Winter 2023

TOUCHPAPER

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

Adjourned AGM

Bryan Howard Book

Explosives Workers Fire Training

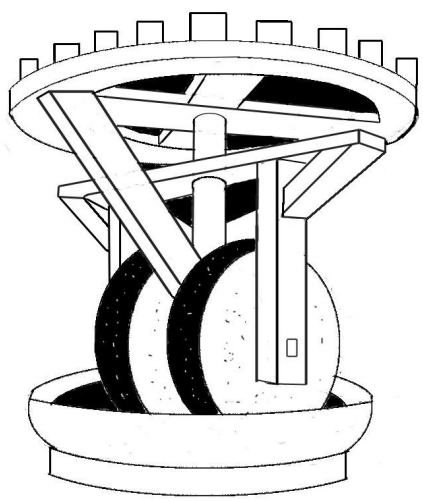
A Quiet Night at Stonehenge

World War II Bombing

The Night Sky

John Smeaton

Tunnelling in Southwold



Winter 2023

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Deadline for the next issue is February 23 2024

Chairman's Chat

I would like to introduce myself as the recently appointed Chairman of the Friends Association. Apparently, I am only the fifth incumbent in the 25 years since our foundation in 1998! Although new to the post, I joined the Friends Committee in 2011 serving as Treasurer for six years so my name, but perhaps not my face, will be familiar to some of you. I was appointed again as Treasurer for this year and hence I now wear two hats. I will do my best to fulfil both roles efficiently and effectively.

Looking forward to next year I, and other Committee members, are very much aware of the amount of work required at the 'Mills' just to stand still. Now, more than ever, the effort required is daunting at least to ensure the site is safe, accessible and actually worth visiting. As individuals, our physical capacity is limited but, thanks to the generous legacies and donations by members past and present, I am confident that the Friends will continue to help improve visitor's enjoyment as well as preserve the site's rich and unique heritage.

John Cook

Editorial

Once more thanks to all my contributors especially Les Tucker who has supported me in every issue since I took over as editor (and once more announces his retirement! we have a full issue (even if I've cheated and put in some old photos.)



At the beginning of this year I wrote that I was going to give up the editors job at the end of 2023, we have reached the last issue of the year and no one has volunteered to take on the job. I have therefore agreed to carry on as long as people contribute articles, or any small items etc that I can use to fill the blank pages. One other condition is that we get the printer to do the distribution to save me a journey to Ware and back, then stuffing envelopes and carrying them all off to a post box. This means that the printers will have members names and addresses but no other information.

Those of you who have both printed and email versions will notice some small differences. The email version does not have a renewal form insert in the centre, there is no point, and the renewal form is a separate attachment as usual. But do please fill it in and return before you forget, further reminders will be sent to those who have not renewed.

Finally I hope you like the issue and have a Merry Christmas and a Happy New Year.

Brian Clements

Adjourned 2023 AGM held at Royal Gunpowder Mills on 11th October

Attendees

Len Stuart (retiring Chairman/Secretary), John Cook (Treasurer),

Daphne Clements (Membership Secretary), Sheilagh Owens (Committee),

Richard Penfold (Committee), MC Black (Committee),

Peter Stone (Committee - via Zoom), Brian Clements (Editor).

Geoff Hooper, David Mullenger, Hemant Desai, Dave Hewkin, John Alcock, Martin Gough, Linda Gough, Suzanne Leeson, Terry Stemman, Derek Back.

Apologies received from Colin Rotbart and Ron McEvoy.

Geoff Hooper and Martin Gough agreed to join the committee, with Geoff taking on the post of Secretary. John Cook agreed to add the Chair to his duties as Treasurer.

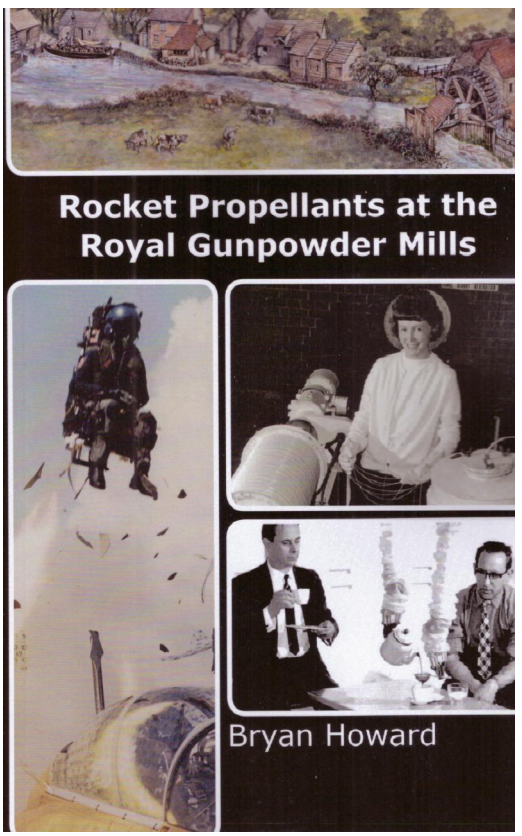
Daphne Clements agreed to remain as Membership Secretary for another year. Brian Clements was prepared to continue as Editor, of Touchpaper, providing the onerous task of distribution was undertaken by the printer and folk continued to send him items for Touchpaper.

