

**Autumn 2021**

# TOUCHPAPER

The Newsletter of the Royal Gunpowder Mills Friends Association  
Registered Charity No. 1115237

**Bryan's Bags**

**Unfinished Business**

**The Way Forward for the Site**

**When did the first electric vehicle appear?**

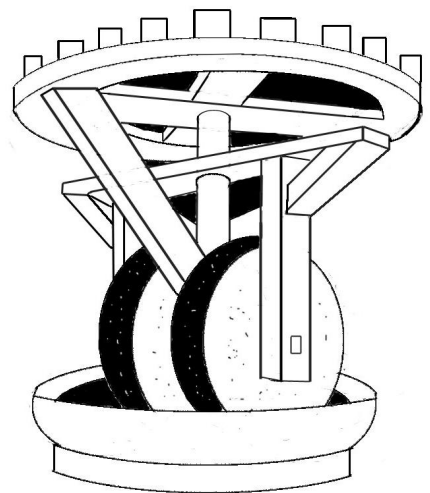
**Industrial heritage, engineers and coincidences**

**Obituary:  
Bob Brown**

**Julie's Nature Column**

**Kelvdon Hatch Secret  
Bunker**

**Laws not taught in physics**



**Autumn 2021**

# **Officers of the Friends Association**

## **Chairman**

Len Stuart  
13 Romeland  
Waltham Abbey  
Essex  
EN9 1QZ

romeland13@gmail.com

## **Treasurer**

Ron McEvoy  
6 Lea View  
Waltham Abbey  
Essex  
EN9 1BJ

ronaldmcevoy@btinternet.com

## **Secretary**

Len Stuart  
13 Romeland  
Waltham Abbey  
Essex  
EN9 1QZ

romeland13@gmail.com

## **Membership**

Friends Association  
Royal Gunpowder Mills  
Beaulieu Drive  
Waltham Abbey EN9 1JY

**All enquiries relating to this newsletter and articles  
should be addressed to:**

Brian Clements  
56 Park Road  
Enfield  
EN3 6SR

wargmfa@btinternet.com

**Deadline for the next issue is 26th November 2021**

# Chairman's Chat

Although we have had to reduce our opening times to the public over the summer months, we have had significant interest from companies wanting to make TV programmes about the site itself and also as a backdrop for cinema films. This includes Abandoned Engineering for Yesterday and Salvage Hunters for Quest. We have also had a company firing replica Congreve rockets on Queens Mead for a history programme on the American war of 1812 and currently Netflix are filming on site. The Company is now working on the programme for next year starting at Easter when we will again be open to the public.

The committee has now resumed face to face meetings and one of our projects is to get our collection of historic documents online. As well as documents, the Company has an extensive collection of video and audio in various formats that has now been digitised, and amounts to some 500 gigabytes of data. Some of this could also be made available. We have recently purchased a clock for the café in memory of Dave Sims. We held our AGM on site in June, our first in two years, with just 12 members in attendance. There are still two vacancies on the Committee.

*Len Stuart*

# Editorial

I have been struggling to find enthusiasm and content to complete this issue. The problem with contributions is increased with us losing members; any new contributors (or indeed those who have contributed in the past but perhaps have lost the habit) will be most welcome. There is an article written by Bryan Howard, probably a long time ago, that was recovered from his house recently.

In addition to the clock for Dave Sims the Friends have purchased a hedge cutter, see the letter from Julie with a bonus photo, and two display cabinets. Photos of one of these in the Rocket vault are on the back page, the other is in the L168 Tower as part of the new fire exhibition.

On Saturday 11th September there was a gathering in the Mills café organised by Dave Sims' children to celebrate his life. A large group of his family, neighbours, members of the Friends and volunteers attended. We did our best to consume the excellent spread of food and drink provided and exchange memories of Dave. I met the latest addition to the Sims family, another great grandson, apparently a tradition of 'one out and one in'.

