

June / September

TOUCHPAPER

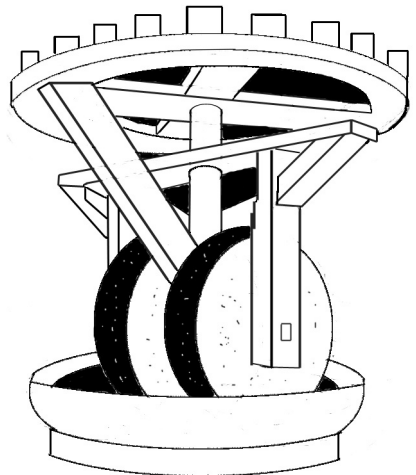
The Newsletter of the Royal Gunpowder Mills Friends Association

Wheelbarrow
Rolls
Into
Powdermills!

Westcott
Reunion
Report

Andrew Booth

Computer pioneer who
started in explosives science



Contents

- 1 Editor's news
- 2 Chairman's Chat...
- 3 Letters to Touchpaper
- 4 The Book Review
- 5 Canal snippets
- 6 Questions and children's answers
- 8 Westcott Reunion
- 10 Andrew Booth, computer pioneer who started in explosives science
- 12 Wheelbarrow rolls into the Mills!
- 19 Obituaries
- 20 Contact information

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Editor's News

The Friends Committee had hoped to send out this edition of Touchpaper shortly after the Social Gathering / AGM. Regrettably, our erstwhile Editor, Michelle Moore, was unable to complete the work. When we met on 23 September 2011, my fellow Committee members and I agreed we should use our best endeavours to finalise, print and distribute a combined July/September edition of Touchpaper incorporating the items available to us. Brian Clements has now added 'desktop publishing' to his many skills and has finished the work done by Michelle using software downloaded from the Internet. Thank you Brian!

I'm sure you've all guessed what I am going to ask for now. If you have any newsletter editing and /or desktop publishing experience, or would be willing to teach yourself, the Friends Committee would be delighted to hear from you. Send me an email or give me a call. We aim to send out four editions of Touchpaper each year providing we receive enough items for publication.

Finally, this is your newsletter, we will be delighted to publish items and anecdotes about the Mills, its people, or related matters that may be of interest to other members.

John Cook

Treasurer

Chairman's Chat

Chairman's chat update!

I am writing this on Saturday 28th May, the day after the Friends Social Gathering held this year in the Spinks Gallery (aka Chemical and Glassware Stores) because the cafe refurbishment is still not finished. Yesterday was a good day and the Friends enjoyed the gathering, the food and the, not quite finished, new rocket exhibition in L168. This previously held the large exhibits such as the casting liquid lorry and some railway items.

The display shelves in L168 were only finished on Wednesday ready for Naivette, the heavy lifting company to move the large rockets in on Thursday ready for the Friends to see on Friday. The 17 feet long Raven motor, which had been in L157, was quite a problem to move into L168 and up onto its shelf. The lorry crane could only move it to the door. Then 8 of us had to carry it inside and lift it into position. We were all thankful when that was finished. The arrangement of exhibits is quite different from before.

Other work by the Friends has included refurbishment of a second 18 inch gauge rail truck previously used for carriage of gunpowder and guncotton round the site, and planting flower troughs round the water wheel, Norman Paul's memorial.

Firstly I must apologise for the lateness of this Summer edition of Touchpaper. We expect different arrangements to be in place for the next, Christmas, edition

Several major changes were due to be in place for the 2011 season. Most of these were achieved by the beginning of the season but a few just missed it and the café is still not fully open. Drinks and sandwiches have been available for most of the season but not full meals. Full opening has been promised for the start of next season

Mad Science, a new exhibit and lecture in part of L168, was very successful and was enjoyed by children of all ages. Water powered cars and air powered rockets were also popular.

Other work by the Friends has included refurbishment of a second 18" gauge rail truck previously used for the carriage of gunpowder and guncotton round the site. The gunpowder boat previously in L168 has now been moved to a tent outside L153. We plan to restore the other end of the boat during the next few months.