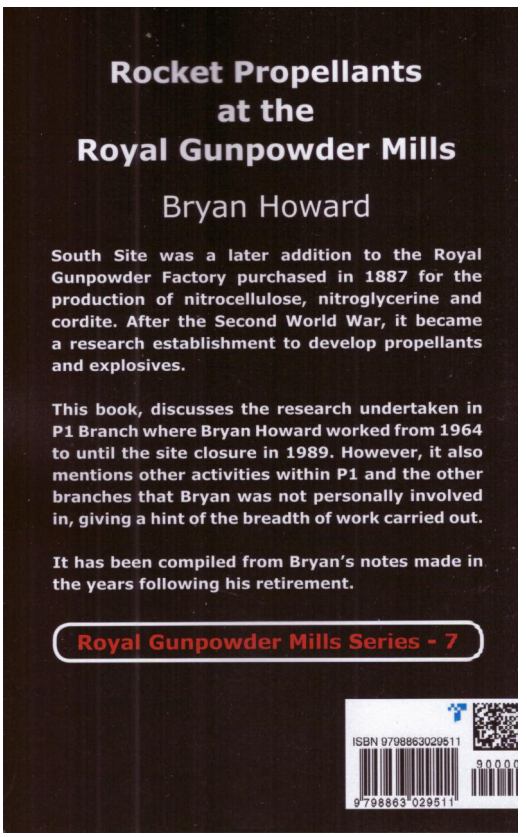
MC Black offered to represented the Friends on the Health and Safety Committee and John Alcock to represent the Friends on other matters at the Mills OpCo meetings with the Trustees and management.

Daphne Clements

Rocket Propellants at the Royal Gunpowder Mills
Bryan Howard

The Friends are pleased to announce the publication of a new book, number 7 in the series, written by Bryan Howard and funded by WARGMFA. In this book, Bryan describes research activities undertaken on South Site with a natural bias towards his main area of focus – the combustion of rocket and gun propellants. The book concludes with the eventual closing of the site in 1989 with Bryan's final notes hinting at the depth of emotion so many staff must have felt at this time.





In the years' following Bryan's retirement, he served as a long-standing member of the Friends Committee. In addition, during this time he diligently produced handwritten notes based on his experiences. I'm sure, if he were still with us, Bryan would be the first to say that bringing his words to life in published form has been a team effort. Brian Clements typed up and digitised the original content which was then expertly compiled and edited by Grant Privett. Ian MacFarlane then arranged publication of the final product by Amazon. We are indebted to all those involved, and thanks should also go to Daphne Clements for her dogged determination to share this book with the world.

A special mention also goes to the lovely cover girl, Beryl Barratt, demonstrating the alginate fibre alignment process using ammonium alginate (or so I'm told!) during the Chief Scientist's visit in 1968.

Rocket Propellants at the Royal Gunpowder Mills is available as a paperback or on Kindle from Amazon at:

https://amzn.eu/d/4S4F2Xi.

Samantha Canfield

Tales of Explosives Workers Fire Safety Training From Waltham Abbey to Larkhill via Fort Halstead

My introduction to explosives at Waltham Abbey

In a previous Touchpaper, I recalled South Site fire brigade anecdotes. Earlier this year, as a volunteer at the Royal Gunpowder Mills Museum, I undertook fire warden safety training which was a scaled-back version of our previous workplace training. This got me reminiscing about the mandatory fire safety training we received as authorised explosives workers. I enjoyed this training and always considered it important, and it was also a useful life skill.

I joined South Site a few years before it closed but I don't recall having received fire safety training from Royal Ordnance on South Site, or later when I transferred to Royal Armaments Research and Development Establishment (RARDE) on North Site. That was probably because my memory is faulty or the respective management of both sites were too busy with closure planning.

My former Waltham Abbey colleagues told me that hands-on fire safety training was undertaken by South Site fire brigade on the concrete hardstanding of the site fire station.

Down to Fort Halstead

Most readers of Touchpaper will know that many of RARDE's Waltham Abbey staff transferred to Fort Halstead, when both Waltham Abbey North and South sites closed in 1991. The Fort, as Fort Halsted is colloquially known, had previously absorbed the work done in RARDE Woolwich Arsenal's experimental high explosives (HE) processing facilities, which was essentially pilot plant scale production, when it closed in March 1984, and

pyrotechnic work transferred from ARDE Langhurst, just north of Horsham, West Sussex, when it closed during 1976 and 1977. Compared RARDE with Waltham Abbey, the Fort's workforce was far larger in numbers and covered a far wider range of activities related to armaments and weapons testing. The Fort contained a number of departments who worked on different aspects of energetic materials research and development. By energetic materials I mean pyrotechnics, propellants and explosives.

