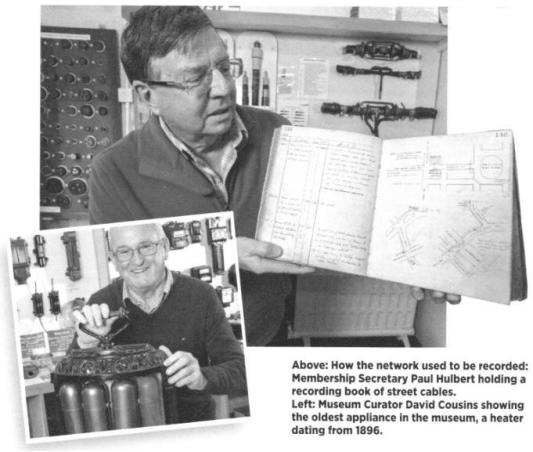
HISTELEC NEWS

NEWSLETTER OF THE WESTERN POWER ELECTRICITY HISTORICAL SOCIETY
Web Site : www.swehs.co.uk
No. 66 **August 2017**

SOCIETY RELATIONSHIP WITH WPD

Following repositioning the Society closer to WPD, a photographer was sent to Cairns Road in May to photograph members in situ. Many pictures were taken but only two appeared in their house magazine "Power Lines" (see picture below), featuring Paul Hulbert and David Cousins together with a covering article entitled "History Boys". We have had a few responses from this coverage including two new members, John Frank and David Clark, whom we welcome. External Affairs Director, Ian Williams and Operations Director, Phil Swift have promised to visit Cairns Road to meet with committee members, and comprehend what we do and hopefully understand that we can be a benefit to WPD in the long term.



Above: How the network used to be recorded: Membership Secretary Paul Hulbert holding a recording book of street cables.
Left: Museum Curator David Cousins showing the oldest appliance in the museum, a heater dating from 1896.

OUR NEW WEBSITE

Our new website, representing our new identity as the Western Power Electricity Historical Society, is now available at **wpehs.org.uk** - we are adding content to it each week.

For example, you can read about the Archives and the Museum, and you can already browse almost all of the previous editions of Histelec News and the accompanying supplements.

Please take a look and let us know what you think - you can use the Feedback facility or email webmaster Paul Hulbert on paul.hulbert@gmail.com.

It will take a while to transfer things fully across, so the old website will remain available at **swehs.co.uk** for the time being. ***Paul Hulbert***

ELECTRIC CAR REVOLUTION

There have been so many headlines about electric cars in the papers, so maybe you won't be able to take any more? The main stories have been France banning petrol and diesel engines by the year 2040 and now Britain is following suit. Also Volvo has stated that it will abandon the manufacture of petrol and diesel only vehicles. Prof. Matt Ridley suggests that this may be somewhat hasty. For a start 40% of the vehicles on the road are Lorries and secondly more importantly where is the extra electricity coming from? Matt has done his sums and maintains that we would need 10,000 onshore wind turbines or 5,000 off-shore wind turbines involving a massive subsidy. Others have suggested we would need 5 new power stations. Have you seen an all-electric lorry or even a hybrid version? However the hybrid vehicle is more likely to win the race as the price falls for these, since they don't need charging; already in London many of the buses are hybrid.

If any of our readers own an electric vehicle, please write to me letting us know your experience with it.

Peter Lamb

GOONHILLY – A NEW DAWN?

In the 1960's Goonhilly's huge satellite dishes were built for transatlantic communications for use of television by BT. In 2008 the plant became redundant and BT were planning to demolish them. But a Mr Ian Jones an electronic engineer, who had built up a small business in Bradford designing hardware for satellite technology and bidding against BT for BBC business, was encouraged to make a bid for Goonhilly site. He was successful, so nine years later he, with the help of his brother who was professor of experimental cosmology at Oxford, became Chief Executive of Goonhilly Earth Station. Old satellite dishes have been repurposed and his team of 20 engineers are planning a commercial mission. Goonhilly is set to act as mission control for relatively small projects of mass produced miniature satellites into lunar orbit and elsewhere. New smaller dishes are being built offering deep space communication for regular commercial users. Mr Jones says our clients are satellite operators who buy our services to help control their satellites.