We recently have not been chasing people for payment of subscriptions as eagerly as in the past but requests for renewal will be going out with the Winter issue, hopefully in time for you to renew before the Christmas rush of postings.

*Brian Clements*

# Bryan's Bags

In his Bryan Howard memoriam in the Summer Touchpaper Dave Hewkin mentioned the shopping bags which Bryan made.

I recall when I first came to the Mills being puzzled by Bryan's apparent use of a sewing machine – for what purpose? Gradually the story became clear.

I first realized that it had some connection with his sailing activity and it became clear that Bryan made sails for dinghies, mentioned by Tony Barratt in the same issue, involving use of the sewing machine.

The sails were of an exceptionally strong white fabric and the shopping bags utilized off cuts from this material, the white colour giving an attractive appearance, enhanced by contrast with colour for the handles. There was an additional attraction - uniqueness as Bryan was able to fabricate and stitch on the outside an individual insignia reflecting the buyer's interests to any design specified.

Bryan later made a bag for me with a cannon insignia on the outside and an appropriate donation was made to the Friends. The domestic side got wind of this and enquired whether it would be possible, for a donation, to make a bag of specific dimension / purpose, – the carrying of bulky week end newspaper.

Bryan agreed and a sunflower insignia requested, representing a hopefully bright society – this was before Covid.

The cannon bag was never used for shopping, finding a more elevated use as a remarkably commodious carrier of bulky Archive material.

The sunflower bag continues to efficiently serve its intended purpose.



**The Cannon and Sunflower**

Fantasising - what a marvellous opportunity for a Mills start up – a group of volunteers on sewing machines making bags for sale, with unique selling points – material, colour and opportunity to specify dimension and personalize, with Bryan supervising and making the insignia.

Has anyone got any information on other insignia made for Mills volunteers?

**Les Tucker**

# Unfinished Business

Brian Clements asked me for a technical article for Touchpaper. The following item was inspired by Geoff Hooper mentioning casually the platonisation of composite propellant, a suitable project for study.

As part of a Royal Ordnance research programme an ammonium perchlorate with an HTPB<sup>1</sup> binder was doctored with chopped cords of F488/2336, a fast burning platonised double base propellant. I remember Don Fosse undertaking this work to produce strands which showed signs of platonisation. This very was tentative and I cannot recall any K-rounds being made and fired, but an encouraging start.

A better programme might be to try a parallel platonisation of an RDX/Rubber since RDX alone has an unacceptably high pressure index for use in rockets.

It seems to me that in future the UK may have to produce its own energetic materials once again and a review of where we were by 1990 might be useful.

Nitrocellulose based propellant was loaded with 25% RDX in XU. Any further additions might need a solvent process since hot rolling of, say, 30% loading might be hazardous.

Only VU was loaded with RDX (to give XU) it would be of interest to load F488/2336 with RDX in anticipating future requirements for higher energetic launches.

One wonders what benefits might be gained by adding energetic compounds such as NTO to existing formulations. A number of materials have become available in the last 30 years.

A lucrative market for energetic materials is the car crash bag one. The original propellant was a sodium azide/PVC mix. This hazardous propellant was superseded by a NTO based one. I believe that the most recent option is based on ammonium nitrate (for low cost?) and has resulted in a number of world-wide recalls.

There seems to be a continuing need for research and development of energetic materials.

**Bryan Howard**

The above article was amongst papers returned to us by Nigel Herrod from Bryan's house in Oulton Broad. I have no recollection of seeing this work before and do not believe it has previously appeared in Touchpaper. Recalls for faulty airbags using ammonium nitrate began in 2008. Ed.

