm fields at night.

His first operation from Tangmere was on the night of November 25/26, 1942 and his last with No 161 Special Duties Squadron on December 16/17, 1943. During these 13 months he was commissioned and completed 36 missions, of which 26 were successful, more than any other pick-up pilot. Nineteen of his operations were double Lysander missions, mostly with Peter Vaughan-Fowler as the other Lysander pilot.

The majority of Mac's flights were uneventful, his most dangerous one being his return flight to Tangmere after hitting a 12ft poplar tree on final approach to a field near Amboise on the night of April 14/15, 1943. Thinking only an aerial had been torn away, he took off, but realised immediately that he had a more serious problem. However, he managed to fly back to Tangmere and after landing, found that the spinner, the centre boss of the propeller, was badly dented on one side and that the tailplane was attached by only one bracket held on by a single screw.

In September 1943, Mac with his CO, Squadron Leader Hugh Verity, and Peter Vaughan-Fowler, carried out the squadron's first treble Lysander aircraft operation. The mission was successful and accomplished with all three Lysanders landing, dropping-off and picking-up agents and departing in nine minutes. On returning safely to Tangmere, Mac recounted that he had flown at low level along the Loire waiting for his turn to land and had heard a strange 'phitt' sound in the cockpit. The next morning his ground crew showed him two round holes in the side windows of his cockpit. A bullet had entered the cockpit and must have missed his nose by just three inches. During his tour with 161's Lysander flight, McCairns was awarded three Distinguished Flying Crosses to add to the

Military Medal he had been awarded for his escape from the German PoW camp in 1942. The painting shows this operation and is titled *Freeman, Hardy and Willis* (after their unorthodox call signs).

Chris McCairns, left, himself a former RAF pilot, presenting his father's medals to Group Captain David Baron, the chairman of the Tangmere Military Aviation Museum Trust, for display at the museum.

If you would like to know more about Mac McCairns, the museum has published a book based on his journals, "Lysander Pilot. Secret Operations with 161 Squadron". You can find further details on their web site, or telephone them on 01243 790 090.

Following his successful tour with 161, he was posted to a staff position to scrutinise proposed landing sites for Lysander and Lockheed Hudson (a much larger aircraft) clandestine operations. He completed the war flying Hawker Tempests with Nos 3 and 56 Squadrons. After the war he remained in the RAF, but was tragically killed when flying a No 616 Squadron Mosquito which suffered an engine failure at low altitude and crashed near RAF Finningley, Yorkshire on June 13, 1948.

Perry Eastaugh

Tuesday 8th November 2016 – Cooch Memorial lecture 'Volk's Electric Railway - the Past and the Future'.

Peter Williams, Volk's Electric Railway Association

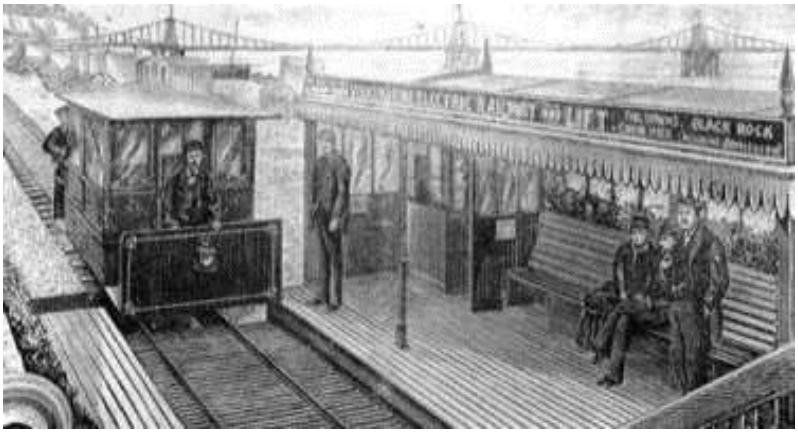
Peter's talk covered the history of the world's oldest operating electric railway, with some fascinating glimpses into the life of its designer, Magnus Volk, and gave an insight into the major restoration now under way with Lottery Fund support.
Magnus Volk, the Brighton man who designed and built the Volk's Railway, was a 19th century inventor and engineer. The son of a clockmaker, he set up the first telephone line in the city in 1879 and pioneered the early use of electricity. He brought electricity to his own house in Dyke Road and in 1881 Brighton Corporation commissioned him to illuminate the Royal Pavilion in the same way.