The Committee hope that you will be able to come to the site next year and see the changes which are making the site more family friendly..

John Wright

Letters to Touchpaper

Dear Touchpaper,

I can understand the confusion concerning the Cornmill Stream, the River Lea (the Old Barge River), the Millhead Stream and the Horse Mill Stream. I was similarly mystified when I started to research the Gunpowder Mills' waterways.

Let me see if I can clarify the situation. The River Lea is the continuous stream from which all the other waterways diverge.

The most northerly to depart is the Horse Mill Stream which wanders off in a westerly direction and then turns abruptly south for some distance until part of it was taken over in 1806 as the Powdermill Stream which connected the Millhead Stream and the Lee Navigation. This was built as a route for the gunpowder barges which carried the finished products to the Government Magazines at Purfleet. The next part of the Horse Mill Stream's journey south was put in a new channel running parallel with the Lee Navigation which had been built in 1768). It then returned south-easterly towards the Mills and the Hoppit where it provided the driving force for the mills along its course. This last part has now disappeared under the Lea Valley Flood Relief Channel, of which more later. Finally it returns to the Old River Lea course south of Highbridge Street. The next channel southwards is the man-made Millhead Stream, built as the power source for the original Mills, which originally flowed to the Millhead on the eastern side of Hoppit Island, near to Walton House. The Millhead then flowed back to the Old River Lea, again south of Highbridge Street. The northern half of the Millhead has become the much wider and deeper Flood Relief Channel down to where it took over the Horse Mill Stream.

The third and last departure is the Cornmill Stream, again man-made, which leaves the Lea by Newton's Pool. It flows gradually over to the east and then under modern Abbeyview and ancient Stoney Bridge to power the Abbey's corn-mills. Having performed this service it goes under Highbridge Street and turns back westward. It rejoins the Old River, which has been wandering through the Mills performing tailstream drainage to various water-powered mills before itself passing under Highbridge Street.

So there are really only two "natural" streams, the Horse Mill and the Old Barge River. As its name implies, the old river was the commercial course of the Lea until the Lee Navigation was built in the late eighteenth century.

If all of this sounds terribly complicated, then the whole development of the waterways in the Mills is fully covered (with maps and pictures) in one of the booklets reviewed in the April edition of Touchpaper! Or you could go to my website www.leandstort.co.uk and really get immersed in the history of the river...

All the best

Richard Thomas

The book review

The Hidden History of Orford Ness
Pub. 2010 The History Press £14-99

Covering scientific research in two World Wars and the ensuing Cold War years the story of Orford Ness is an intriguing one.

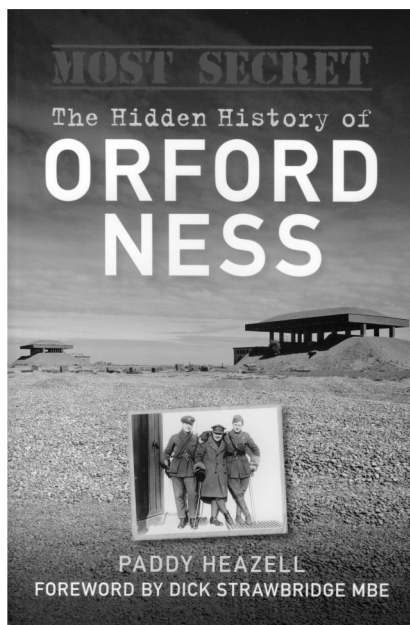
Today this narrow spit of land south of Aldeburgh is managed by the National Trust as a haven for birds and coastal plants as well as the place from which the BBC World Service is broadcast. The story begins with the requisition of farmland opposite Orford in 1913 by the army to test the recently invented aeroplane as a war machine.

Countering the Zeppelin and studying the behaviour of bombs were added to flight testing a variety of planes. 1937 saw the birth of radio detection of aircraft in anticipation of WWII. Experiments were conducted on Orford Ness and the nearby Bawdsey Manor the home of 'Home Chain' radar defence.

