

Retired Professional Engineers Club Bristol

Newsletter Spring Edition

President: Michael Clinch.
Committee:- Chairman: John Coneybeare, Hon. Treasurer: Frank Whitehead, Events Secretary: John Green, General Secretary: Keith Clark, Committee Secretary: Nasim Ahmad, webmaster: Marcus Palmén, Members: John Gale Don Vickers.



April 2005

A Word From The Editor

You may have been experiencing problems in reaching this Web Site. This is entirely due to my endeavours as Web Master. The site has been moved to a completely new Service Provider and is now reached directly by the old address www.rpec.co.uk without being redirected from another source as in the past. The benefits of this and the availability of additional web resources should become apparent from now on. Apologies if you have had problems.

The Events Program - is now automated to give you all known fixtures within a six month period from when you access it. The scrolling text with information on the next talk will also contain urgent news items from time to time.

Time flies and it is now well over 4 months since the last newsletter was published. I have had several contributions to this news letter and a previously published article by Len Targett which I have included together with some members news. The photos used in the newsletter are interactive when viewed on site, the title is displayed when the mouse is on the picture and if you click the picture is enlarged while the mouse is on it.

April Meeting Review

For our April meeting we enjoyed a light-hearted talk by Dr Emma Smith of Bristol University - "Beasts in Battle - Tales of the Unexpected". Dr Smith is a researcher in the Biology department specialising in the activities of birds and she first told us of about the use of pigeons in war. They can fly at 50 m.p.h. finding their way back to their home base guided by sun, stars and/or the earth's magnetic field - it has not been established exactly how. They have been used to carry messages since the days of the early Egyptians, the Greeks and the Romans and in World Wars 1 & 2 some 20,000 died in service. British Forces ceased using them in 1950 but they are still used in some countries. Their biggest disadvantage is that they are unidirectional.



We heard of how one named Chez Ami in WW1 received an award for saving the lives of 200 men by getting through though wounded to tell the French artillery to stop shelling an area recently captured by Americans. Similarly in WW2 one named GI Joe succeeded in getting a message to the US Air Force to stop bombing a village in Italy recently captured by the British.

Pigeons have also been used as gas detectors and for spying by carrying cameras.



Dr Smith described how some animals have helped morale at some units by serving as mascots but that other creatures such as rats and lice have sometimes been as great a hazard as the enemy. Examples of other animal hazards were a polar bear attacking a submarine's periscope and charging bison.

As helpful animals cats were often used on ships to control vermin. One such being Simon on HMS Amethyst in 1949 when trapped on the Yangtze for some months by Chinese communists.

Dogs have been widely used for casualty-finding, carrying infra-red cameras, attacking the enemy, message carrying and clearing anti-tank mines.

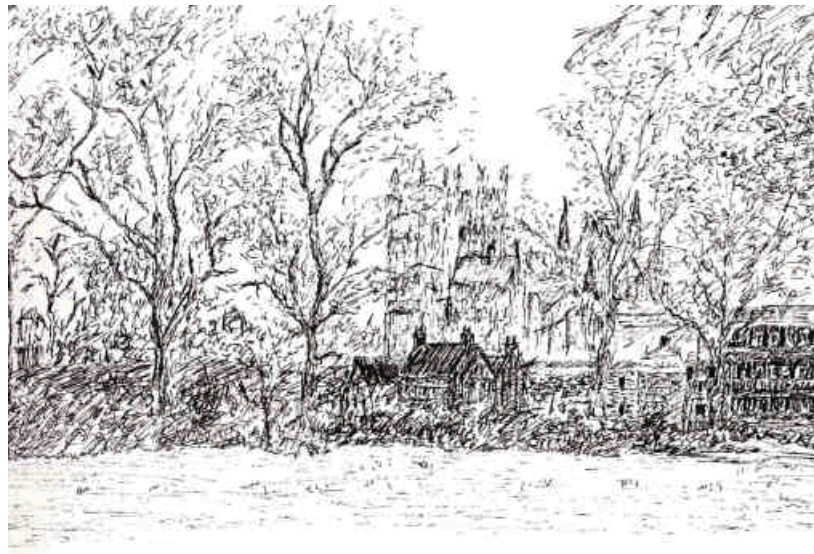
As to horses, we immediately think of the cavalry forming part of armies for many centuries and still used as recently as the attacks in Afghanistan. Horses were also used for transport. For the many used as pack animals on the Western Front in WW1 as pack animals and for hauling guns and general transport there were major logistical problems in feeding them and of disposing their manure or the carcasses of them that died.

Elephants and camels have also been used for transport. Dolphins have been used for mine clearance and sea lions have been trained for this purpose in the U.S.