With these projects behind him, on 14 June 1883 Magnus Volk wrote to Brighton's town clerk seeking permission to lay an electric railway near Madeira Road (now Drive). After some deliberation this permission was granted and on 4 August 1883, after a construction time of only 6 weeks, Magnus Volk's electric railway was formally opened on Brighton sea front by Mayor Cox. This short demonstration line was very different to today's operation, being 2' gauge and ¼ mile long. It ran from a site on the seashore opposite the Aquarium to the Chain Pier. Power was provided by a 2hp Otto gas engine driving a Siemans D5 50 volt DC generator. The small electric car was fitted with a 1½hp motor giving a top speed of about 6mph.

No sooner was the railway open than Magnus sought powers to extend it westwards along the beach to the town boundary. To his dismay the Council turned this proposition down so he reversed direction and succeeded in getting permission to extend eastwards from the Aquarium to the Banjo Groyne. He also secured the rental of the 'Arch' at Paston Place to provide workshop and power facilities. Following experience gained from the first line he also decided to widen the track gauge to 2'8½", and he designed two more powerful and larger passenger cars.

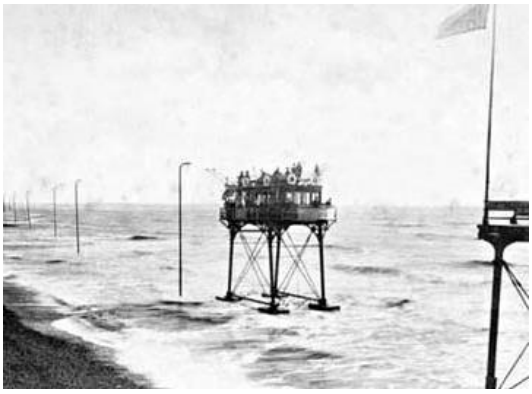
Although the line would run along the seashore it still required a lot of timber trestles to bridge gaps in the shingle, and severe gradients down and up to enable the cars to pass under the Chain Pier.

The new line opened on April 4th 1884 using one car. The uprated power plant in the 'Arch' consisted of an Otto 12 hp gas engine powering a Siemens D2 dynamo at 160 rpm. This gave an output of 160 volts at 40 amps – more than sufficient to propel the two new cars along the 1,400 yard long line. A station was provided adjacent to the Banjo Groyne, and a loop complete with halt was provided halfway along the track for cars to pass.
With the arrival of the second car a 5 or 6 minute service was provided daily summer and winter (excepting Sundays until 1903) – weather and storm damage permitting.



It says a lot for Magnus's fortitude and engineering that this service operated right up until 1940 when the threat of invasion closed the railway for the duration.

Part of the line was built along the sea wall, and Volk had problems controlling voltage loss – not helped by waves breaking over the cars. The passengers were protected but the driver was out in an open cab! The voltage loss problem was solved in 1885 by the introduction of an insulated third rail, but the drivers remained exposed to the elements.



Volk wanted to extend the railway from Paston Place to Rottingdean but the Corporation wouldn't let him run the railway along the top of the cliff so, in 1892, he obtained permission to run the line along the sea shore, about 400 yards out from the cliff. The line was powered at 500V and an 18' high vehicle ('Pioneer' aka 'Daddy Long Legs') was designed to run on it. Because the vehicle ran through the water at high tide, the driver was designated the captain of the vessel. An opening ceremony for this line was held on 28th November 1896. The line consisted of 2 tracks and vehicles (or vessels) could operate at 4mph at low tide and 1mph at high tide.

Less than a week later on the night of the 4th and 5th of December a storm, the like of which had not been seen for many years, destroyed the old Chain Pier, badly damaged the original electric railway and all but wrote off this brave new enterprise. Pioneer had broken from her moorings at Rottingdean, trundled slowly down the 1 in 100 slope away from the jetty and stood exposed to the full force of the storm. By morning she lay on her side broken almost beyond repair.

In the light of day things did not seem quite as bad as they had looked at the height of the storm. The track was only broken in one place, the overhead wire was still intact with only three poles damaged, and the jetty had survived at Paston Place even if the building had gone.