Bomb, gun, and rocket ballistics were again on the menu during WWII extending into the Cold War.

Eventually AWRE secured the site for testing conventional explosives in atomic bombs; two 'Pagodas' bear witness to that phase and are visible from Orford Village. Finally project 'Cobra Mist' saw the building of an 'over-the-horizon' radar unit financed mainly by the USA.

Bryan Howard

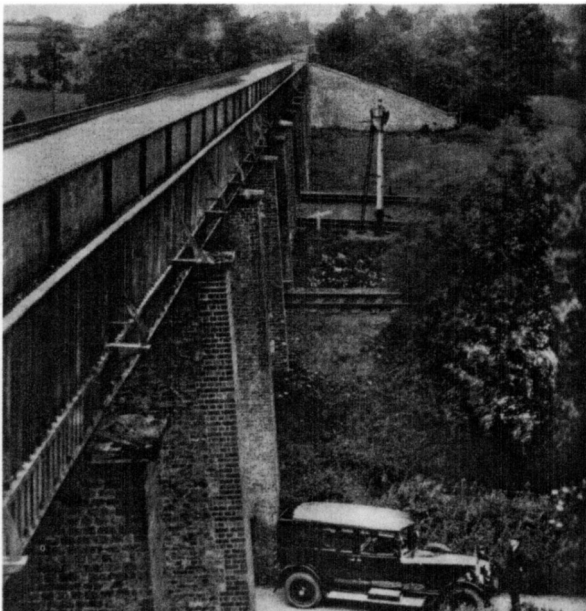


Canal Snippets

Although the Pontcysyllte Aqueduct receives all the publicity as the largest cast iron canal aqueduct (Touchpapers June and October 2010), the relatively unknown Edstone or Bearley aqueduct on the Stratford-upon-Avon Canal is a similarly impressive structure.

As the canals gradually succumbed to railway competition the railway companies often bought them up, mainly to remove a source of competition, sometimes to close them and use the route for a track bed and very occasionally to continue a profitable trade.

On occasion the canal water was a useful source for railway engine use. The Stratford-upon-Avon Canal came under the control of the GWR. On the Alcester branch instead of a water tower they tapped water directly from the aqueduct. The down pipe from the aqueduct to the engine can be seen to the left of the signal. To stop the pipe freezing up in winter a stove was situated under it.



The image shows it spanning the road and rail. The car is another example of fine engineering... a 1920's 21hp.

Questions and children's answers

- What is the meaning of the term "activation energy"?
A It's what is needed to get up in the morning
- What is a vacuum?
A Something my mum says I should use more often
- What does "terminal illness" mean?
A When you become ill at the airport
- What happens during puberty to a boy?
A He says goodbye to his childhood and enters adultery.
- Give an example of a smoking-related disease.
A Early death.
- How is oxygen loaded, transported and unloaded in the bloodstream?
A By forklift truck.
- What is a cadaver?
A It is a make of car.
- Why would living close to a mobile phone mast cause ill health?
A You might walk into it.
- What does a transformer do?
A It can go from being a robot to a dragster in 3 seconds
- Give three ways to reduce heat loss in your home.
A 1) Thermal underwear. 2) Move to Hawaii. 3) Close the door.
- Define the term "Shanty Town".
A It's a place where people like beer with lemonade in it
- Inhabitants of Moscow are called?
A Mosquitoes.
- What is the name of the highest peak in the Alps?
A The highest mountain is Blanc Mange
- How high is Mount Everest?
A It depends how much snowfall it has had since it was last measured.
- Change $\frac{7}{8}$ to a decimal.
A 7.8

