



**Newsletter No. 126**

**July 2019**



**Libya April 2019**

## Membership Details

**Membership** of the Ordnance Society runs from 1<sup>st</sup> July to 30<sup>th</sup> June.

**Application Forms** can be downloaded from the membership section of the Ordnance Society web-site.

**Membership Rates** – the current rate for individual members is £25. A limited number of student memberships will be available at a cost of £10. Please contact Ian McKenzie for corporate, lifetime and overseas rates.

**Membership renewal Forms** have been included with this edition of the newsletter.

### **Payment**

Payment should be in £ sterling by personal cheque, banker's draft or International Money Order, payable to "The Ordnance Society". Overseas sterling cheques must be drawn on a London bank.

Payment via 'Paypal' may be possible – please e-mail The Ordnance Society for details. [ordnance.society@btinternet.com](mailto:ordnance.society@btinternet.com).

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### Save the Dates

The Nautical Archaeology Society and the Ordnance Society are co-hosting a two-day conference examining how ship and ordnance remains found on land and under the sea help our understanding of our maritime past. Bookings will open in August.



The date of the 2019 Ordnance Society AGM will be later than usual so that it can be held concurrently with that of the NAS at our joint conference. So the date will be Saturday 16 November 2019, probably at the end of the day's papers. Arrangements will be made to admit any OS members who wish to attend only the OS AGM.



## ***From the Editor – Graham Whittington***

Publication of the newsletter was delayed a few days so that the minutes of the Board Meeting held on 30<sup>th</sup> June could be included.

Thanks to everyone who sent in articles, photos, comments and queries for this edition of the newsletter and for inclusion in future editions. Please keep them coming. Articles from 'first-time' contributors are particularly welcome – book reviews, visit or interest reports, etc. Things you take for granted may not be known to other members but will be of interest to them.

**The next edition will be published in October 2019 – copy needed by 15<sup>th</sup> September.** Please send copy, electronically if possible as a WORD document, to [graham.whittington@hotmail.co.uk](mailto:graham.whittington@hotmail.co.uk) – contact me for my address if you need to send your copy in paper form. The contributor should ensure that any copyrighted material has permission for use and that the original owner is attributed. **Views expressed in articles are not necessarily those of the editor!**

I expect that many members attended or participated in D-Day commemoration events. I spent D-Day on a ship cruising past the Normandy landing beaches and attended a service on board in the company of three D-Day veterans – very interesting chaps. The ship sailed up the Seine as far as Rouen and almost every village and town, and several private houses, were the flying flags of all the nations which took part in the invasion.



### **Ordnance Society Visits (from July 2019)**

See the OS website for full details. Note that spaces on some of the events are limited, so if you are interested in attending any of these events, please contact the visits coordinator **Neil Grant** on [neilgrant2@yahoo.co.uk](mailto:neilgrant2@yahoo.co.uk) The events listed at the bottom of the page will only be organised if sufficient people are interested.

#### **VIP Spitfire & Hurricane Experience (17 July 2019, £70)**

A private guided walk around of restored WW2 Hurricane and Spitfire fighters, guided by the team who restored them, plus actually getting to sit in the cockpit of the spitfire and being talked through how to fly it. Located in Kent

**Armourgeddon tank museum (21 July, £6)** A visit to a small collection of WW2 and cold war vehicles, some of which will be running during our visit. Located in the Midlands.

**Crofton Beam Engines (28 July 2019, £8)** A visit to the Victorian static steam engines near Marlborough, which pumped water for the Kennet & Avon canal on a day when the engines are in steam.

**Fort Nelson (4 August, Parking charge only)** Fort Nelson now holds the artillery collections of the Royal Armouries – everything from medieval cannon to railway guns. This session includes a guided tour of the fort and the collection, including firing demonstration of several artillery pieces.

**Raglan Castle (11 Aug, £7 Pay on Day)** A chance to visit one of the most impressive ruined medieval castles in South Wales, just across the border.

#### **Vintage Bus to Imber Restricted Village (17 August 2019, pay on day)**

In 1943, the village of Imber (near Warminster) was requisitioned for military training. The civilian population was never able to return after the war, and the village continued to be used for urban combat training. Still in the middle of a restricted military area, it is not normally accessible.