The remains of 'Pioneer' were salvaged by Blackmore & Gould of Millwall and placed alongside the Banjo Groyne where it was rebuilt with legs 2ft longer than the originals. After a tremendous effort by everyone concerned the railway reopened on July 20th 1897. Over the rest of the year 44,282 passengers enjoyed taking the sea air aboard Pioneer without the slightest fear of 'mal de mer'. As with the original electric railway a year round service was maintained.

But however popular the railway might be, it had serious defects which were exacerbated by a lack of money. Pioneer was underpowered for anything other than shallow water – the resistance at high tide slowed it to an elderly walking pace. New, more powerful motors would have cured this but money was tight. The company never recovered from the cost of the reconstruction works so a proposed second car was never going to materialise.

In September 1900, the fate of this part of the line was sealed when Volk was informed that he would have to divert his line into much deeper water to bypass new sea defence works between Paston Place and Black Rock. Such a construction proved beyond the financial means of the company, and in January 1901 the Corporation, following on from their early warning, removed those parts of the track which were in their way.

Following the failure of the Daddy Long Legs venture, Magnus sought permission to extend Volk's Electric Railway beyond the Banjo Groyne to Black Rock. Finally opened in September 1901, the extension bought the total length of the railway to 1¼ miles.

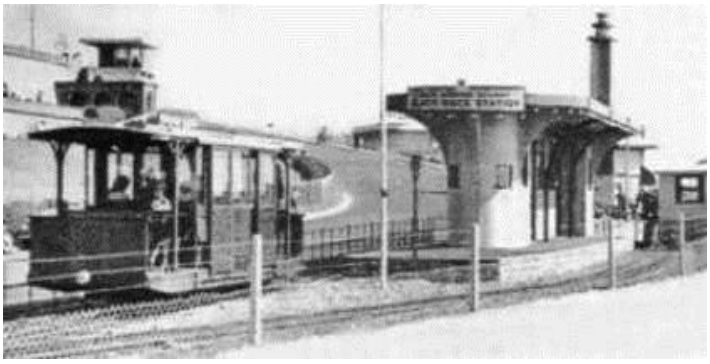
With the increased power requirements of the newly extended railway the gas engine powered dynamo was replaced in favour of connection to the town's mains electricity. A Parker rotary transformer was used to lower voltage to the 160 volts dc that was required by the system. It wasn't only the power that needed upgrading – the longer line meant more miles per year per car so three new semi-opens joined the fleet in 1901 making a total of 8 cars in all. Over the next 25 years two more cars were added making a total of 10 to handle the million or so passengers the railway carried a year.

In 1930 redevelopment of Madeira Drive saw the line cut back at the western end to a site opposite the Aquarium. Not so conveniently placed for the pier as the original station, the name reverted to Aquarium. 1930 also saw the introduction of a purpose built winter car – the last car built specifically for Volk's Electric Railway. And it wasn't only at the west end of the line that things were changing. At Black Rock the Council decided to build a new swimming pool on the land currently occupied by the VER station. In order to accommodate the new development, the eastern end of the railway was shortened by a few hundred yards.

The new Black Rock station was opened on May 7th 1937 when the Deputy Mayor and Magnus Volk took joint control of Car 10 for a journey from the New Station. Magnus, by now 85, is shown reaching up to take control of the overhead rheostat while the Deputy Mayor grips the brake wheel. Unfortunately this was to be Magnus's last public appearance as he died peacefully at home 13 days later. With Magnus's death control of the railway passed to his son Herman – but, unlike his father, Herman's tenure was to be short-lived.

The 1938 'Brighton Corporation (Transport) Act' had far reaching powers – including taking Volk's Railway into Corporation control. Initially they simply leased the line and operation back to Herman but on April 1st 1940 they took full control and the railway's association with the Volk family ceased. It seems odd to think that the Corporation could concentrate on such matters when far more important events were unfolding on the world stage. The threat of invasion caused the closing and fortification of the beaches and the railway ran its last train in July 1940.

In 1947 the Corporation set to and upgraded their new asset. The mainline was rebuilt using 50lb rail for the running line and 25lb mounted on insulators for the third rail. At Aquarium an old tram shelter replaced the rather flimsy pre-war shelter while at 'Half Way' a completely new island platform and passenger access was created about 50 yards west of the car sheds and old station. Even the car sheds were rebuilt to allow all cars to be kept undercover.



At Black Rock a new station was built to replace the 1937 building which had suffered badly during the war. Most of the steelwork for the platform shelters at 'Half Way' and 'Black Rock' came from wartime defences and aircraft scrap. The 'art-deco' style of station was designed to blend in with the architectural style of the Lido at Black Rock.