The Fort's MOD fire brigade was more substantial than that at Waltham Abbey with a larger complement of staff and full-scale fire tender and they also conducted fire safety training for workers who handled energetic materials. It was at Fort Halstead that I have the clearest initial memories of fire safety training. The purpose of the training was not to tackle fires involving energetic materials but to tackle small scale fires which may encroach into an explosive containing facility, thus giving time for the fire brigade to appear to deal with a fire.

For the record, we experienced a large fire at one Royal Ordnance PLC's South Site's magazines. The fire was attended by many fire tenders from surrounding fire stations. They followed the safety-first method of letting the propellant fire burn out, whilst preventing it from spreading to other explosives magazines. I was away on detached duty at the time and missed the excitement and I first learned about it from television news as, unsurprisingly, the incident attracted great media attention.

MOD's workforce's fire training followed a formula comprising classroom talk and film on the fire theory of fire, the fire triangle of oxygen, heat and fuel, classes of fire. Our training included details of classes of fires and the appropriate media to tackle each fire class e.g., water, carbon dioxide, foam and powder, the types of hand held first aid fire appliances (FAFA) and their colour codes. Liquids fires are particularly difficult to extinguish as there is a likelihood that they can spread.

Our hands-on training focused on fire the classes most likely to be encountered at work, namely, flammable solids and flammable liquids. We handled water, carbon dioxide gas, foam and powder fire extinguishers and wall mounted fire hoses and were taught where to point the extinguisher to best tackle the fires. We were also given a demonstration on how to extinguish a chip pan fire, using a damp tea towel, without sustaining burns to the hands. This was most useful if you used a deep fat fryer at home.

Yet another move – onwards and upwards to Royal Aircraft Establishment (RAE) Larkhill Trials Range

Fort Halstead was hit hard after privatisation and it haemorrhaged staff through redundancy. I learned from the Fort's Head of Site, Dr Brian Mortimer, that my post as QinetiQ's explosives safety advisor was to go. He too was made redundant. I was most fortunate that he identified a job for me at the former Royal Aircraft Establishment (RAE's) Larkhill air trials range, known locally as the rocket range. I am most grateful to Dr Mortimer for that and publicly thank him. The air range was on central section of MOD's Salisbury Plain Training Area (SPTA). The whole training area is similar in size to the Isle of Wight.

The now closed QinetiQ Larkhill range, which was known within QinetiQ as Larkhill, was a small site with administrative offices at the Bustard Site headquarters (HQ) which overlooked Stonehenge. Trials work was based at a location known at Observation Post 3 (OP3), close to the impact area, at which our explosives magazines were located and where handling of explosives and trials preparations took place. The main purpose of the air range was originally missile testing but the nature of the range also lent itself to fixed and rotary wing aircraft firing, and dropping, of various munitions into the Larkhill impact area, air drops from cargo aircraft onto various drop zones, the closest to Bustard Site being Blackball Firs drop zone (DZ) which was less than half a mile away from the Bustard Site HQ. Being within SPTA's Larkhill Range restricted red flagged danger

area, the range was also used for a wide variety of Army, Royal Air Force, defence manufacturers, special forces and even Royal Navy trials.

During very dry weather, huge tracts of the Larkhill impact area could be set fire by exploding munitions from artillery pieces. The fires would burn for days. As our staff conducted trials across SPTA then this was another good reason to receive fire safety training and to be fire safety aware.

Larkhill range was administered from Boscombe Down (BD) airfield, the home of the Empire Test Pilot School, who operated fast jets. Larkhill's fire safety was the responsibility of BD's airfield fire service and they were also responsible for our fire safety training. In addition to full scale civilian type fire tenders, BD was equipped with huge airfield crash tenders for dealing with aircraft crashes and fire. Crash tenders are built to rapidly dispense huge volumes of foam to suppress fuel fires.

The Station Officer was the highly professional Graham Ridley who had previously been posted to RAF (USAF) Fairford. George Millichamp was his deputy, later to become chief fire officer when Graham was promoted. Both were most very helpful, highly competent and very decent people.

The BD brigade took their fire training kit to us at the Bustard Site to train our staff. Virtually the whole site personnel received fire safety training. The same MOD routine of lecture, film and hands-on fire extinguisher training was followed. I discovered that, hidden under a covered area, the Bustard Site owned a very large cylindrical foam fire extinguisher (capacity 100 litre plus) mounted on a wheeled trolly and that nobody knew how to operate it. That was soon rectified and arrangements were made for a number of our people to be trained in its use over at BD.

Furthermore, we received a form of training I had not received anywhere else: simulation of a smoke-filled building. A disused Boscombe Down office block was used and an area was filled with a smoke simulant and it soon became obvious that a smoke-filled building is very disorienting. A real fire would be accompanied with far denser and much hotter dark smoke, containing toxic gases. Inhalation of very hot smoke destroys lungs and the toxic gases kills people. In a building fire, more people are killed by smoke inhalation than by fire.

Life is full of coincidences. I learned that Graham Ridley had lived in the same row of cottages in Farringdon, Oxfordshire (formerly Berkshire) as one of grandfather's relatives. Graham told me that there was many Goughs living in Farringdon and warned that it was best not to fall out with any of them, but I suspect that tale was apocryphal.