1      HTPB - Hydroxyl-terminated polybutadiene



# The Way Forward for the Site

The Foundation Trust, which owns the Royal Gunpowder Mills real estate upon which the Operating Company runs the Visitor Attraction, commissioned Dr Simon Thurley to carry out an options study for the future use of the site. Simon Thurley was previously Chief Executive of English Heritage (2003-2015), Director of the Museum of London (1996-2003) and Curator and Surveyor of the fabric at Historic Royal Palaces (1988-1996). This year the Prime Minister appointed him as Chair of the National Heritage Memorial Fund and The National Lottery Heritage Fund for a three year period. The aim of his options study was to identify and evaluate the various opportunities that exist within the Royal Gunpowder Mills both in terms of the development of the visitor attraction but also the use of the wider site. This report was delivered in March 2021.



**Dr Simon Thurley**

The principal recommendation of his report was that the Foundation and the Operating Company should set up a joint Project Board to solve the current conservation crisis, establish a sustainable business model and lay plans for improved public access and engagement. A secondary recommendation was to push forward on establishing whether New Hill might be a source of capital receipt.

One of the new Foundation trustees, Rosanna Lawes, offered to chair this Project Board. The Foundation trustees approved this, and so did the Operating Company.



**Rosanna Lawes**

Rosanna Lawes is the Executive Director of Development for the London Legacy Development Corporation. She is in charge of the Olympic Park redevelopment. She also works with, among others, the Victoria and Albert Museum and Sadler's Wells.

The membership of this Joint Project Board has been agreed and the first meeting has been held to agree the Terms of Reference. The Operating Company felt that its recently appointed new trustees have much to contribute to this exercise and could bring a fresh perspective to matters, but that some sense of what has happened in the past would make a useful input to the exercise.



**Geoff Hooper**



**John Brown**



**Tracey Reed**

Therefore the Operating Company has fielded two of its new Trustees; John Brown MBE is the Executive Director of Commercial Services and Operations at the Imperial War Museum and Tracey Reed OBE is a recently retired Historic Properties Director at English Heritage. Geoff Hooper provides the continuity. The work of the Joint Project Board will focus on three key areas identified by Simon Thurley, namely:

- a. To ensure the financial sustainability of the overall site;
- b. To agree a conservation strategy to address the conservation deficit;
- c. To create a compelling modern visitor offer which increases public understanding of the site and its subject matter, raises the profile and reputation of WARGM, and pays for itself.

Watch this space; we will keep you apprised of developments.

**Geoff Hooper**

# When did the first electric vehicle appear?

A Scot, Robert Anderson built the first electric vehicle in 1838, it was a very basic machine, with three wheels, a single seat and using non-chargeable batteries, but it was a start and by the beginning of the 20th century, electric cars, buses, taxis and vans would account for 40% of all vehicles on the road in America.

1859 French physicist Gaston Plante invents the rechargeable lead acid battery and in 1881, his countryman Camille Faure makes improvements to the design, making it more practical as a traction battery for vehicles.

1884 Englishman Thomas Parker produces the first practical electric car for sale in the UK.

1890 Oliver Fritchle of Iowa, USA, builds a car that will do 100 miles on a charge and in 1908 drives from Lincoln, Nebraska to New York City in 20 days covering a distance of 1800 miles at 90 miles per day in one of his models.

Throughout the 19th and early 20th century, designers were working on electric vehicles of all types throughout Europe and America. For example Ferdinand Porsche designs and built (in Austria) his first electric car (the P1) and then the first Gasoline/electric Hybrid car with the motors in the wheels, allowing it to be sold in front wheel or four wheel drive, called the Lohner-Porsche, which could be purchased in front wheel drive or 4 wheel drive. It was a four seater and the year 1891.

By 1890 New York City had a fleet of 60 Electric Cabs with charging point every ten blocks and American, William Morris was selling 6 seater electric cars.

1899 Thomas Alva Edison develops the nickel Iron alkaline battery for use in electric vehicles and goes on to build in partnership with his close friend Henry Ford a prototype affordable electric car, but it never goes into production. The suggestion being that the oil industry put the boot in.

1908 Henry Ford launches the mass-produced model T Ford, which will be the death knell of the electric car as it is a fraction of the cost of the cheapest electric car and can operate outside of cities or away from a charging source.