WEEKEND AWAY IN 2018

Note in your diary 28th September – 1st October 2018 visiting Bletchley Park etc.**,** ***see page six for details***.

REVUE OF UNDERFALL YARD VISIT

Just like visitors before us, when 33 of our members visited Bristol's "Floating Harbour" they came from all over. Some crossed the channel (the Bristol Channel that is) some came from a distant port (Torquay in fact) and one, from Salisbury, arrived by train and then ship (well ferry boat actually) to go to "Underfall Yard".

In 1809 William Jessop completed construction of a non tidal, Floating Harbour by by-passing the original course of the River Avon with the "New Cut" and enclosing the water in the harbour with lock gates. An "Overfall" weir was needed to keep the harbour's depth constant and a dam was built at the original site of the yard. Unfortunately the harbour continually silted up and by 1832 the problem was so severe that Isambard Kingdom Brunel was brought in to solve the problem. His solution was to construct an underfall with 4 sluices, hence "Underfall Yard", 3 shallow and one deep, to scour the harbour. This system is still in use today although nowadays the sluice control is computerised and automatic. A hydraulic pump house was built on the opposite side of the dock to provide power for the sluices as well as cranes, swing bridges, and lock gates around the harbour.

In the 1880s, Docks Engineer John Ward Girdlestone rebuilt the whole site to provide a single site for the docks maintenance workforce. In 1887 a steam driven pump house was completed within "Underfall Yard", replacing the original, which has now become the "Pump House" pub. In 1907 the original 2 steam engines were replaced by DC motors supplied from a 6.6kV Rotary Substation established nearby. The system later changed to AC motors, although no longer used, is still in working order and the pumps were run for our benefit, charging the external hydraulic accumulator.

Following the pump run we embarked on a guided tour of the rest of the Yard, first the sluices, then the rest of the buildings damaged by WW2 bullet holes, the slipway, the maintenance workshops (where machines, originally driven by a steam engine and line shafts, are still in use,) and finally back to the visitor centre with its interactive models and a huge satellite sourced map of the whole harbour.

An enjoyable lunch at the "Lockside Cafe" brought an equally enjoyable event to an end. Our thanks must go to my daughter Susan for a well organized, most interesting day. Well done Sue. ***David Hole***

EXETER ENERGY FROM WASTE

Some 30 members, partners and guests spent a very interesting morning at Matford seeing how Exeter Council, which has a very enviable reputation in processing recyclable waste material, disposes of the remaining waste by incineration and then generating electricity, They also send the ashes from combustion to Avonmouth where another company makes a brick substitute that is used throughout the construction industry.

The current facility became operational in July 2014 and processes some 60,000 tonnes of non-recyclable household waste collected in Exeter, East Devon and Teignbridge each year. The maximum generation is approximately 3.5 MW and excess available after running the plant is exported through a link directly to the NGC Network.

In addition, the plant is capable of a local district heating scheme which, as yet, has not been commissioned with cost being one of the defining reason. The overall cost of the plant was £45M.

As visitors we were given a very interesting talk about the facility with an equally informative video which was really aimed at children but none the less very good for us. We were also shown around the Control Room where there was an excellent view of the area where the different waste products are mixed together thoroughly before burning so that they achieve the best heat output from the process. This mixing is done by a man with a grab and he was a very interesting character to talk with as he described the intricacies of mixing the waste. Apparently one of the worst things to prepare for incineration is an old mattress that really shouldn't reach this far into the process. The grabber will tear it to pieces and it can be incinerated in the end; as an aside, not too many years ago, if a mattress was to be disposed of it was taken to a local prison and dealt with by the prisoners by hand!

We were also shown some of the plant from a viewing gallery though the detail available wasn't very clear. Our guides explained to us that the concept of visitors was never factored into the original plant design and hence all of the viewing facilities have been added on afterwards. When you learn this, it makes the efforts of all of the people concerned even better – they couldn't do enough for us.