A little light relief

I would like to leave you on a lighter note, an anecdote from my Fort Halstead days. One of the attendees on a fire training course was an energetics materials worker, senior in years, who had spent decades working for the Ministry. He had probably done fire training many times before. We have all been to lectures where the room's warmth, and darkness, and subject matter, have been sleep inducing. Under the circumstances, it was perhaps unsurprising that he succumbed to temptation and dozed off into deep sleep. He slept through the lecture and film. His sleep had been noticed by the training officer, and most in the room. The time came for hands-on training and the first fire type to be tackled was a flammable liquid, floating on water, which had been placed in a shallow steel drum. A pressurised carbon dioxide (CO2) gas extinguisher had been selected as the first method of fire suppression. Many "blue-light" (emergency services) workers develop gallows humour – it comes with the job. It was probably inevitable then that the first person to whom our trainer chose to hand the extinguisher was our recently awakened colleague. He was

then instructed to extinguish the fire. Having slept though the course, and seemingly not fully awake, he walked up to the fire and placed the discharge nozzle very close to the fire and then let rip with the extinguisher at full pressure. The outcome was that the extinguisher's efflux blasted both water and fire from the drum, and onto the surrounding training area. Cue: a look of surprise on my bewildered colleague's face and guffaws of laughter from the trainer and the course members. The fire officer dealt with the fire spillage efficiently. This incident was an important lesson learned.

Martin Gough

I cannot resist a comment; I worked at Waltham Abbey North Site for many years. We received fire traing more than once at the burning ground to play with extinguishers and on one occasion elsewhere in a smoke (artificial) filled room wearing breathing apparatus. The instructor commented that I would not be able to get a good seal of the mask over my face due to my beard. He was wrong, I had less trouble than some of the clean shaven types.

Ed.

A Quiet Night at Stonehenge

Grant Privett's nice photo of a tranquil Stonehenge in the Autumn Touchpaper put me in mind of the events of the night of 21st June 1986.

The 1980's saw a good deal of tension in British society, including the bitter division of the miners' strike and its confrontations with the police. Meanwhile the hippy culture became a feature and some opted out of conventional living, converting old ambulances, buses etc into homes and moving around the country with families to the various free gatherings, festivals, which were springing up. The tension was associated more with the north, but far to the southwest events in deepest Wiltshire were not far behind.

The day of the summer solstice when the sun reaches its highest point in the sky was of particular significance in the hippy culture with its connection to the Bronze Age people, the rhythms of nature, the spirits which supposedly existed in the natural world and so on. The mysterious stones of Stonehenge and their origins were a powerful attraction and the solstice of particular importance. Reflecting this in the weeks before the summer solstice it became a hippy custom to gather near the stones. By the mid 80's the gathering was attracting hundreds of travellers and became the biggest hippy free festival, prior to travelling to the stones for the solstice. Not surprisingly these were chaotic affairs and in 1984 opponents, citing noise, drugs, litter and general social disorder succeeded in obtaining an injunction establishing a four mile exclusion zone, which it was hoped would neatly solve the problem, with Wiltshire Police enforcing the injunction. I did not. The hippys still gathered, and in fact numbers steadily increased, with animosity growing at being deprived of what was considered their natural right to witness the solstice. In the decade that followed there was an almost ritual confrontation with the police with varying degrees of violence. 1985 was one of the worst, including what has entered hippy lore as The Battle of the Beanfield, with many arrests.

It was in this atmosphere that in 1986 English Heritage, in the hope it might defuse things, intimated in a very low key that a number of tickets for admission to the site on 21st June to wait up to view the solstice, including rather generously free coach travel from and to central London, leaving about seven o'clock, would be issued to those who 'wrote in'. In those days you still wrote in, i.e.in handwriting. The snippet caught my eye and without giving much thought I wrote in, assuming there would be a flood of competing applications from English Heritage supporters and somewhat to my surprise got a ticket back. The distaff side had wisely decided its interest in the ancient stones did not extend as far as spending a night in the open on the Salisbury Plain and indeed the implications for me began to sink in. However, honour decreed I had to continue. And so I set off on the expedition, suitably equipped with the usual for an overnight expedition in Britain - rain coat, cheese sandwiches, a copious supply of what were then still called Mars bars, no nuts and a Thermos of coffee.

I was glad to see the coach waiting, empty, at the appointed place and boarded, expecting to be joined by genteel English Heritage supporter types and was rather surprised to see the large group of young females who joined, apparently organised – not least by the Anarchist banners they carried. I realised they must have hijacked the ticket applications, which I thought was cheeky. The first tremors of doubt began to creep in. Were Anarchists obliged to attack those they regarded as class enemies, I was outnumbered about thirty to one with no escape, albeit some would argue being trapped on a coach with thirty young females was no bad thing. However I was left undisturbed at the back apart from a few baleful glances, but tortured by a continuous what sounded bloodthirsty chanting and banging of a small drum. I thought how out of place they were going to feel amongst all the genteel English Heritage applicants who would be there.

We duly arrived and the Anarchists tumbled out and disappeared into the night, appearing to follow pre arranged directions.