Wartime storage, much of it in the open, had taken its toll on the car fleet. The 1897 built saloon had been withdrawn from service for dismantling and disposal in 1928, now it was the turn of original cars 1 & 2 from 1884 to meet their end. Worse still the comparatively young winter car had a severe case of the rust worm in its metal cladding and was deemed beyond repair. To fill the gaps two ex Southend Pier Railway trailer cars were purchased in 1949 and converted to motor cars.

The railway reopened from its wartime hibernation on the 15th May 1948 and settled down to post war normality. In

1952 the winter service was suspended to allow some track repairs but was reinstated after repairs were complete. The new, short-lived, winter service had the drivers selling tickets as well as driving the trains and was not a success. Winter services were not included in the timetable after the 1954 season and this has remained the case except in occasional circumstances.

In 1961 control of the railway passed from Transport to Entertainments & Publicity. The new owners decided on a facelift and from 1962 cars started to appear in a new brown and yellow livery with VR and the Brighton crest applied to the sides. Like many other seaside towns, Brighton was feeling the pinch caused by cheap package holidays. This, coupled with closure of the Black Rock pool in 1978, caused the railways passenger numbers to drop to an all-time low – the railway's star was beginning to fade.
In 1964 the railway introduced 2 car operation whereby two cars could be coupled together with controls duplicated on each car. Not only did this mean that each two car train could cope with moving larger numbers of people, it also halved the number of drivers required to operate the service. This type of operation also spelt the end of needing two platform faces at Aquarium and Black Rock and the sidings were eventually removed.

Although these and other changes, such as the replacement of the old overhead speed control with a new 'tram type' controller, were introduced during the 50s and 60s they did little to halt the decline in passenger numbers. With many other calls on the Corporation's financial coffers the railway could be seen as a bottomless pit of expenditure if it was allowed to be. The decision was taken to keep the railway running at least until its centenary in 1983 and then to see what the future held. The proviso was that as little as possible was to be spent if the line was to survive.

The 1983 Centenary was a great success with Conrad Volk, Magnus's youngest son, driving the special train. Cars 3 & 4 carried special headboards commemorating the event and a souvenir booklet was produced. The railway had been tidied up for the celebrations and a lot of hard work had been put in to keep things running by Eric Masters who was the engineer at the time. Eric was responsible for bringing a lot of engineering knowledge to the railway and even experimented with both three and four car formations.

The railway's existence continues thanks to the enthusiastic support of a group of volunteers – the Volk's Electric Railway Association (VERA) – a fact recognised by John Wood, Chairman of the IMechE's Engineering Heritage Committee when he presented the railway with an Engineering Heritage Award in July 2013.

More recently, the Volk's Electric Railway has received an award of nearly £1.6 million from the Lottery Fund to help rejuvenate the railway. The money will be used to:

- Provide a purpose-built heritage visitor centre and ticket office at the Aquarium station, replacing the existing ex-Brighton Corporation tramway shelter that was placed there in the late 1940s.
- Create a new depot (running shed) at Halfway with a viewing gallery, new maintenance pits and restoration facilities.
- Restore three of the cars, Nos. 4, 6 and 10, to full working order to increase the service capacity.
- Develop new learning materials and educational sessions for schools.

Peter said that the work was running slightly behind schedule but they hope to have a formal reopening ceremony in early August 2017. If all goes well, RCEA are planning to arrange a visit in late August which will allow us to see the new facilities and ride on one of the restored cars. We are most grateful to Peter for giving us such an interesting talk and for being prepared to arrange a visit for us once the railway is fully operational. We shall provide more details of the visit nearer the time.

Perry Eastaugh

REPLY SLIP

To: George Woollard 18 St Lawrence Ave, Worthing West Sussex BN14 7JF (01903 523640)

E Mail : Georgewoollard1@hotmail.co.uk

Can you please reserve me …….. places for the Spring Lunch at Northbrook Collage, Worthing on ***Wednesday 26th April 2017.*** 12.00 for 12.30.

Full name:……(Block capitals)

Address………

……

……

Telephone Number…….Name of guest/s …….

E mail address……

I enclose a cheque made payable to RCEA for **£…….(£15.00) per person**

(Separate cheque for this event please)

Applications by Friday 21st April

If possible, I would like to be seated with……..

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