**Escape Room Swindon (7 September 2019, £20)** Can your team escape from the locked room before the time limit elapses and the air runs out?

**Vulcan Bomber Experience (14 September 2019, £20)** A chance to get on board one of the most iconic British cold war aircraft – a walk around the aircraft with the ground crew, see the aircraft being powered up get into the cockpit for a talk from former air crew about flying the aircraft operationally.

**Avebury, Silbury & West Kennet (22 September 2019, Free)** A guided tour of these related Neolithic monuments in Wiltshire - a certain amount of walking.

**Stonehenge Stone Circle Special Access (Early Morning) (29 September 2019, £15)** An hour inside the circle for photography etc, and there will be a short, optional talk pointing out some features not normally visible from outside the circle.

**Tank Driving Day (6 October 2019 £175)** You get to drive four different military vehicles -a Chieftain tank, Abbott self-propelled gun, Stormer load carrier and FV432 APC. Near Winchester, no prior experience necessary.

**OS/Nautical Archaeology Society Conference (16/17 November, cost TBA)**

A joint conference by the Ordnance Society and the Nautical Archaeology Society, with two days of papers on the theme of "Wooden Walls & Stone Bastions" – held in Portsmouth.

**Dependent on Interest**

**Tudor Baking (TBA, £35)** Learn to make Tudor bread and cakes and bake them in a wood-fired oven in a historic property at the Chiltern Open Air Museum.

**Hands-on Falconry (TBA, £45)** A half-day session with a falconry school at a historic property in Northamptonshire. Weather dependent – basically, the birds don't fly in heavy rain.

**"Artistic" Blacksmithing Day (TBA, £140)** This is a basic blacksmithing course with no prior experience required, run near Marlborough. As part of the course, you will make a metal ornament of your own design, hence the "artistic" label, to distinguish it from farriery or bladesmithing type blacksmith work.

**Polo Taster Day (TBA, £120)** This starts with an explanation of the rules and learning to hit a polo ball correctly on a wooden horse, before mounting up and learning to apply the knowledge on horseback. Note that the venue for this is likely to be in the Midlands, but may change. Being able to ride is a requirement for this session.

**Horse Archery Day (TBA, £185)** It starts with a short ground session teaching the specialist horse archery draw before mounting up and learning to apply the knowledge on horseback. . In Hertfordshire.

**Zombie Boot Camp (TBA, £99)** As part of a small group of survivors, armed with simulated modern weapons, you have to fight hordes of zombies in a 32,000 square foot purpose-built gaming area including streets, bunkers and tunnel complexes, some of them filled with disorienting lights and smoke. Then you get made up as a zombie, and get to try and eat the brains of the next group of poor fools..... Note that this is located in the west Midlands, and is a relatively physical day.

**Visit to the French tank Museum, Saumur (TBA, circa £500)** This will probably be a long weekend trip – travel down one day, two full days at the museum with an English-speaking guide and travel back on the last day. The price will include travel, hotels, admission and guide. We're still in the planning process on this, and much will depend on how many people want to go, but it is likely to be toward the end of the year.

**Query from Jonathan Greenland, Ph.D.**

**Director, National Museum Jamaica** - [jgreenland@museums-ioj.org.jm](mailto:jgreenland@museums-ioj.org.jm)

I was wondering if OS members could help us. There are the remains of an old Victorian battery in Port Royal (see below photos) and we are trying to work out what kind of gun used to be there. Could you point us in the right direction?

The maps from about 1880 state there was a 7" RML gun but the pivot that remains doesn't look quite like that. Thank you for any help you can provide.





**Query From Gus Mellon** - gusmellon@hotmail.com

**Re: British Submarine Torpedoes and Their Warheads, circa 1914**

I am a retired submarine engineering officer of the Royal Australian Navy. From 2012 to 2015, I was a researcher and contributing author of the second edition of Dr. Michael White's seminal work on the history of the Australian submarine service: ([www.submarineinstitute.com/Shop/Books-and-DVDs/Australian-Submarines-A-History.html](http://www.submarineinstitute.com/Shop/Books-and-DVDs/Australian-Submarines-A-History.html))

In December 2017, I was also a member of the search team on board the Fugro Equator survey ship, when we found wreck of the Australian submarine AE1 off the Duke of York Islands, near Rabaul, PNG. I am currently assisting in the development of a study concerning the risks associated with the eight torpedo warheads which are still within the wreck. As far as we are able to determine from the available records, the AE Class submarines were fitted with either Whitehead Weymouth Mk I, or Royal Gun Factory Mk VII torpedoes. We are in possession of a copy of the Admiralty Torpedo Drill Book 1914 (updated to May 1915) and this gives a reasonable amount of information about the torpedo, the warhead and the firing pistols.