What greeted me was as far from my imaginings as you could get. The whole ticket system had obviously been hijacked and the site was seething, not with English Heritage types, but representatives of every alternative culture - anarchists, eco activists, pagans, druids etc. etc. The druids were well organised. In distinctive white over cloaks and held their own ceremony. All were highly excited, presided over by a formidable large bearded man resembling Willy Rushton or maybe it was him wearing a rural hat with a game bird feather sticking up which seemed to be some kind of badge of office, who bellowed above the noise calling for good behaviour. This was followed by a full scale chant with drums by a large eco group led by a feathered lady.

In my conventional gear I was sticking out like a sore thumb and I began to wonder whether there might be some who would object to my presence as one of the enemy.. This sounds ridiculously alarmist now but at the time in the dark surrounded by excitable people it didn't seem so funny. The only other person I could see that looked conventional came over to talk and it turned out he was from the Salisbury press, he said there might well be some darker elements there and advised a very low profile. As it turned out my misgivings were not entirely groundless. I inadvertently included one of the crowd in a photograph, his friend noticed, aggressively accosted me, accusing me of being some kind of official spy and was only mollified by profuse apologies and assurances I did not come from any official agency.

Darkness had descended, but there was no question of settling for the night. The noise went on unabated and it was plain no one had any intention of trying to sleep in the lee of a stone. If anyone flagged the feathered leader would make a short speech or call for another chant, accompanied by the ubiquitous drums. So the night passed.



Druid ceremony

Fortunately the weather was rain free and as sunrise approached around four o'clock the various diffuse elements gathered in a close packed crowd of pagans, eco activists, Celt worshippers etc., and me in my raincoat trying to look inconspicuous, particularly hoping for a view of the sun as it rose to a point framed by two of the stone uprights with a lintel stone. Luck was with us, the weather was mild, rain free, the mist had cleared, visibility good and we had a perfect view. Just before the sun reached the special point the crowd had grown silent and then when it appeared at exactly the right point there was a universal 'Ah', and I must admit I found it quite moving.



The magic moment

In publication the image is probably very indistinct and this applies to all three. The light was very weak at that time in the morning and there was a bit of mist around so I wasn't very hopeful I would get any useful photos. For this one I was blocked by those in front of me and I was in danger of recording densely packed backs of hippy heads. I just had to hold the camera above head height, click and hope for the best, so I was lucky. At least it is a relatively rare record - a moving target in a precise location for a brief moment of time on one specific day of the year and of course clear weather and in any case the photographer being allowed on site at sunrise.

In the meantime things had been happening in the exclusion zone. A 'convoy' of travellers had been moving steadily towards the site and there was a rumour they were going to attack the police thin blue line holding them back and break in. But they appeared to be pacified by an agreement with the police that they would be allowed in early in the morning.



The hippy convoy and police line, Salisbury Plain looms in the mist

This seemed to work and as the light increased the by now weary watchers of the night gradually dispersed, to be replaced by eager new groups.

Having devoured my now dry cheese sandwiches I returned to the coach wondering how the coven of anarchist maidens had got on and would they be waiting for the coach. They were nowhere to be seen and I never saw them again.

So I and the coach driver had a peaceful journey back to London and I could contemplate what had turned out to be a very weird night at Stonehenge.

Some years later the participants in the confrontations met together and hammered out a compromise which has as far as I know has brought tranquillity. However Stonehenge still hasn't seen the back of disputation. The controversy about what should be done about the A303 which runs too close to the site is a saga which has run for years. A final decision was reached when after years of controversy the Transport Secretary approved a 1.7Bn tunnel scheme. Only it wasn't final. Such decisions are subject to legal challenge, which was made - only to be quashed by the High Court, but there is nothing to stop fresh appeals. The Director of the RAC commented the saga is starting to feel almost as old as the stones themselves.

Les Tucker

The above article and Tunnelling in Southwold (at the back of this issue) are the last of my regular contributions..

I will continue working on the Archive – adding Information Summaries, Archive Notes etc.

Les Tucker

World War II Bombing

Imagine this; you are walking through a London park. World War II is well under way and you come across a group of scientists from London universities with a tiny model of a group of houses. What are they doing? They are in fact carrying out experiments to assess and optimise the effects of British bombing on German housing.

When I first became involved with explosives licensing and explosion effects, I was taken aback by the size of the models used and the quantities of explosives involved. The purpose of one particular trial that I recall, was to assess the overpressures experienced in different directions from the accidental explosion of a special building. It was an earth covered building with relatively weak front doors. The idea being to direct the pressure wave to the front of the building and to reduce the overpressures in the other three directions. This would enable a smaller distance to be used between the group of similar buildings. I believe that a scale of 1:20 may have been used[1]. Hence, for instance, a 10 metre long building would be represented by a 500 mm long model. An earth covered building might be represented by a terracotta pipe of the right dimensions and be covered with sand to the appropriate depth, say 100 mm of sand to simulate a 2 metre earth cover.