- How do the following companies fund themselves, a) BBC, b) ITV?
- A Phone in competitions.
- Describe the term "Stakeholder".
- A A vampire hunter, "Buffy" being the most famous.
- Outline with two examples what is meant by "unanswered prayers".
- A Not winning the lottery and Arsenal never winning the league
- Explain the process of learning.
- A A process by which information goes into one ear and out of the other.
- Where was the American declaration of Independence signed?
- A At the bottom.
- Name Britain's highest award for bravery.
- A Probably Nelson's Column.
- Upon ascending to the throne the first thing Queen Elizabeth II did was to...
- A Sit down
- Explain the word `autocracy".
- A A country that has too many cars.
- What did Mahatma Gandhi and Genghis Khan have in common?
- A Unusual names.
- What is a "Co-operative"?
- A It is a shop that is not as expensive as M&S.
- What is hacking?
- A A very bad cough.
- What is a Network?
- A When you chat to people you don't like to try and get a job

Contact Needed

Does anyone know a member of the Salters Livery Company? They will probably be a chemist, Lance Bourne who is working on fundraising for the Royal Gunpowder Mills needs a contact who would be prepared to put forward a grant application on behalf of the site for science educational equipment to support the schools programme. If you know anyone please contact him at lance.bourne@royalgunpowdermills.com.



Westcott

Reunion

April 2011

This year was the 65th year since the Westcott site was opened. To celebrate this event a dinner was held in the Sports and Social Club attended by large number of former staff. To represent PERME Waltham, Dave Sims, Eric Baker and myself, Bryan Howard, attended, reinforced by three former members of Waltham, Ian Tungstall, Keith Ledbury and Paul Burnham. The three of us all went in Dave's car carrying a display from the RGPM including a Skua and a Law and other odd bits of rocketry some of which was from the original Westcott display. Good job the plod were not active since we didn't have any paperwork with us. We also reminded our colleagues what PERME stood for- Pantom Expects Ruddy Miracles Everyday- this was a winning entry in a Quickmatch competition some years ago.

After the meal we went outside for the usual photograph but there were so many present that the photographer had to take a panoramic shot just like they did in school days! Following the pictures we fired a couple of paper spacecraft with a gunpowder charge. These were particularly impressive as we lost one in the woods and another on a roof (see picture).

As usual they held a raffle for Help the Heroes and since both Eric and Dave won a prize perhaps we will not get invited again.

John Harlow has produced a brief booklet on the history of Westcott. It is mainly a list of milestones but requires some additional text so we await with interest the second edition which he has promised. We have a copy that will be placed in the archives at the RGPM for future reference. The proceedings closed about 4.30 and it was deemed a great success. Eric Baker must have had a good time since he slept all the way home. Members of the Explosives History group indicated that they would visit the RGPM later in the year.

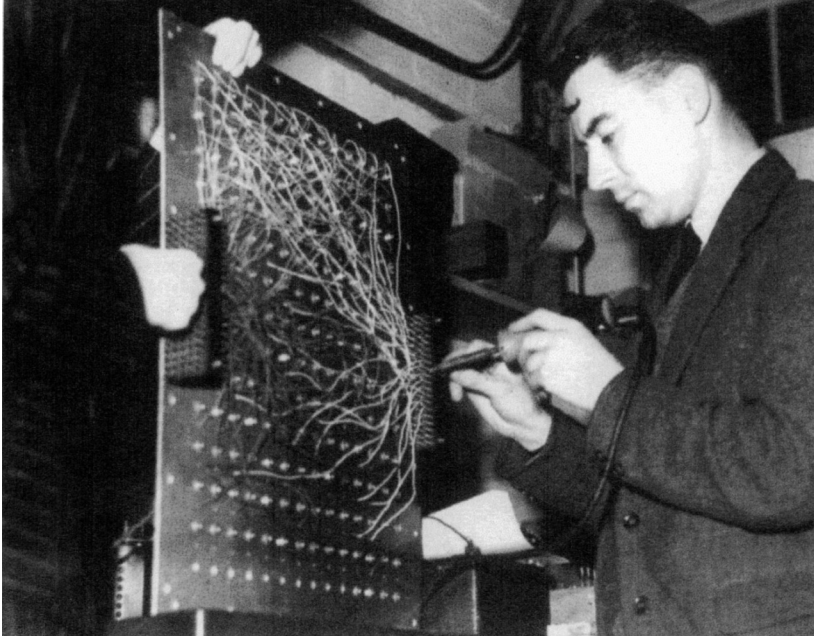
B Howard

Computer pioneer who started in explosives science

Andrew Booth

1918-2009

At the end of 2009 Andrew Booth died in Canada aged 91. Les Tucker examines the links between this pioneer of computer science and Waltham Abbey.