In 1912, Charles Kettering invents the electric starter, driving another nail into the electric car coffin. By the 1920s most electric car manufacturers have ceased production in America.

Electric cars staggered on, with advertising aimed at the woman driver, with the sale point being that electric cars are comfortable, quiet, don't use petrol or emit smelly fumes.

1919 Harrods import from Walker of America a Van to deliver their products around London and in 1936 build, in house, their up-dated model with fully enclosed cab, which continued to deliver to Harrods customers until the 1970's.

A final word about Hybrid Electric vehicles. If you hear that term used today, it always (with the exception of the BMW i3 with range extender), means a petrol or diesel engine car which is only driven by battery, a very short distance, before the I.C. engine takes over and drives the wheel direct.

All Hybrid vehicles of the 1800 and 1900 hundreds were driven by either a I.C. engine driving a generator, which charged the batteries, which drove the electric motor to drive the wheels. Some designs such as the Tilling Stevens bus did away with the batteries and the generator drove the road wheel motor direct. The idea being, to do away with a gearbox and prop shaft, which saves weight and complexity.

**John Wilson**

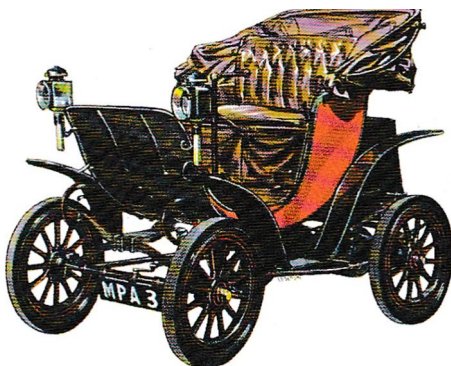




**Typical Electric car of the late 1880's, the earlier models usually open with no windscreen, and a folding roof.**



**1897 Waterbury launches his taxicab in London.**



**1901 Columbia Chassis is imported from America and has British bodywork added for Queen Alexandra for driving around the Sandringham estate.**



**1936 Harrods own design of electric delivery van, to replace their 1919 model.**



**1923 Tillings of Peckham and W.A.Stevens of Maidstone, Kent build the first Hybrid bus in 1908 developing it into the TS3A petrol/electric of 1923.**

# Industrial heritage, engineers and coincidences

Whilst on holiday in Northumberland recently my wife and I twice visited the local National Trust estate of Cragside, which was once the home of William George Armstrong, an eminent Victorian visionary engineer, scientist, and Industrialist. Ironically, however, Armstrong possessed no formal qualifications in any of these disciplines, being instead a solicitor by training.



**WAI\_1602\_01**  
**W G Armstrong**

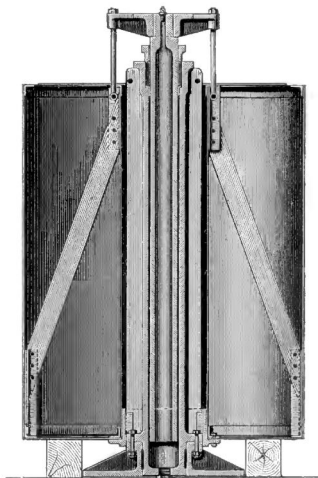
Built in the Arts and Crafts style Armstrong's impressive palatial home, Cragside, is largely known for being the first house lit by hydroelectric power, which Armstrong himself had developed and installed there using technology well ahead of his time. Armstrong was also the owner of the vast Elswick factory near Newcastle, which employed 25,000 workers, and manufactured numerous industrial parts and structures, many being of his own invention which greatly improved many industrial processes. It also made him very rich. One of these inventions was the "Accumulator," for which the factory received a rush of orders.



Whilst learning of this at Cragside I saw immediately a connection with the Royal Gunpowder Mills at Waltham Abbey, knowing just how pivotal the accumulator towers were on site to maintaining and regulating hydraulic pressure for pressing and moulding gunpowder.