The formula relating equivalent explosives effects from different quantities of high explosives is $D=XQ^{1/3}$ where D is the distance in metres from the explosion, Q is the quantity of explosives in kilogrammes and X is an empirically derived factor describing explosion effects at this distance[2]. For the model system this formula gives $Dm/Db=(Qm/Qb)^{1/3}$ which can be rearranged as $Qm=Qb/20^3$. Where Qb is the quantity of explosives in the actual building and Qm is the quantity of explosives to be used in the model building to get the same explosion effects at 1:20 scale.

Hence for the storage of 5,000Kg of explosives, the equivalent quantity of explosives in our 1:20 scale model is 0.625 Kg. When I first came across this relationship, this seemed to me an absurdly small quantity in an absurdly small model.

One particularly interesting result of their experiments was the enhanced effect of an air burst. For some reason they were unable to set off their explosives charge at "ground" level on their model. So, they mounted it above the model at the correct distance expecting that this would not affect their result. To their surprise they found more damage to their model than predicted. They repeated the experiment the next day and got the same result. Almost the next night an RAF bomber left for Germany with bombs fused to give an air burst. And the following morning a reconnaissance Spitfire was dispatched to film the result, which was confirmed as being real. After that air bursts were used extensively; most notably for the Atomic Bomb. Later the theorists worked it out and the effect is called Mach Stem. It results from the reflection and enhancement of the supersonic shock wave as it travels along the ground.

1 My memory is that it was around this scale. If anyone knows different, please correct me!

2 The tables currently used for normal explosives storage are based on WWII work in the UK. These tables are now used by the MoD, the HSE, NATO and now the UN. The work was carried out, in the main, by a lady who styled herself as Miss E B Phillip. Although she did in fact have a Physics PhD. She never received the recognition that was due to her for her work. It was she who deduced the relationship between the effects of an explosion and the quantity of explosives involved, expressed in the formula $D=XQ^{1/3}$. She also deduced that the factor X is equal to 22.4 for the limit of serious damage to normal dwelling houses. Hence the formula $D=22.4Q^{1/3}$ is used to site explosives facilities in the vicinity of public housing.

According to someone who was involved at the time, 1000 man years of effort were expended in studying the effects of explosions on structures. Once the phrenetic activity of the war ended Miss E B Phillip found life so dull that she went to India to become a teacher. At Waltham I worked with John Costen. Although he came back later, he left after the war ended for the same reason. He told me that it was a common experience.

Peter Stone

John Connor, Ex CIE MoD, after seeing a draft of this article said it was fascinating.

The Night Sky

Winter is Coming: is a phrase much beloved of Game of Thrones fans, but its also true. We're past the autumnal equinox, the nights are getting longer and the clocks have gone back, giving a country of 60 million people a very welcome lay in and, possibly, mild jet lag.

As we enter November the east winds turn cold and the south westerlies seem to blow in on storm after named storm. I'm certainly not expecting a hose pipe ban round here any time soon and we may soon be receiving a stiffly worded petition from the newts in our garden pond complaining about the shockingly damp conditions they have to put up with.

For an amateur astronomer like me it's good news. Long nights means I can spend 6 hours looking at stuff and still pack up just about midnight before things turn really cold.

So, what in the night sky is it worth going out for when it's a tad parky? Through November and December, if you go out and look a little east of south and high up in the sky you will see the planet Jupiter. It should be the brightest thing in the sky apart from the Sun

and Moon. If you have binoculars and hold them steadily – leaning against a house wall helps – you may be able to see some of its 4 bright Moons.

If you have a telescope of some sort you may also see the equatorial cloud formations. There is a storm on Jupiter called the Great Red Spot but, as that's been shrinking for the last 50 years it's perhaps better called the Nothing-Like-As-Big-As-It-Was Red Spot, which doesn't really flow off the tongue. It's still big enough to drop the Earth in and not touch the sides. You don't need to be out long to see Jupiter and don't even need to get used to the dark.

In December we have the return of the Geminid meteors. The shower occurs when our planet traverses the bit of space that an asteroid called Phaethon passes through on its path round the Sun. The meteors we see are debris blasted off the asteroid during a collision millennia ago. So if you see a Geminid meteor, you saw a lump of asteroid, probably about the size of a grain of rice having a Kerouac moment.

Just get out a recliner or deckchair, avoid bright lights, dress up well (two pairs of everything and a scarf, warm hat and glove) and drape a sleeping bag or something over you. Then just watch the sky overhead for half an hour. After 10 minutes you will see far more stars than you did initially as your eyes adjust to the low light level and more stars peek through the light pollution from the M25. The meteors will come from the direction of the eastern or south eastern horizon, but some will pass through your field of view. Being realistic you may see one every 10 minutes or so, but Geminids do have more than their fair share of fireballs so you may see something really worthwhile. The important thing is to have fun. We used to sit and watch them with the kids – who saw it as a bit of an adventure. Just remember to keep watching the sky.

The nights of 14 and 15th December are best with a day or two either side still well worth a look.

After all, at the end of the night you can say you watched the stars and saw a bit of space rock hit the atmosphere at 22miles per second, sear its way downward, burning brilliantly white for a few seconds before falling to the Earth. That's pretty cool.