The sum total of drawings available from the Australian Archives however is very small, and our colleagues at the Barrow Submariner's Association have not had any better luck finding drawings in the Vickers Archives. So, our detailed knowledge of the submarine and its weapons systems is rather limited. We did find a few drawings related to the structure of the bow and stern torpedo tubes but, as one would expect, nothing on the actual torpedoes. I would be extremely grateful for any information that members can share with me regarding these weapons and their warheads and firing pistols, in particular any drawings, or details of any other sources I could contact.

**Reply from Geoff Smith**

I would first ask at [www.nmrn.org.uk/our-museums/explosion-museum-naval-firepower](http://www.nmrn.org.uk/our-museums/explosion-museum-naval-firepower). This is the RN museum of ordnance. When I was researching torpedo starter cartridges, they found for me the complete maintenance manual of the torpedo.

For the boats

[www.nmrn.org.uk/submarine-museum](http://www.nmrn.org.uk/submarine-museum)

Torpedo history

[web.archive.org/web/20121010140644/http://www.btinternet.com/~philipr/torps.htm](http://web.archive.org/web/20121010140644/http://www.btinternet.com/~philipr/torps.htm)

More links

[web.archive.org/web/20110927114732/http://www.weymouthdiving.co.uk/torpedoes.htm](http://web.archive.org/web/20110927114732/http://www.weymouthdiving.co.uk/torpedoes.htm)



## ***From William Clements***

### **4.7-in QF Gun on Spike Island**

For those members who find themselves in or near Cork on holiday or on business I would strongly recommend a visit to Spike Island in Cork Harbour, accessed by ferry from the pleasant little seaside town of Cobh.

Spike Island with Fort Westmoreland was a major part of the British defences of Cork Harbour from the late 18<sup>th</sup> Century until handed over to the Irish government in 1938. Fort Westmoreland was re-named Fort Mitchell and continued to form part of the defences of Cork Harbour during the Second World War, or The Emergency as it was termed in Ireland, subsequently becoming a prison.

Now a major tourist attraction Spike Island today houses, amongst its attractions, an excellent collection of artillery assembled from around the Republic of Ireland by the Administrator, Tom O'Neill, with the assistance of the Irish Army.

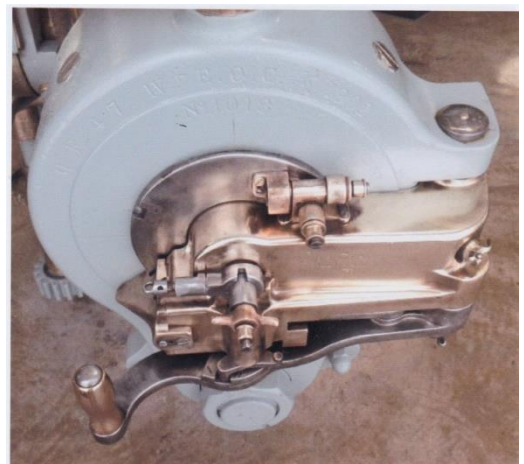
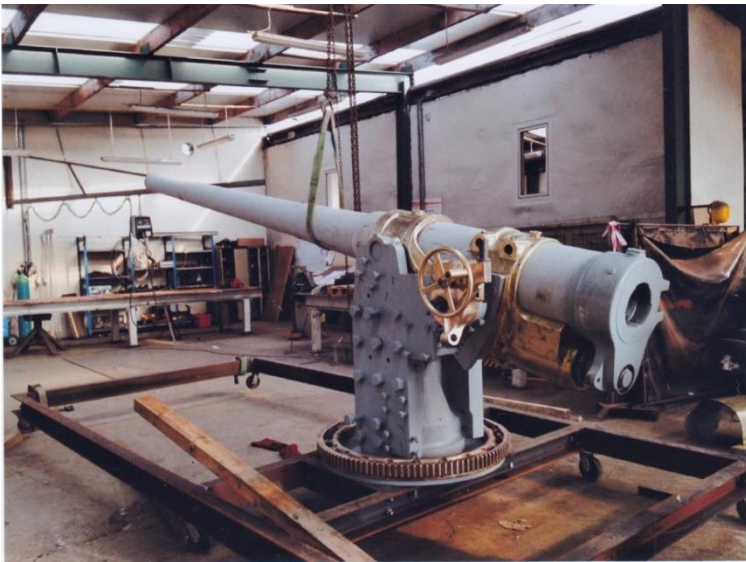
Tom O'Neill has assembled an excellent collection of artillery pieces amongst which are a 7-in RML Mk I (RGF, No 151, 1865); a 12-pdr QF gun complete with original shield; 17-pdr A/T gun; 25-pdr guns including a Mk I 18/25-pdr; and two 6-in BL Mk VII coast defence guns still in their original positions in the fort.