Dr Smith finished with an unlikely U.S. WW2 story of thousands of bats having had incendiary devices attached to them; they were packed in special containers that were to be parachuted into Japan to set fire to combustible Japanese houses but the atomic bomb brought the war to an end before they could be used.

Don Vickers

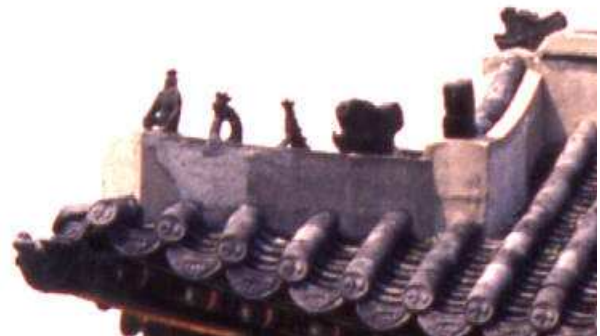
Observations from a Quiet Spot



Walking the other day from one Art Exhibition to another I paused to sketched the scene above of a Green and Trees and a Church and the peace it gave me. The walk was along the river Thames from the Turner, Whistler and Monet Exhibition at the Tate to the Caravaggio Exhibition at the National Gallery and I had just reached the Houses of Parliament when there was a quiet moment that reminded me of village greens visited in the past.



A bit further on using a telephoto lens I took a picture of the towers used to counter balance the flying buttresses on the side of Westminster Abbey. These are covered with carved animals as are the buttresses themselves - A complete Zoo in fact. The use of animal carvings on buildings appears all over the world as witness the carvings on a Korean Palace shown below from the same period as the Abbey



The IEE Benevolent Fund

For those members who are also IEE members, it may have escaped your attention over the years but The IEE Benevolent Fund is active and becoming even more active. It will not be of interest to most of us but the qualifying time of membership has reduced from an original five years to now, two years.

Benefits can be life savers for some members who for no fault of their own find themselves in financial difficulties. Grants can be made for a wide variety of needs e.g. Christmas and/or holiday grants.

Benefits can comprise one off payments, however regular payments can be awarded if ongoing needs are identified. The fund is mainly concerned with helping members financially, usually in connection with specific problems, perhaps a wheel chair becomes necessary, there are so many needs that one could go on and on giving examples ad nauseam. Over 1000 regular and one-off grants are made each year. Support is not confined to actual members of IEE but includes support for widows and widowers and dependant families of members bereaved by the death of their partner.

Other support can include personal legal issues. Legal action may not always be appropriate, but sound advice may help you to resolve your problem by other means. The service cannot represent individuals but in the normal event legal advice can prove very expensive if sought through a high street solicitor.

Another area where help can be obtained is disability. 'The Fund' runs its own residential home Speirs House, which is situated in New Malden, Surrey. Speirs House comprises en suite residential accommodation for elderly and disabled members. They do not provide nursing care but in the case of residential home members becoming in need of nursing care, this can often be arranged. Residential costs will be provided on request.

So IEE members, **THINK ABOUT IT!** When in need consult your IEE booklet for the address of your Benevolent representative, or email benfund@iee.org.uk or phone 020 7344 5498.

Michael Clinch.

Shuttle Design Fundamentals

Did I tell you about the curious case of the Shuttle and the Horse's Bum? But let me begin a little further back....

In the US the standard railway gauge, as many of you will know, is 4 feet 8.5 inches. That's a very odd number which unsurprisingly derives from the British standard which our engineers perpetuated in the US. So why did we use such a strange size? Obviously because the people who built the early railway lines were the same ones who built the horse-drawn tramways and that was the gauge they used. But why?

Clearly, they used the same jigs and tools for building railway stock that they used for building wagonswhich used that wheel spacing. So what was the reason for building wagons that wide? Well if they didn't they would simply break up on our old long distance roads because that's how wide apart the wheel ruts were!

Who built those early rutted roads over the length and breadth of the country (and Europe too)? Who else but the Romans! The roads have been used ever since although the ruts have now mostly gone; but what about the ruts? Roman war chariots first made the original ruts which everyone else had to match or break their axles and destroy their wagon's wheels. Since the chariots were made for, or by, Imperial Rome, they were all alike in the matter of wheel spacing.

So to sum up..... The most modern country in the world operates a railroad system based on the original specification for a Roman war chariot. Specifications and bureaucracies live for ever, so the next time you see a curious specification and you wonder "what horse's rear came up with that" you might just be right! It turns out that the Imperial Roman war chariot was made just wide enough to accommodate the back ends of two horses!