At the end of a very successful morning we adjourned to the nearby Devon Hotel for lunch. It is one of our regular watering holes and once again lived up to its very high reputation. ***Mike Gee***

PARISIAN WATER TAXIS

The Mayor of Paris tried out a new electric boat that rides on foils carrying its hull 2ft above the water cruising at only 11mph, the maximum speed on the river there. A new water taxi service is envisaged that will get their batteries recharged from charging points on pontoons. It is called the "Sea Bubble" and holds 5 people. The designer Alain Thebault, an international long distance yachtsman, has raise 14million Euros, but it is not expected to get the service going until 2021 by which time the bubble might burst!!

Engineering Joke?

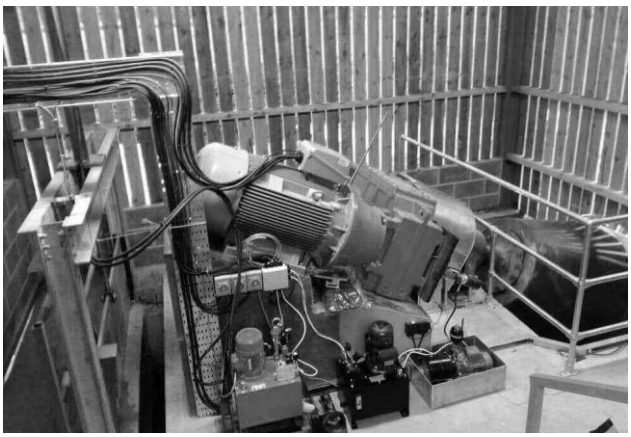
BEASLEY WEIR HYDRO, DULVERTON

The Dulverton Electric Lighting Company was registered in February 1904 and operated a generating station on the site of an ex fulling/paper mill on the Town Leat. SIAS Bulletin No 70 records it employed a waterwheel with a Crompton 75 volt 30 amp alternator (?), later supplemented by a Pool 6 h.p. oil engine. In 1914 the operation was transferred to a new site downstream near Brushford employing Armfield turbines (plural). Garcke's of 1918/19 describes the undertaking thus –

System -Two wire D.C. Voltage 230.
Plant.-Water power and oil engine. Total cap. 55K.W.
Commencement of Supply.-February 1914.

The plant is believed to have operated until 1938 when Dulverton was connected to the mains (from Wellington!) by the Exe Valley Electricity Co. and presumably employed its system quoted as A.C. 3 phase 4 wire distribution (overhead) 400-230 volts, although Carcke's of 1947/48 still listed Generating Stations at Dulverton and South Molton.

Those of you visiting Exmoor this year may notice a new slatted wood shed with a curved corrugated roof by the side of the road (B3222). Beasley Weir Hydro was designed and built in 2015 by *Renewables First* based in Stroud. The station employs a 78kW Archimedes screw generator with a projected annual output of 320MWhr. The design incorporates an improved fish pass to facilitate trout and salmon moving upstream. ***Barrie Phillips***



Beasley New Hydro
(from Renewables First website)

BISHOP'S CASTLE & ELECRTICITY

Bishop's Castle, south of Shrewsbury Shropshire, exemplifies the disorganised approach to the public supply of electricity that characterised the UK a century or so ago – and blighted the modernisation of its economy.

The borough (England's smallest at the time, population c1,350) was one of a minority of towns that relied upon a local entrepreneur to supply electricity. The supplier was H G H Wenham, a Wolverhampton engineer. Presumably short of capital to expand, Wenham transferred his enterprise to the Bishop's Castle Electric Light & Power Co Ltd in 1913. The company registration documents stated that it was to take over the 'rights, liabilities etc. …originally conferred or imposed upon H G H Wenham… ' by the Corporation of Bishop's Castle.

The BCE issued its prospectus in 1913 and was registered in March, 1914. It had a capital of £2,500 in ordinary shares (but only £845 were issued) and a further £180 in debentures.