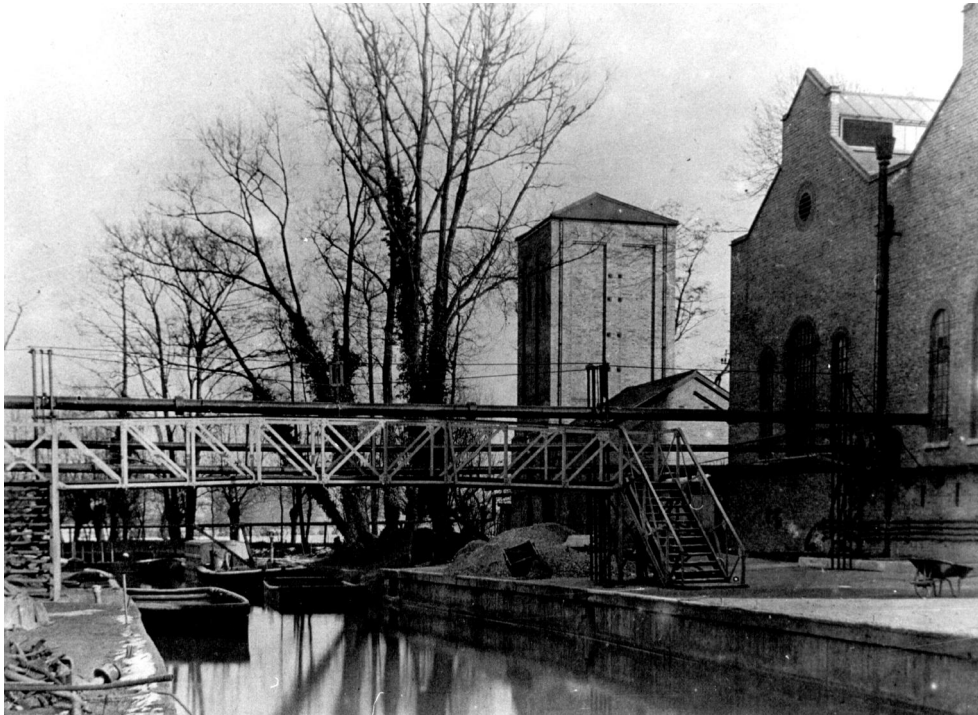


**WAI\_1585\_03\_01  
Remote Accumulator  
Tower L136 Built 1879.  
Now known as the  
Nature Tower**



**WAI\_1656\_01  
Hydraulic  
Accumulator**

I was intrigued to learn too that Armstrong had also invented a battlefield gun, which used shells rather than cannonballs and that in the 1860s he was put in charge of artillery at The Woolwich Arsenal in London, by coincidence at the same time my great-great grandfather was working there as a time keeper. Given Armstrong's elevated position at Woolwich, along with his technical prowess it must be likely that he had visited the mills during his tenure there. Whether this happened or not Armstrong, through hydraulic technology, is nevertheless inextricably linked to the Mills, and reflecting this I found on my return from holiday that his contribution to hydraulic technology at the Mills is well covered in the "Listed Buildings" publication on pages 150-155.



**WAI\_0080\_18**  
**Image of Power, distinctive hydraulic accumulator tower and 1905 electrical power house on the right**

While in the Northumberland National Park I also stayed a few nights in the village of Chollerford, which has a spectacular 18th century stone bridge, which conveys traffic over the Tyne North River. Keen to learn of its architect in the absence of any informative plaque or board, I Googled it on my mobile phone. I was intrigued and astonished to learn that it was designed by Robert Mylne, a man whose ancestral home is in Great Amwell, not 20 minutes from where I live. I had too only recently discovered by way of some research for work that Robert and his son William Chadwell Mylne were both giants in water supply technology and architecture in their day, as were subsequent generations of the Mylne family. Furthermore, the careers of these men had strong associations with the New River, as have I. Some members of their dynasty are interred at a small mausoleum in the churchyard at Great Amwell, near Ware and only a stone's throw from 2 gauges on The New River, which they had each designed.