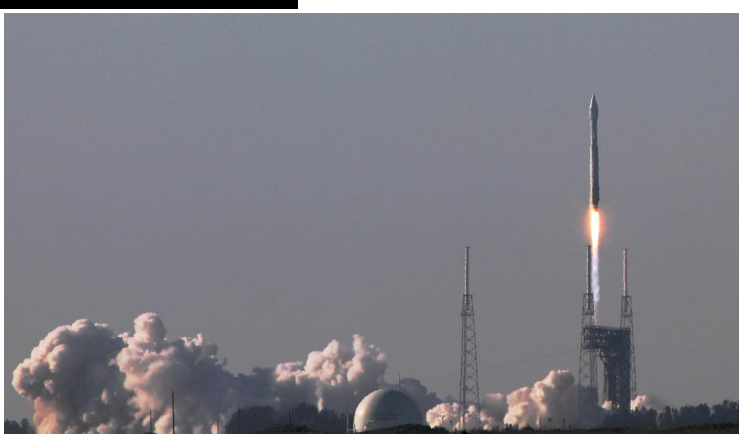
Grant Privett

Grant started work at Waltham Abbey with a degree in astrophysics. He has been an amateur astronomer for many years; two of his photographs are below, more can be found online at:

https://britastro.org/observations/user.php?user=1911



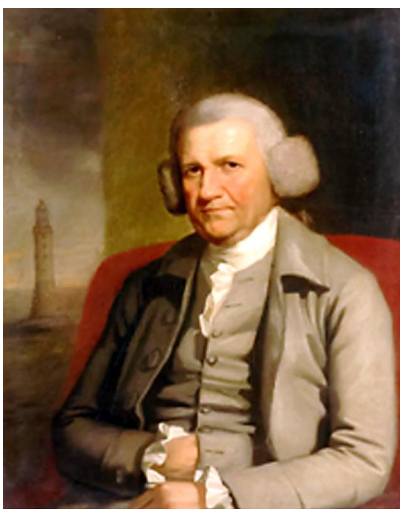
Comet Neowise



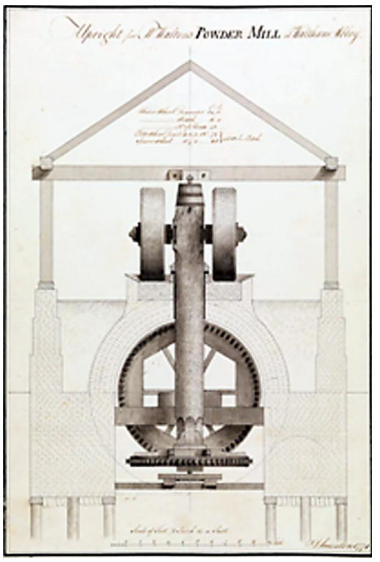
TDRS-M Launch by Atlas, Photo from Playalinda Beach

John Smeaton

Next year will be the three hundredth anniversary of the birth of John Smeaton (8th June 1724 – 28th October 1792). He was a civil engineer responsible for the design of bridges, canals, harbours and lighthouses. He designed the third Eddystone Lighthouse (1755–59), shown in the background of this portrait of him.



He was also an accomplished mechanical engineer, designing, amongst other things, gunpowder mills. It is in the context of the design of both canals and gunpowder mills that he had an association with the Royal Gunpowder Mills. This was during the period that the Mills were owned by the Walton family. In 1757 John Walton, one of ten children of William and Philippa Walton, founders of the Walton dynasty, died and brothers Thomas & Bouchier Walton inherited the factory. In 1767 John Smeaton was engaged by Bouchier Walton to design improved mills. This resulted in what was to become the benchmark for all the following gunpowder mills at Waltham Abbey and elsewhere. This drawing by Smeaton dated 1771 shows the design.



At the same time (1767) a survey of the River Lea was carried out by John Smeaton. His report recommended that a number of new 'cuts' (navigation channels) be made in the River Lea at Limehouse, Hackney, Edmonton and Waltham Abbey and that the existing flash locks be replaced by new mitre gate locks. These improvements would allow traffic to flow efficiently from Hertford to Bow. In 1768 a navigation canal was built in order that boats could by-pass the winding River Lea and by 1771 eleven miles of new cuts and twelve new locks had been constructed.

As part of his studies John Smeaton assessed the effect that these canal works would have on the operation of Bouchier Walton's Mills. He observed that one canal gate was not only out of repair but materially defective as it could not be shut down properly and thereby a great quantity of water would go down the old barge river, to the detriment of the Mills. He recommended various engineering works that would mitigate the adverse effect of the new canal on the water-powered incorporating Mills at Waltham Abbey.