One of the research activities carried on in what had been the North Site incorporating mill bays was the study of the crystallography of explosives, in L146, employing computers for the calculations involved.

He received a PhD from the University of Birmingham during WW2. His subject was the crystallography of explosive materials. Was he directed into this by the Authorities?

The work involved the solving of complex sets of equations. Booth turned his mind to the possibility of devising a machine to undertake these calculations and using his practical engineering skills he began to build experimental machines.

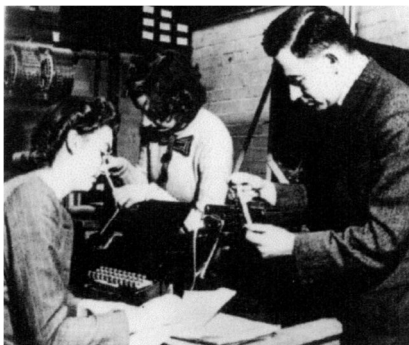
The following is a synopsis of the information published on Booth's

Left

Andrew Booth and Kathleen Britten working on the 1st decoder for their X-ray calculator

Below

Kathleen Britten Xenia Sweeting and Andrew Booth working on ARC in December 1946



subsequent career.

In 1945 he began his academic career in J.D. Bernal's crystallography laboratory at Birkbeck, London University. By the following year Andrew was building one of the first computers in the UK. He recognised the need for a compact storage device and developed the world's first rotating storage device in the form of a drum. Later researchers adapted his technology to create the now familiar computer disk.

In 1948 Andrew built the prototype Simple Electronic Computer (SEC). This was followed in 1951 by his All Purpose Electronic Computer (APEC), which was among the first generation of electronic computers.

APEC technology was used in the UK's best selling range of computers. Andrew's research on improving computer performance resulted in the 'Booth Multiplier' - still found in Pentium processors in PC's today.

In 1949 he married Dr. Kathleen Britten, one of the first female computer pioneers. At Birkbeck, Booth founded the first university department devoted to the study and teaching of computing.

In 1962 he moved to Canada where he occupied several high level academic posts.

Wheelbarrow Rolls Into The Powdermills!

On Wednesday 16th March 2011 an item which had for some years been on display in the foyer of Leicester De Montfort University's School of Engineering was gifted to the Royal Gunpowder Mills Museum. Known as "Wheelbarrow", the machine is a caterpillar-tracked, remote-controlled robot designed to neutralise car bombs and suspect packages without endangering personnel. It is thought that this particular machine had gone to Leicester De Montfort University for some development work some twenty or so years ago.

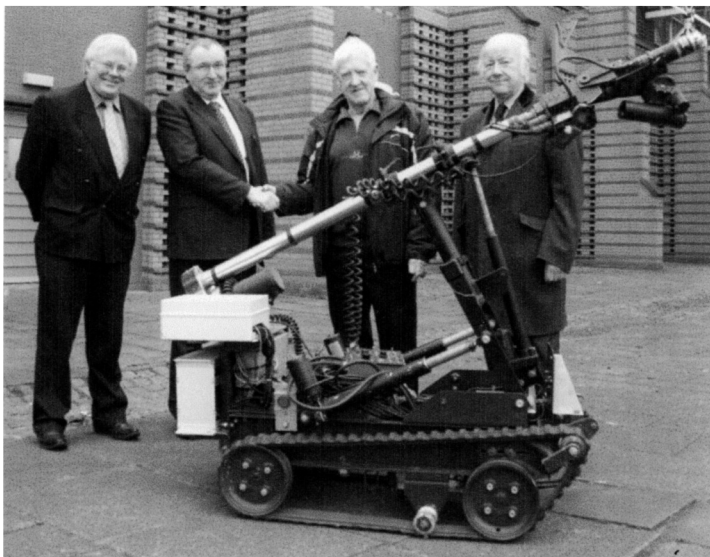
The photograph shows, from left to right, Roy Carter, of Aptifirst Instrumentation and Technology, Prof. Bogumil Ulanicki, Head of the School of Engineering, Dr Dave Sims of the Friends Association and Dr Geoff Hooper, the last Director of RARDE Waltham Abbey.