Tom has been assiduous in seeking out guns, particularly guns still in the hands of the Irish Army. Perhaps the star of the display in the new purpose-built gun shed inside the fort is the 4.7-in Mk IV gun on Mk III carriage. During The Emergency the Irish government endeavoured to obtain a number of guns for the defence of the Shannon, Waterford and Galway.

Winston Churchill was reluctant to provide these weapons because of Ireland's neutrality in the war, but eventually agreed and two 6-in Mk VII guns were delivered in late 1941. However, it was not until 1944 that two 4.7-in QF guns were delivered for Galway. Since the Second World War was then in its final stages it is, perhaps, not surprising that these guns were never installed.

Some years ago one of the two 4.7-in guns was placed on display in the Fort Dunree Military Museum in County Donegal, but Tom O'Neill was recently tipped off by a contact in the Irish Army that the remains of the second gun were laying in a field at the Curragh Camp in County Kildare. Tom acquired the remains of this gun, less the breech-block, and moved them to Spike Island for restoration funded by Cork County Council and the Irish Tourist Board. The breech markings are: QF – 4.7 – IV – EOC - 1902 – No L1018. Subsequently, on a further visit to the Curragh the breech-block was discovered on the shelf in a storeroom.

The below photographs show the remains of the gun in the field at the Curragh; the gun in the process of its restoration; the restored gun on display in the Gun Shed in Fort Mitchel on Spike Island; and a close-up of the re-conditioned breech-block and the breech markings.



**From Geoff Smith**

**Response to Sjef Pijls article - OSNL 125**

In OSNL 125 Sjef Pijls asks what is wrong with his theory. A comprehensive answer to that question would be lengthy and I would not wish to try the patience of members with a dissertation on partial vapour pressures.

However, briefly, the saturated vapour pressure (SVP) above various salt solutions is well known and used to produce defined humidities *in an enclosed space*. In an open atmosphere, the figures quoted are meaningless.

The facts about early saltpetre are clear. Kramer's claim that it was calcium nitrate is based on an unsupported assertion and his inability to understand either the chemistry or the clear evidence of the *Fuerwerksbuch* itself. It is disappointing to find that his spurious ideas are still being disseminated.

To avoid repetition, members can find the facts fully examined in several papers at:

<https://independent.academia.edu/GeoffSmith17>

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**Queries from Peter Webster - [artillerist@iprimus.com.au](mailto:artillerist@iprimus.com.au)**

**Re: Woolwich Photographic Archives and Allen Brake Set**

I am a member of the Ordnance Society living in Croydon, Sydney, Australia and have two questions.

With the dissolution of the Royal Arsenal Woolwich Historical Society a couple of years ago, can anyone tell me what happened to their photographic archive?

Secondly, can anyone tell me the location, or a person who would know, of a complete Allen Brake set for Garrison Standing Carriages? In a number of locations there are various bits and pieces relating to Allen Brakes, but it would be nice to know if there is a complete 'set' somewhere with all the linkages and original wood block. I will be using the data to complete my drawings of 68 Pr Rear Chock Carriages used in Australia.