On the way home from Northumbria my wife and I broke the long journey by staying at a random hotel overnight near Barnsley. Nearby was another National Trust estate called Wentworth, which we visited unplanned, just to pass a few hours before setting off the next day. Here I was drawn to a blue plaque on the wall of the house and would you believe it, it commemorated the fact that Joseph Bramah, inventor of the hydraulic press and other mechanisms, (as employed at the Mills), had been born on the estate in 1748.

So we completed a great holiday and some intriguing coincidences.

**Phil Smart**

# Obituary

**Robert James Brown    10/10/31 – 17/7/21**



Bob Brown was a great friend of Bryan Howard and Bill Smith. They enjoyed several boating holidays together (one was reported in Touchpaper Autumn 2016).

Bob and Bryan were crew and Bill Smith the cook.

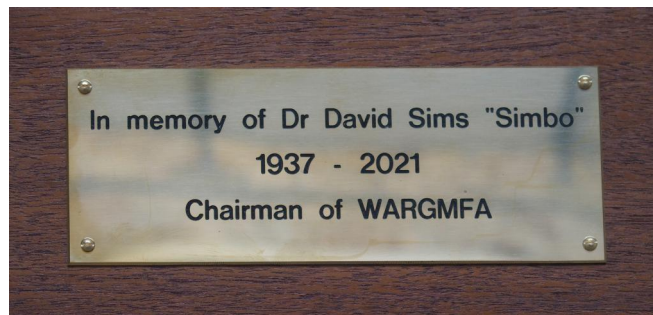
Bob worked on South Site Waltham Abbey and retired on the same day (30th November 1989) as Bill, Bryan, Chris Evans and Kim Henshaw. Bob had taken the death of Bryan very badly.

**Daphne Clements**

# Dave Sims Memorial

The WARGMFA committee on behalf of the Friends purchased a clock and a plaque in memory of Dave Sims. He gave so much time to the Mills that it seemed an appropriate memorial. Both can be seen in the café.

**Daphne Clements**





# Letters

Dear members of the Friends Association,

I would just like to say a big Thank You for agreeing to pay for a new petrol hedge trimmer for the Mills which is now in our possession.

The difference it will make is that I no longer have to worry about tangled cord from the electric one, nor am I restricted as to how far an extension lead will reach. I assembled the hedge trimmer last week and stored it in the control room for the weekend. On Monday I put oil in it and some fuel. I was just about to start it up by pulling the cord when I saw something move, I must admit that it did make me jump, but it turns out that a toad had decided that the engine housing was a nice place to climb into for a snooze! Hope you like the photo.



I have tried the trimmer out and it cuts very nicely with good height too. I shall be checking for toads in future before I use it again.

Thanks very much again.

Kind regards,

Julie Matthews

Grounds Keeper / Conservation

## Julie's Nature Column

I've tried to keep my camera at hand more often than usual as I have missed so many opportunities in the past. One of the trickiest for me is getting a photo of a kingfisher. I see and hear them all of the time speeding past me and on occasion flying right over the top of my head. I don't have the time to sit still for too long and wait (or the patience) as most of my photos are when I'm on the go. I finally got lucky and managed to get a couple of photos by being in the right place at the right time. In this photo the kingfisher actually knew I was close by and looked over at me a few times. It was perched on a branch and swooped down to the water and caught a fish. It happened so fast that if I had blinked I would have missed it, hence no photo of that part.



Once again we weren't successful with our barn owls breeding. When the box was checked for young owls it was found to be full to the brim with leaves as a squirrel had turned it into a winter home. All leaves and debris have been removed now and it's still not too late in the season for barn owls to breed. The good news is that they are still around. I have managed to spot one regularly, but it's a bit too high up in its roost for me to get a decent photo.