Roy Carter, who worked at ERDE/PERME/RO Waltham Abbey during the 1970's and 1980's and ran

his business from the University's Innovation Centre, had been chatting about a research project to the Chief Technician Paul Dean in the School of Engineering at the University, who told him that the "Wheelbarrow" was to be disposed of. Roy contacted Geoff Hooper and Dave Sims in order that the robot might be preserved for posterity.

There was a handover ceremony on Wednesday 16th March at the University at which the Head of the School of Engineering, Professor Ulanicki, entrusted the machine to the Friends' safe keeping.

At the handover ceremony Geoff Hooper said, "We are extremely pleased to be acquiring the Wheelbarrow at Waltham Abbey. Much of the development work and testing had been done at our sister RARDE establishments in the engineering, electronics and explosives sections, so it is very much going to be coming home."



Dave Sims observed, "We are hoping to strip down and rebuild the Wheelbarrow, so that it can be demonstrated as a working exhibit in the Museum. From the serial number, we should be able to track down the full service history of this particular machine".

Professor Ulanicki, in handing over the machine, said, "We are very pleased that this machine, which has been an exhibit in our foyer for so many years, is going to the Royal Gunpowder Mills Museum to be preserved to educate future generations of visitors."

But what exactly is a "Wheelbarrow" and what is its history? The Wheelbarrow is a remotely controlled robot designed by

Lieutenant-Colonel John Francis 'Peter' Miller in 1972 for use by British Army bomb disposal teams operating in Northern Ireland, mainland Britain and Iraq. Peter Miller was born in Darlington, the son of Colonel J. F. X. Miller, and educated at St George's College, Weybridge, and Sandhurst. He was commissioned into the Royal Tank Corps in 1932.

The name Wheelbarrow came about because the prototype was built out of a wheelbarrow and a lawnmower. Inventive by disposition from boyhood, Peter Miller realised that the simple means he had devised to trim his lawn, without the bother of walking behind the motor-mower, might have an important application

to bomb disposal. This clever perception was to go on to save hundreds of lives in Northern Ireland and elsewhere. Until 1972 bomb disposal teams of the Royal Army Ordnance Corps (RAOC) had no means of examining or neutralising IRA explosive devices from a safe distance. The number of RAOC Ammunition Technical Officers (ATO's) killed or maimed while attempting to disarm terrorist explosive devices in 1971-72 made it imperative for some form of remote controlled gadget to be introduced. This led Peter Miller, then a weapons and explosives trials officer, to be asked to devise a solution. His first trials were with a mortar-propelled grapnel hook on a line. But the weight of a line of sufficient strength to bear the weight of the car compromised the accuracy of the shot. It was then that Miller was reminded of his own lawn-mower device by seeing a powered wheelbarrow being driven on a football field. His lawnmower had a lanyard attached near the front roller and fixed to a post in the centre of the lawn, so that it mowed in ever decreasing circles until the engine cut out when it reached the tethering post. Miller visited his local garden centre intending to order a "gutted" mower, that being with only the chassis and motor as the basis for development. But the sales assistant

suggested instead a chassis of a battery-operated three-wheeled wheelbarrow. Miller took this and adapted it to carry a spring-loaded hook on a boom to reach beneath the suspect car, attached light nylon steering lines to the ends of the front axle for steering and fixed a rear shackle to drag the heavy-duty cable necessary to haul away the car once the hook had engaged. Trials showed that the device would work if handled with dexterity.