The system, that it inherited and expanded, was a basic 2-wire Direct Current network, 240V distributed by overhead mains draped around the town. The original generating station in a converted chapel was replaced by another near the railway station. Here one might find a 50hp Astor paraffin engine and a 30hp Westinghouse gas engine. These drove a GEC 30kW dynamo and another 20kW from Union. Like many small DC systems, the BCE used back-up battery power, accumulators being topped up in quiet periods; in this case it was a 150 amp/hr Premier accumulator.

Fuel was brought to the town by the famed Bishop's Castle Railway which, apart from a telephone and batteries to light its dilapidated carriages was entirely innocent of electric power.

Unfortunately this pioneering effort was financially anaemic. By 1925 the debenture holders had a receiver appointed, presumably because they were receiving few if any interest payments. Also in 1925, the County Court at Leominster appointed a Provisional Liquidator. The Company was wound up in August of that year, struck off the Companies' Register in 1932

The regional power company, the 'SWS' – Shropshire, Worcestershire & Staffordshire Electric Power Co took the system over and constructed yet another power station in 1929. A corporate map of 1931 shows that SWS proposed a network extension to Bishop's Castle; which came in due course; perhaps a member might know precisely when. ***Roger A S Hennessey***

BRITAIN'S SILICON VALLEY?

A large technical hub is being created in London's former Olympic Park. The Plexal Centre, the former Press Centre at 68.000sq.ft has enough accommodation for 800 workers. The £15 million development also includes a town square, a park and a canal-side terrace. This is part of £100 million development involving 1.2 million sq.ft and will include businesses such as Ford's Driverless car division, BT Sport, Laboratories operated by Loughborough University and UCL. Technical start-up companies will be encouraged.

Already situated elsewhere in London, Apple and Google have set-up European headquarters and this new wave of development is being propelled by artificial intelligence, mass automation and hyper-connectivity in communications. There have been breakthroughs in robotics, drones, 3D printing and

nanotechnology, which transform how we live and work. It is dubbed the Fourth Industrial Revolution.

LONDON'S ELECTRIC CABS

You may be surprised to learn that the first London Cabs were electric. In 1897 with a top speed of 12mph they were nicknamed the "hummingbird", because of their low drone and garish yellow. Of course they barely made it into the 20th century as the petrol driven taxis quickly took over.

Now with TFL (transport for London) introducing legislation from January 2018 for zero emission, the London Taxi Company are developing a new electric taxi. Their manufacturing facility at Ansty Park, Coventry went into liquidation in 2012 and was bought by a Chinese company Geely. With the need for new electric taxis, a new £300 million plant is being installed for a new model TX5. At this time the first prototype is being tested in the Arizona Desert for extreme heat conditions.

London's Electric Cabs 1897

ROME'S STREET LIGHTING

The municipal authority in Rome is replacing existing sodium street lights with new LED type at a cost 48 million Euros, which is projected to save 23 million Euros a year, but the populace don't like it. A leading City politician is leading a campaign to stop the replacement of the 186,000 elegant bell shaped light fittings with square clusters of LED's, since they like the warm-glow of the sodium lights, whereas the bluish-white light of the LED's makes everyone look deathly.

TRANSORMING THE COUNTRYSIDE – The Electrification of Rural Britain (edited by Paul Brassley, Jeremy Burchardt and Karen Sayer)

A new book has been added to our archives, it gives an interesting perspective of the electrification of rural Britain and why it took so much longer to achieve in comparison with the urban areas. The book is in three parts, firstly, the progress of electrification, secondly, the effects on rural life and the landscape and finally, looking at electrification in Canada and Sweden and drawing parallels with present broadband expansion in rural areas.

By the early 1900's, most electricity supplies were in urban areas generally provided by local authorities or private supply companies. In the 1920's various Acts of Parliament including the establishment of the Central Electricity Board led to the building of larger generating stations linked by a national grid system. The CEB were in favour of rural electrification and by 1938 two thirds of rural dwellings were connected to mains electricity but remaining rural premises were not connected until the 1970's and some even later.