Our honey bee nest swarmed again. They hung themselves in a huge ball on a low branch. It was so low that I nearly walked into it and that's how I discovered it! I can tell you that I moved out of the way pretty quickly. They are quite fascinating to watch, but scary at the same time at the thought of them getting upset. I managed to get some photos without standing too close; luckily my camera has a good zoom feature.





Heron has been coming thick and fast to our canals. There have even been two at the same time. It's surprising how one particular canal attracts so much wildlife. I have seen a pair of green woodpeckers, a pair of jays, a heron and the kingfisher all around at the same time, that's not to mention the damselflies, ducks, coots, moorhens, dragonflies, swans and fish that all favour this canal and its banks. It also shows how healthy our waterways are. This heron seemed to be rather deep in the water and getting its feathers wet.



The buzzards have been ever present with the young one calling all day long which I expect is demanding food. Kestrels have been around too and several times now I have seen a kestrel chasing a buzzard away. Kestrels are rather tiny compared to a buzzard, but I would imagine that it had a nest nearby and this would cause it to chase the buzzard. How lucky we are to have such a lot of wildlife in one place. I have been keeping an eye out for the hobby, they are similar in size to the kestrel, but seem to fly past so fast that I have missed many chances for a photo. I did however spot one land on a tree and put my camera's zoom into full stretch! Not my best photo, but still a delight to capture one.



Our small herd of deer are looking good. They will soon be losing velvet and becoming rather muscular to be ready for the rut season. I saw a young fawn the other day with its mother, but the vegetation was too dense to get a photo, perfect cover though for fawns to hide in. I'm still seeing the odd muntjac on site, look at this handsome boy, I took him by surprise and it's the first photo I have of one in velvet.





I'm still keen to get some more opportunities with the kingfishers. I know that there is a pair here as I got a photo of a male and female on separate days. The first photo at the beginning of this column is a male, he has an all-black beak. This photo is of a female, you can see the underpart of her beak is orange. I thought I'd be content just getting one photo that was ok to share with you, but no, I want more! So there you have it, no photos of kingfishers for ages and then two at once.



I hope to bring you more wildlife photos next time around so until then I'll be keeping my eyes wide open, let's just hope that my camera is in my hand!

**Julie Matthews**  
**Mills Nature Conservationist**

# Kelvdon Hatch Secret Bunker

In 1952 Russia tested a nuclear bomb and the British Government started to build nuclear bunkers to protect Military and Government personnel so that in the event of war, some semblance of government could be maintained and Civil Defence and Military response to any attack could be directed.

In October 1952 the Government purchased the Parish family farm at Kelvedon Hatch, Essex and started to build a bunker for use by the RAF as a fighter command base and remarkably the bunker was completed by May 1953. It wasn't originally intended for RAF personnel to live permanently in the bunker and it was manned on a rota system with staff only living in the bunker during periods of heightened tension and there was provision 200 personnel to sleep in the bunker at this time.

The bunker has 10ft thick walls and 30ft thick roof made of concrete with tungsten reinforcing bars, this in turn is coated externally with pitch and a wire mesh Faraday cage to protect against electromagnetic pulses from a nuclear blast which would destroy electrical equipment. The bunker is built on a 20ft layer of gravel which acts as a shock absorber and was then buried with earth. Concrete burst caps were added for additional protection and the roof was covered to a depth of 35ft (see drawing). On its roof there is a 150ft mast, 24000 gallon water tank and running from ground level to the base of the bunker, a ventilation shaft and emergency exit. It has three floors, with the top floor having a viewing gallery to the lower floor so that RAF controllers look down on a large map showing incoming bombers and fighter movements. The bunker remained a RAF command until 1967.