The death of an ATO in Belfast on 30th March 1972 decided Peter Miller to waste no further time on non-operational trials, and Wheelbarrow Mark 1 was sent to Northern Ireland that day. It was just 22 days since the problem had first been put to him to solve. The chief ATO in Belfast soon requested reinforcement by means of five more Wheelbarrows. In June 1972 the IRA drove a Ford Cortina packed with explosives into a car showroom in Belfast. A Wheelbarrow was deployed and the car was removed and destroyed without casualties or damage. Miller continued to persist with improvements, both in its steering and in its capability once in position. By mid-October 1972, the four-wheeled electrically driven and electrically steered Mark 3 had been in action on 21 occasions, the four



wheels providing the essential stability. The attachment of a closed circuit television camera, to enable the ATO to make a thorough close-up reconnaissance of suspect vehicles using a remote monitor, followed in November 1972, resulting in a significant breakthrough in bomb disposal operations in Northern Ireland.

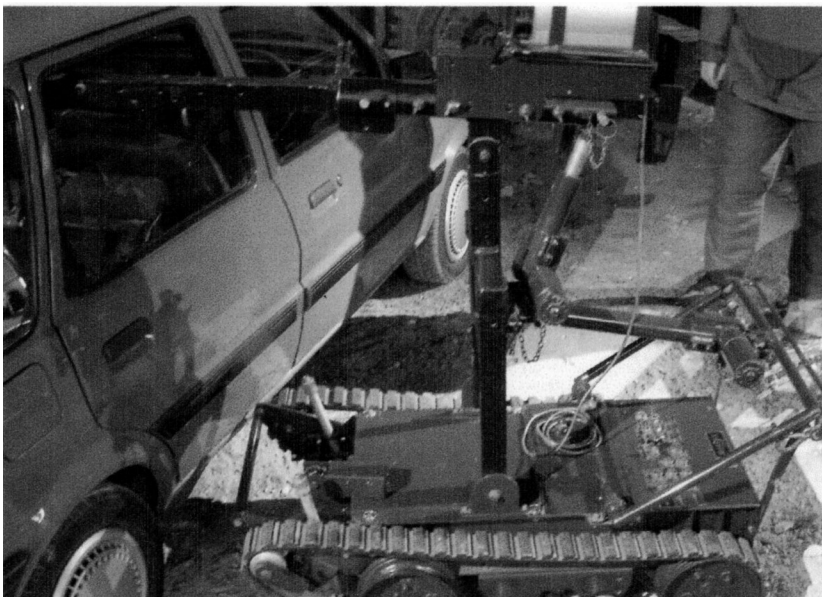
A scissors clamp to remove explosive packed milk chums and a "Pigstick" were added. "Pigstick" was a water-jet disrupter device that disabled improvised explosive devices (IED's). It fired an explosively-propelled jet of water to disrupt the circuitry of a bomb and thereby disable it with a low risk of detonation.

Tracks were fitted to the Mark 3 Wheelbarrow, which could already climb a

kerb, to enable it to negotiate a flight of three or four steps into a building, and it became the Mark 4. By November 1973 Wheelbarrow had been deployed operationally more than 100 times. In his refinement of it, Peter Miller was helped by Warrant Officer Peter Gurney, GM, who later joined the Met's Bomb Squad, won a Bar to his George Medal and was appointed MBE. The development was subsequently taken over by a team of engineers and the manufacture formalised. The Times of October 29, 1981, reported: "Wheelbarrow Mark 7 is said to be capable of handling six out of ten devices found in

Northern Ireland, and during the past decade must have saved countless lives." Some 400 of the machines have been destroyed in action and it can be assumed that thereby many lives have been saved.