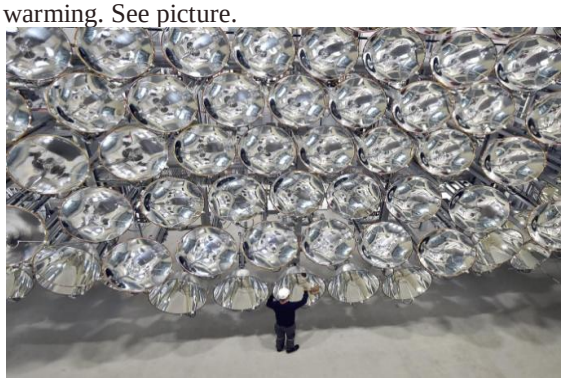
Rural electrification involved constructing many km of overhead circuits with associated towers and poles, some being in environmentally sensitive areas of outstanding beauty including National Parks. These gave rise to many construction challenges and to satisfy objectors, some circuits were put underground. WPEHS member Graham Warburton's 'SWEB Rural Electrification' is a quoted source in the book of the progress made in the South West, as is 'Power Comes to Widdecombe'.

Several organisations promoted the use of electricity in farms and homes, mainly the Electrical Development Association and Electrical Association for Women, encouraging those in the countryside to take advantage of the latest technologies. It is an interesting book to read and describes not only the challenges of the electricity supply companies but also of the political influences particularly in the earlier years.

David Cousins

ARTICIAL SUN LIGHT ARC LAMPS

Scientists in Germany at their Space Centre have created an incredible honeycomb of 149 arc xenon lamps, a 350kW display. They are individually a sort of short arc lamp used in cinema projection, but together they simulate sunlight. It is described as furnace type conditions with temperatures reaching 3,000 degrees Celsius and is to be used to make hydrogen, which is a cleaner energy source. The Professor in charge believes that hydrogen is the fuel of the future because it produces no carbon emissions when burned, meaning it does not add to global warming. See picture.



GRID BATTERIES

Two islands off the Scottish coastline are installing large battery units to store electricity. On Gigha Island off the West Coast seven shipping containers will house the battery units capable of 1.68 MWhrs. The batteries will be charged from Wind Turbines. On Foula Island west of the Shetlands they already have lead-acid battery system to store solar and wind energy and are planning to replace with Tesla's Lithium-ion batteries in order to get greater capacity storage.

HYDRO-ELECTRICITY IN PORTUGAL

A River Cruise on the Douro in Portugal this Summer involved negotiating five locks associated with hydro-electricity schemes and wine tasting!! I was impressed with the large dams built between 1964 and 1980 and each containing 3 Norwegian Kaplan Turbines connected to Brown Boveri Alternators, the capacity ranging from 40MW to 82 MW each and the generating stations with an output of between 100 and 200MW totalling 867MW on the River Douro. I found these details, when researching the five Douro schemes; if you are impressed with these figures, then there are 56 in Portugal and I would guest that they had all been paid for by the Government. Is there a lesson for us here or are our rivers not fast flowing enough?

Peter Lamb

Coming Out of the Lock at

BIGGEST BATTERY

Elon Musk, the technology billionaire, who founded Tesla Cars and is setting up two new factories making lithium-ion batteries, flew into Adelaide recently to sign a contract with the South Australia network provider for the largest battery yet made. South Australia has been hit by a series of vast black-outs due to storm damage of high voltage networks. The State has raced ahead with wind turbine generation involving 30% of the State's electricity needs, but lacks a means of storage. The battery project will be built near Jamestown, near a new Wind-farm being built by a French company and have a capacity of 129 MWhrs and capable of 100MW output, which is enough energy to supply 30,000 homes.

FRICTIONLESS FLYWHEELS

A £3.5 million project is getting off the ground to develop frictionless flywheels to balance supplies on the Grid system. It is to be installed next to a battery storage system at Willenhall near Wolverhampton. It is the first project of its kind in the Country and it consists of cylindrical structures that draw electricity from the Grid when surplus energy is available powering a motor that makes the flywheel rotor spin at high speed. The flywheels are enclosed in a vacuum and operate on magnetic bearings such that they are virtually frictionless. It seems a lot of money for little output, since it is described as only giving one megawatt for just a minute before it runs out of energy. The lithium-ion project adjacent can do better at 2 megawatts for ½ hour. Such are the efforts that are being made to find a means of electricity storage.