Turning to the 20th century, the Historic England research records note that excavations at the Explosives Research and Development Establishment were undertaken in 1971. These revealed workings dating from the early 1700's, including brick structures that were subsequently part of Smeaton's Mill. Pictures of these excavations are in the Waltham Abbey Special Collection, which is easily accessed via the Royal Gunpowder Mills website. The specific entry in the collection is WASC 1479. Now I only joined ERDE in 1972, so I was not present at these excavations, but several colleagues in the Friends Association were, and they confirm their location. There is another excavation photograph in the archive at WAI-142-01 dated 1st September 1973. Photographs of this and the two 1971 pictures are shown below:



1971



1971



1973

Bearing in mind the remarkable similarity between the pictures attributed to 1971 and 1973 there must be some doubt about the dating accuracy, but the pictures are clearly from the early 1970s. If any of our readers can shed light on these excavations, it would be good to hear from them.

Turning now to the present century, in 2005 a further archaeological dig was instigated by the Waltham Abbey Historical Society. Leading lights in this were Peter Huggins and Ted Ayres, also Dennis Ashby from the Friends. Their work is shown in the pictures below which were taken by Brian Clements on 22nd July 2005.





This work is referenced in the March 2006 issue of Touchpaper. The location of these works is just to the west of the boardwalk from Hoppit Road (the site entrance road) to A200 (Walton House) , A201, A202 (Saltpetre and Mixing Houses) & A203 (the Lecture theatre, etc.).

The picture below from 2018 shows their condition much as now, a bit more overgrown but essentially the same as thirteen years earlier.



So the memory of John Smeaton very much lingers on at the Mils. Given the close association between John Smeaton and the Royal Gunpowder Mills, his 300th anniversary on 8 June 2024 may be worthy of some celebration.

Geoff Hooper

Tunnelling in Southwold

During a recent lucky week of almost uninterrupted sunshine in the pleasant seaside town of Southwold on the North Norfolk coast, well known for its much photographed brightly painted beach huts not to mention Adnams brewery, we stumbled across a piece of industrial archaeology totally unknown to us in a most unlikely location.

Southwold has a pier which was rescued by public subscription; there is a pleasant walk to the end. This includes the Tim Hunkin Water Clock. Dr.Hunkin describes himself as Engineer, Cartoonist and Artist. He drew a series of cartoons describing the working of household appliances and is one and the same as the Tim Hunkin who designed Pink Floyds flying pigs and sheep. The water clock demonstrated a clock powered by water machinery in a quirky way and it might now be termed an art installation. We wondered whether it had survived and were disappointed to see the place where it had been was empty but then reassured by a notice saying it was away being refurbished. .

Having been disappointed at one feature our attention was immediately caught by a strange structure at the end of the pier - about eight feet high and three feet diameter of rather crude construction with an external pipe and cable leading in with a revolving head on a viewing platform at the top of a couple of concrete steps. The head sheltered a screen with two eye pieces. All very mysterious, visitors were walking around it looking totally baffled. Surely it couldn't be connected with the usual seaside telescope. In fact it was.

The Pier had the usual obligatory seaside telescope at the end of the pier and Stephen Bournes owner of the pier, and friend of Hunkin had become dissatisfied with the sea scene in the telescope which in truth didn't have much variety. This was mentioned to Hunkin who concluded that what was needed was something which would attract children. By chance a science degree student had written in asking whether there was any chance of work experience and including photos of some highly skilled models which she made as a hobby. This sparked Hunkin to visualise a kind of periscope image in stereo with the models in the real sea and a team was formed to carry it forward. In the finest traditions of British science material for the instrumentation and structure was found in scrap yards and Hunkin's scrap store. Stephen Bournes young son Ben was recruited for consumer reaction.





Tunnelling telescope

Made from scrap parts:
Recycled lawnmower wheel rim, recycled gas bottle, industrial bred mixing bowl, portable tyre inflator, final stage from BBC long wave transmitter, ring dispencer from arcade machine and military jet exhaust pipes.

After initial failure an end of pier experience was created based on the telescope including sound, Hunkin gradually evolved it to cover as well as the sea scene a variety of subjects, sufficient for Bournes to market it as an attraction. Subjects covered included world leaders on jet skis, oil rig raves and some of the famous beach huts washed out to sea and about five others.

My quantum physics are at zero and I make no attempt to explain the science, but either at this point or what followed, optic science, particle physics and quantum dynamics came into it, including the concept of quantum tunnelling.

The Royal Radar Establishment developed the idea and it was employed at the GCHQ to monitor other side activity during the Cold War. English Heritage later refurbished the telescope and named it the Quantum Tunnelling Telescope, tunnelling being the term applied in quantum physics to the process which enables you to 'see' the other side of an electronic wall (excuse the excruciating phraseology) with an explanatory plaque including the claim that it changed the course of the Cold War. Opinion seems to be this is either the writer letting his imagination run away or it's a bit of English Heritage hyperbole for the general public. It was very useful at GCHQ but hardly to the extent claimed.

I have so far been unable to determine what happened with the ticket scheme but it looks as though it either failed completely or Bournes decided it had run its course. Now the mysterious object stands rather battered by the weather and somewhat forlorn and unknown but a splendid piece of modern industrial archaeology and a reminder of a war which could so readily have turned from Cold to Hot. Fortunately Mr. Putin wasn't in charge.

Les Tucker



Father Christmas in the Spinks Gallery back in 2002