Now as I was saying about the Space Shuttle.... When a Shuttle is sitting on the launch pad, you will see two big booster rockets attached to the sides of the main fuel tank. These are solid rocket boosters or SRB's. The SRB's are made by Thiokol at their factory in Utah and shipped by rail to the launch site in Florida. The engineers would probably have preferred to make them a bit fatter... but the railway line from the factory must pass through a tunnel in the mountains. The SRB's have to fit that tunnel. The tunnel is slightly wider than the railway track and, you guessed it, the railway track is about as wide as two horses' rumps!

So, the major design feature for what is arguably the most advanced form of transportation yet devised was determined by the width of a horse's ass!

Forwarded by *Frank Crofts*

*This brings me to our Member Mr. Len Targett who wrote for the Newsletter, a most interesting article covering a brief history of rockets culminating in the German V2 Rocket, a project in which he was intimately involved during the last War. As Major Len Targett, he was attached to **The Special Projectile Operations Group**, which was the team formed to investigate all aspects of V2 development, associated equipment and firing techniques. This group was responsible for the compilation of the final report on the task.*

A Rocket History

The origin of the rocket was in China following the invention of gunpowder in 1200 AD and was used aggressively by the Chinese who went to war with "arrows of fire". There are also records of similar types of weapons being used by the Venetians in the year 1380. Little development took place until 1580 when a German Dr. Haas experimented with gunpowder mixtures which gave better combustion resulting in greater distances but used a stick for stability. Between 1668 and 1779 rockets with metal bodies were made and a lot of research was done by William Congrave at Woolwich Arsenal in London, successful weapons were manufactured and added to the armoury. The Duke of Wellington raised The Royal Rocket Regiment and Nelson at the same time trained a section of the Marines for rocket duties. The regiment had quite a useful action at Waterloo.

In 1850 Dr. Hale added side vents to make them spin and so did away with the stick. Up to 1909, development was still with gunpowder and advances were made in life saving equipment, signals and entertainment. At this time the German firm Krupps acquired a patent on fuels based on nitro-glycerine, as a result, advance was rapid and led to the combustion of fuels in cavities instead of at the end which considerably increased the thrust and range.

During the first world war, Dr. Goddard in America concentrated on liquid fuels for propelling vehicles etc. From his findings a more controllable rocket with twice the thrust for the same size and range of 7500 ft was achieved.

In 1923 racing cars were being fitted with rockets and activity was boosted by a paper on space travel by the German Interplanetary Society and Prof. Hans Orberths, interest was also being shown by space societies in the USA, Russia and England.

By 1926, the German team had produced bi-fueled rockets with a mile range and demonstrated these on an international basis to show their possible use for postal travel.

It was after the effects of these demonstrations by the German Society under the Professor and two founder members, Willie Smidt and Willy Ley, and also Von Braun who was then a student, that a significant change took place, and the Society was given official recognition, as a result of which a number of nations i.e. U.S.A., Russia and England realised the potential value of the use of the rocket as a weapon.



The Artillery Research Dept of the Wermacht sent Captain Dornberger to see a demonstration and examine their set up. He was very taken with it's potential as a weapon and persuaded the Wermacht to allocate funds and a proving ground at Kamnersdorf West, and to put him in charge of further research. Thus the Society was absorbed into the army, the personnel transferred, and Dornberger raised the German Rocket Regiment under his control.



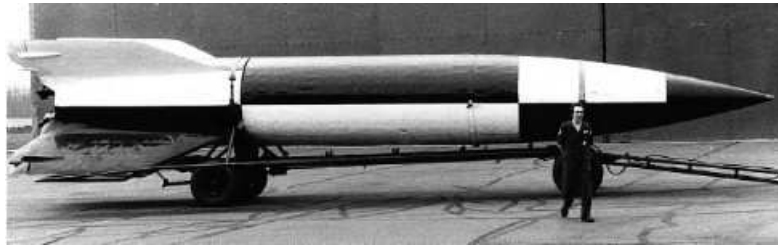
Progress was slow but they did produce a flying model weighing 333 lbs. Followed by a bigger version designated (A1), with encouraging results, it was unstable but all agreed it was on the right lines. Interest was fading due to the success of the flying Bomb and Hitler called for a report. Work on a larger missile the (A2) was well advanced but Dornberger needed more time before showing Hitler. He was persuaded by the team to take a chance, Von Braun was particularly optimistic.

The show went ahead to the General Staff and to Hitler in 1933 and the A2 flew 8,000 ft. It was in effect a very good show with one exception, the staff agreed on it's war potential and the need to enlarge the facilities. Goering said it was worth "look into it". Dornberger was alarmed at this, and asked for their support for a meeting with Hitler, since Goering's tactics were well known. This was arranged and Hitler issued instructions that the Regiment remain under the Army and move to the research Station at Peenemunder which was situated on an island in the Baltic some 70 miles from Stettin and which had a firing range of 330 miles over open water. It was here that real progress was made, a higher priority granted and skilled people made available. An(A3) type was fired which stood 22ft. high carrying a payload of 100/150 lbs. and this worked well except that there was not enough energy in the fuel to maintain adequate volume and pressure to the pumps. Clearly a different fuel had to be employed.