NEW GRID CONNECTIONS

It is rather amusing in the present circumstances that whilst the Country is hell-bent on cutting our connections with mainland Europe and Ireland, the electricity industry is actively pursuing a different agenda. At present there are two Grid connections to France and Netherlands and two to Ireland. There are a further 12 being considered of which four are already in the construction stage making 16 in total eventually.

The four under construction are 1. Through the Channel Tunnel to France, 2. Hampshire to Normandy, 3. Kent to Belgium, 4 Teesside to Norway.

Others planned include subsea cables to Ireland, France (three more), Germany, Denmark, Norway and Iceland.

One firm is doing very nicely from this bonanza, they are Prysmian Cables with Head Office in Milan, Italy, who are reported to have four manufacturing units in this Country, the main ones based at Wrexham, Southampton and much larger unit in Holland. For those older engineers, you may remember Pirelli Cables of Southampton and Prysmian claim that through the Southampton factory they have been making cables in the UK since 1914 over a 100 years.

For those interested in the cable construction, the HVDC cable is a single copper core with insulation of polyethylene, then a lead alloy sheath, then a polyethylene sheath, then steel wire armour and finally an outer layer of polypropylene. I believe they are generally around 500kV. The transfer capacity of these cables varies between 1GW to 2GW, with only 2 at the higher value.

DRONES FOR THE GRID

National Grid has set up a team of drone operators to study monitoring the Grid System. It would save money by not employing helicopters to do the job as at present. Success is assured since they are already employing private contractors to do this work particularly in difficult urban situations. Drones could carry infra-red equipment to study hot-spots in substations. Three of NG 's new nine person teams are being trained to fly 20kg drones and are seeking approval from Air Traffic Control (CAA).

GEOTHERMAL PLANT IN BRITAIN

A £5 million bond issue is being launched to support the construction of the first commercial Geothermal Power Plant in Britain, which is destined to be at a site near Redruth in Cornwall. The project already has millions of pounds of funding from Cornwall County Council and the European Regional Development Fund and involves drilling holes 1.5 miles down and pumping water which will be naturally heated to 185-210 degrees C and brought to the surface as steam for electricity generation or heating systems. It is anticipated to produce between one and three megawatts. Not a lot you may think and it is described as high risk, which doesn't sound too hopeful?

WEEKEND AWAY 2018

Arrangements are being made for a Weekend Away at Bletchley Park, Milton Keynes on 28th September to 1st October 2018. We have located a suitable friendly hotel, which is the Mercure Parkside, Houghton-on-the-Green. MK6 3LR. Venues are being arranged over four days for visits to the following – Grand Union Canal Museum, Bletchley Park Code Breaking Centre, Museum of National Computing and Woburn Abbey. The main attraction for this visit is to view the £8 million spent at Bletchley Park to spruce up and open up the huts and buildings, telling the fascinating story of Code Breaking during the World War II. A letter will be sent out in Oct/Nov asking for those interested. Costs will be in the order of £300.00 pp.

DARTMOOR TUNGSTEN MINE

One doesn't think of the UK for mining minerals these days with bigger countries having bigger potential, but Australian companies such as Sirius Minerals thinks otherwise having opened a controversial Potash Mine in North Yorkshire and now Wolf Minerals has opened an open-pit Tungsten Mine on the edge of Dartmoor at Drakelands. Tin has also been extracted from the same site, which is situated at Hemerdon near Plymton. It has involved china clay workings for years and many Plymouth residents will remember the River Plym being polluted with the washings from the china clay extraction.

PUTTING YOUR FOOT DOWN!