Miller received no honour or financial award in recognition of his invention. The Committee of Awards to Inventors claimed that, as an officer of a Ministry of Defence research establishment, he was already "paid to invent". He did not actually claim to have invented the Wheelbarrow, but simply copied the idea from his own lawnmower control, and took satisfaction from the great number of lives the device



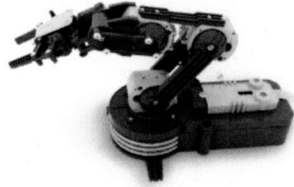
A similar device in action

had saved. Peter Miller had a distinguished military career, having served with the Transjordan Frontier Force between 1935 and 1941, then as a Squadron Commander of 6th Royal Tank Regiment in the Western Desert, where he was taken prisoner at the battle of Sidi Rezegh. He escaped from a prisoner-of-war camp in Italy in 1943, and made a 600-mile walk south in an attempt to reach the Allied lines but was betrayed and recaptured. He remained a prisoner until the end of the war. His post-war career was devoted almost entirely to weapon development and instruction. He commanded the Armament Wing of the Fighting Vehicles Research and Development Establishment from 1953 to 1957, which was latterly to become a sister establishment of the Powdermills, it being the Royal Armaments Research and Development Establishment (RARDE) (Chertsey) when we were RARDE Waltham Abbey. Work on the "Pigstick" water jet disruptor was undertaken at RARDE Fort Halstead. Lt Col Peter Miller worked at Chertsey as a trials officer after leaving the Army. He was born on 22nd March 1912 and died on 2nd

September 2006, aged 94. The precise history of the version of Wheelbarrow acquired by the Friends Association has yet to be established; it appears to have been used as a research and development vehicle, as it contains a number of features which are not to be seen on the versions used in Northern Ireland and elsewhere, as can be seen from the photograph. This shows the addition of various aluminium boxes on to the chassis. As Dave Sims observed at the handover ceremony, it is hoped that details of the Wheelbarrow's history can be gleaned from the present Explosives Ordnance Disposal authorities within the MOD, and that it can be returned to working operation in the not-too-distant future. For the time being it is lodged in the Rocketry display.

Dave Sims, Geoff Hooper

~~Don't~~ try this at home!



Anyone who wants a fascinating technical challenge can build their own remote controlled robot arm with this absorbing self-assembly kit. Although simple to construct, building the robot arm is a great way to learn more about basic robot technology and control systems.

With five motors for multi-directional control of five different joints, the robot arm features base rotation, shoulder, elbow and wrist motion as well as a functional gripping claw. The gripping claw also has an integrated LED spotlight for extra illumination of anything that you are going to pick up.

The five-way directional control allows the robot arm to grab, lift, position, lower and release items smoothly and efficiently. A wired remote controller gives the user complete control over all of these functions, and in addition to learning about robotic operation during the assembly process, manually controlling the arm is the perfect way to learn more about how machines work.

Available from Amazon, f33.48.

Obituaries

John Corjeag Cannell

All those who knew John Corjeag Cannell, who worked at ERDE, then PERME in the 1960s through to the 1980s, will be saddened to hear of his death at the age of 78, on the 30th April, here in his beloved Isle of Man. He leaves his wife Nora, and son William (a geophysicist), step-daughter Mary and two grandchildren.

John was a materials physicist who worked in Materials branch, and his broad Manx accent and forthright manner were widely known and appreciated throughout the establishment.

He was also a knowledgeable engineer, with a keen interest in steam locomotives, an interest I shared and which we discussed together occasionally when we met. I worked in Explosives and P2 branches, and so never actually worked with him, so others will be better placed to write more personal reminiscences.

Jim Hawkins

John Gooding-Pax Vobiscum

We have learned of the death of John Gooding at the age of 96. He will be remembered by many of the residents of the Monkswood Estate.

I recall meeting John as a colleague on P1, where he was engaged in conducting storage trials of propellants; reporting on these was, in John's words, known as 'knitting the fog'.

As a stalwart of the ERDE Croquet Club, John was able to pack all the balls, mallets and hoops in a box too small to accommodate them.

One of his wartime occupations was to carry buckets of molten RDX/TNT up a ladder to fill 'tallboy' bombs at Chorley!

No doubt our readers will have happy memories of John and our sympathies go to the members of his family.

Bryan Howard

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Deadline for the next issue is 28th October