The answer was found in the work done by Dr.Walther with steam produced by chemical reaction between permanganate of Potash and concentrated hydrogen peroxide, giving super heated steam. Dr.Walther had made the engines for midget submarines driving a 22 inch turbine developing 4000 HP. His work also had far reaching uses in the war effort such as take

off boosters for aircraft.

It was clear that a complete redesign of the fuel feed was a must. Dr. Walther designed an engine that was not only lighter than the original but gave an increased Velocity from 2590 to 4000 meters per second. The project was given top priority and designated (A4).



It was after a great effort that a stable missile was fired in 1942 which was 30 ft. high with a range of 118 miles. Hitler said he wanted to see a firing himself and saw two very successful launches in Oct. 1942 after instructing Reich Minister Speer to put the rocket into production at Peenemunde in the old airship sheds, with all speed and at any cost

For some time fears of an air raid on Peenemunde had been expressed and Speer had set up Shadow Research Plants at Nordhausen and Blizna, so that by the time we raided both these establishments were in operation. The raid took place on 17/18th. Aug 1943.

While the raid did not destroy the working buildings due to the path finders flares falling short, the bombs landed on buildings housing the scientists and the forced labour barracks. 700 people were killed of which 374 were forced labour.

The failure of the main objective was more than compensated by the scientists killed, amongst whom were Dr Walther, Dr. Theil and Reidle, who were not only vital to the rocket on guidance systems, but atomic weapons and warheads. In fact the guidance system for the A4 was never a success, and had to be manually set with gyroscopes.

The top level position in Germany at this time was chaotic and politics led to quarrels among the leadership, the rocket team was split up. Suspected of delaying the finalising of the arrangements; Prof. Von Braun was investigated by the SS and moved to research, Dornberger to the Regiment. Speer took over all manufacture, and Himmler research. It was lucky for us that this caused a delay so that it was not until June 1944 that the attacks on London began. The performance in the raids showed a lot more work was needed but Von Braun managed to continue his work and designed a number larger rockets to ranges of 8000 miles and 50 miles high.

The dimensions of the A4 which we knew as the V2 were:-

- Height 46 ft 1"
- Diameter 5 ft 5"
- Width over the fins - 11 ft.
- Weight empty - 4 tons

Fuel carried:

- Liquid oxygen 11,000 lbs.
- Alcohol & water 8150 lbs.
- H₂O₂ / Potash 370 lbs.



The average run time for the engine was 1 minute in which enough energy was generated to propel the rocket 185 miles travelling 2220 miles per hour to a height of 16 miles to cut off point, its highest ceiling trajectory was 56 miles with 2 tons of explosives. It was fired from a portable platform and ignited by a Catherine wheel type firework placed in the combustion chamber by remote control.

Interest in the future of rockets was taken very seriously by the U.S.A. and Russia, and as many of you will know, personnel who had been engaged on rockets were rounded up and a selected group divided between U.S.A. and Russia.

Thus the history continued into the beginning of the Space age.

Len Targett.

Members news

Members will know that our General Secretary Keith Clark is unwell. He suffered a stroke back in November, on the day of our Charity Concert as it happened, and spent a long time in Southmead Hospital. Keith has recently moved to a very pleasant nursing home at Field House, Blakeney Road, in Horfield where he is able to receive visitors although he finds speaking rather difficult. The telephone number for Field House is 0117 9690990.

Many members will also know that another stalwart of the club is ill. Mike Norman suffers from Parkinsons Plus and finds it increasingly difficult to get to meetings. He is being cared for at home by his wife Valerie who is a doctor. It was good to see them both at our March meeting on Weather Forecasting. Mike is also able to receive visitors at home and his telephone number is of course on the membership list.

Photo Images

The Suspension Bridge



Opening the Bridge 1862



Suspension Bridge Construction 1



Suspension Bridge Construction 2

The Next Edition

Contributions from members are essential otherwise there is no material to edit. I am open to suggestions as to items to include. Reports on visits and on talks should provide the bread and butter items. Individual articles on subjects of prospective interest to members will also be most welcome. Between 3 and 1000 words, with or without pictures or photos please!

This is a call for papers and contributions for the next edition of the Newsletter. Do share your interesting experiences past and present with other club members. Your views may not correspond with the views of the Club Committee and we shall say so - but that is not a reason why they can not be published. **Contact details are as follows:**

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telephone 01275-372905

[Email Marcus](#)