If you thought that car pedals have always been standard – clutch, brake and accelerator left to right, you're wrong? Take the Ford Model T for example. It had three pedals and a handbrake lever. Left pedal was the forward gear selection – high, neutral or low. Centre pedal was reverse gear and right pedal was the footbrake; the "handbrake" also shifted in and out of neutral. The accelerator was the right hand lever. In fact apart from the steering wheel the only control that is remotely familiar was the choke button (remember that?) So nowadays we've lost the choke, and if we drive an automatic we only have two pedals, brake and accelerator. What else could we possibly lose? The BRAKE pedal, apparently.

Electric cars can make use of regenerative braking, converting the kinetic energy of the car into electrical energy that is fed back into the battery, so in effect the "accelerator" pedal can be a brake pedal as well – you slow down rapidly when you lift your foot. The braking force can be powerful enough to slow the car to a standstill. Drivers only need to use the brake pedal to come to stop.

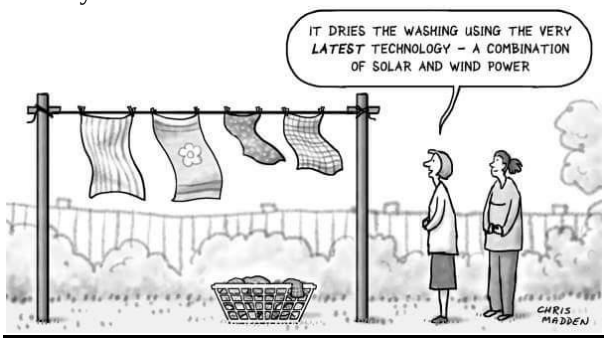
In late 2017 Nissan will become the first car manufacturer to introduce full "one pedal driving" in the latest model of the electric Leaf, which will have an "e-Pedal" option. Lifting off the accelerator won't just slow the car, but even hold it without rolling backwards on hills. In fact the only use for the brake pedal – which will still be there – will be for an emergency stop. A footnote (No pun intended!) – The UK was once the world leader in electric vehicles (No, not in 1897). According to a press release from the Electric Vehicle Association in 1967, Britain had more battery-electric vehicles on its roads than the rest of the world put together. Unfortunately almost all of them were milk floats! ***Paul Hulbert***

MEMBERS NEWS

Andrew Smith – You may recall that Andrew wrote a supplement for this newsletter in April on "Two Generations in the ESI". He is becoming more active with us following the demise of the Retired Professional Engineer's Club recently of which he had been Chairman. I find that he did an MA in Archaeology at Bristol University in 2000 and subsequently was asked to research the Nailsea Glassworks site, culminating in his writing a large book on his findings in 2004.

Colin Hill – Sad to report that Colin, our Huddersfield member, is not well suffering with Dementia problems and has had to off-load his large collection of electrical appliances. It has gone to an unusual recipient the Oil Can Restaurant, Hepworth, Huddersfield. Interestingly you can find it on the internet and its title doesn't reflect the venue since it appears more like a museum!!

Steve Cole – Further communication from Steve advises us that he was best man at the wedding of the late Roy Dickinson.



Wind Energy?

FOR YOUR DIARIES 2017/2018

ADVANCE NOTICE

Thur 9th Nov. CAIRNS ROAD – Talk on "THE IMPACT OFWIND/SOLAR GENERATION ON THE DISTRIBUTION SYSTEM" by Stephen Gough (WPD) followed bu buffet lunch at ?

29th Sept. - 1st Oct. 2017

WEEKEND AWAY IN THE STROUD VALLEYS

Around Stroud are 7 valleys and the rivers flowing through these powered industry in the past. We will visit restored mills; Woodchester Mansion, an un-finished neo-Gothic house; and the headquarters of Ecotricity. There is much more to explore in the area.

Sat. 3rd Feb. WINTER LUNCH at DEVON HOTEL

At Exeter. Talk after "The Titanic & WT Stead, the First Investigative Journalist" by Peter Lamb

NEXT EDITION - This newsletter is produced every four months. Please send articles, photographs etc to :- Peter Lamb 35 Station Rd, Backwell, Bristol BS48 3NH or telephone on 01275 463160 or e-mail him on lambpandv@btinternet.com.