In 1967 the bunker was taken over as a Regional Seat of Government. The Operating viewing hole was filled in and provision made for 600 people to live in the bunker for 6 months. The bunker was run by a Cabinet Minister assisted by an ordinary minister and various Civil Servants from the Ministries, such as Agriculture and Fisheries, Pensions, Defence, Transport etcetera. Then there were representatives from the Police, Judiciary, Civil Defence, Local Government and so on.

The bunker was equipped with a BBC studio, 14,000 phone lines, Operating theatre, Canteen (which is still in use for visitors), and Science section (for plotting radiation levels and effects) . As there was only 200 beds, they were shared on a hot bed rota of three shifts, so as one person vacated a bed to start a shift, someone else took it over at the end of their shift.

There were 11 of these bunkers throughout the UK, plus County Council bunkers, Observer Core bunkers and Military bunkers and these were all connected by deep copper phone lines in a chicken wire system (Faraday cage), so that if one bunker was knocked out, it wouldn't prevent communication with other bunkers.

There was a military unit posted at the bunker to provide defence against criminal elements attempting to enter and steal food and materials.

It was realised in the design of the bunker, that a large number of people living in a confined space for any length of time, would generate considerable heat (1Kw per person), so the plant room at the base of the bunker contained a large air conditioning plant to keep people cool. The plant room also had filters and water scrubbing systems to keep the air breathable. A second plant room close to the bunker entrance contained two diesel generators for power. Although there were flushing toilets, these were only for use during standby. In the event of a nuclear strike, water would be too precious to flush toilets, so earth closets would be used, but how these would be emptied wasn't explained.

In the event of a fatality in the bunker, there was provision of body bags and cardboard coffins, but no mortuary, so bodies would have to be taken down the entry tunnel and put outside.

**John Wilson**

---

## **Laws not taught in physics**

- 1 Law of Mechanical Repair - After your hands become coated with grease, your nose will begin to itch and you'll have to pee.
- 2 Law of Gravity - Any tool, nut, bolt, screw, when dropped, will roll to the least accessible place in the universe.
- 3 Law of Probability - The probability of being watched is directly proportional to the stupidity of your act.
- 4 Law of Random Numbers - If you dial a wrong number, you never get a busy signal; someone always answers.
- 5 Variation Law - If you change lines (or traffic lanes), the one you were in will always move faster than the one you are in now.
- 6 Law of the Bath - When the body is fully immersed in water, the telephone will ring.
- 7 Law of Close Encounters - The probability of meeting someone you know INCREASES dramatically when you are with someone you don't want to be seen with.
- 8 Law of the Result - When you try to prove to someone that a machine won't work, IT WILL!!!

- 9 Law of Biomechanics - The severity of the itch is inversely proportional to the reach.
- 10 Law of the Theater & Hockey Arena - At any event, the people whose seats are furthest from the aisle always arrive last. They are the ones who will leave their seats several times to go for food, beer, or the toilet and who leave early before the end of the performance or the game is over. The folks in the aisle seats come early, never move once, have long gangly legs or big bellies and stay to the bitter end of the performance.
- 11 The Coffee Law - As soon as you sit down to a cup of hot coffee, your boss will ask you to do something which will last until the coffee is cold.
- 12 Murphy's Law of Lockers - If there are only 2 people in a locker room, they will have adjacent lockers.
- 13 Law of Physical Surfaces The chances of an open-faced jam sandwich landing face down on a floor are directly correlated to the newness and cost of the carpet or rug.
- 14 Law of Logical Argument - Anything is possible IF you don't know what you are talking about.
- 15 Law of Physical Appearance - If the clothes fit, they're ugly.
- 16 Law of Public Speaking - A CLOSED MOUTH GATHERS NO FEET!
- 17 Law of Commercial Marketing Strategy - As soon as you find a product that you really like, they will stop making it OR the store will stop selling it!
- 18 Doctors' Law - If you don't feel well, make an appointment to go to the doctor, by the time you get there, you'll feel better. But don't make an appointment and you'll stay sick.





**Model of Tracked Rapier  
in new display cabinet  
in Rocket Vault (L168)**