**From Geoff Smith**

**Book Review**

**INTERIOR BALLISTICS Part 1**

**Properties of powders and their action in closed chambers and in cannon**

**Maj Gen A Brynk translated by John B Bewrnadau US Navy 1904**

The end of the nineteenth saw the apex of gunpowder as a propellant and the introduction of smokeless powders. The change did not take place overnight. Both were current at this period and were investigated thoroughly by many of the great names of chemistry. Noble and Abel are well known for their investigations in the field but their work was supported and confirmed by a plethora of the famous; Bunsen, Gay-Lussac, Boyle.....to name but a few.

Thus this work written in pre-revolutionary Russia compares the properties of the powders current in both Russia and Europe and was considered sufficiently important for the US Secretary of the Navy to commission a translation.

The term 'Black Powder' had evidently not yet become current and instead the text refers to smoking and smokeless with the former including both black and chocolate powders. Smokeless powders are considered as 'pyroxyline' (modern single base) and 'nitro-glycerine' (double base).

There are some interesting and little known facts such as a French service powder containing a significant portion of (presumably paraffin) wax and an unidentified Spanish 'spherical' powder.

There is a resume of the work of General Piobert whose law is often quoted. It is made clear that his findings were based on open burn trials and although his linear burning law applies to smokeless powders, it breaks down when 'smoking' powders are burned under pressure. This is due to the fact that the grains are porous allowing the flame front to penetrate and evidence is given to support this in that the burn rate is clearly shown to depend on the degree of compression, hence porosity, of the grains.

Although metric units are used for temperature etc., where service charges are discussed the pound weight is not the English pound except where specifically stated. Thus the charge for the Russian 4 Pdr light gun is given as 1 pound (funt) 65 zolotniks. Fortunately the internet provides conversion tables.

Thermodynamics, the kinetic theory of gasses and thermochemistry, vitally important to any extensive study of interior ballistics but frequently ignored, are extensively covered.



Unsurprisingly, as serpentine powder was long obsolete, there is no mention of its radically different burn characteristics, but I hope to enlarge on this in a future Journal article.

Overall this is a most valuable addition to the record of our understanding of propellants at a critical period of their development.

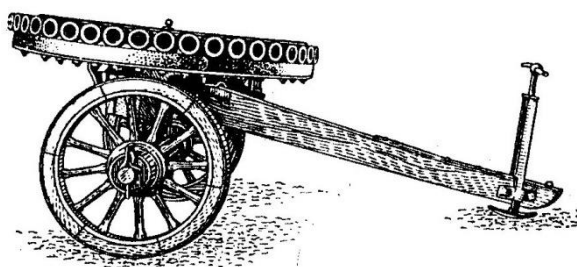
The book has recently been re-printed in facimile and is readily available from internet sources. The full text is also available on line at:

[https://archive.org/stream/interiorballisti00ingarich/interiorballisti00ingarich\\_djvu.txt](https://archive.org/stream/interiorballisti00ingarich/interiorballisti00ingarich_djvu.txt)

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**From Senior Captain Yuri Kulikov**, Russian Navy (Retired)

**Response to Query re Multi-Barrelled Gun**



In OSNL 125 Rob Morgan asks about the details of the vertically directed artillery battery. This is a 3 pound mortar battery of 44 barrels, which is on display in Military Historical Museum of Artillery, Engineer and Signal Corps in St. Petersburg. It was designed in 1741 by Andrey Nartov, scientist,

member of Russian Academy of Sciences (born in 1723, died in 1756). Nartov finished Nautical School and worked as a turner under Peter I. Subsequently, he took a position of Ordnance and Fortification Office Adviser.

His battery consisted of forty four 23-cm-long bronze small mortars, calibre 3 pound (76 mm), grouped in 8 sections, each comprised of 5 or 6 mortars, which were attached to a horizontal round wooden platform diameter 185 cm mounted on a carriage. A screw mechanism in the carriage trunk served to lay elevation.

By inventor's idea, grouped mortars were intended for sustained high fire at closed targets. While some were aimed and fired, others were quickly charged and by means of platform rotation took place of discharged ones. This should improve the rate of fire, by Nartov's idea.

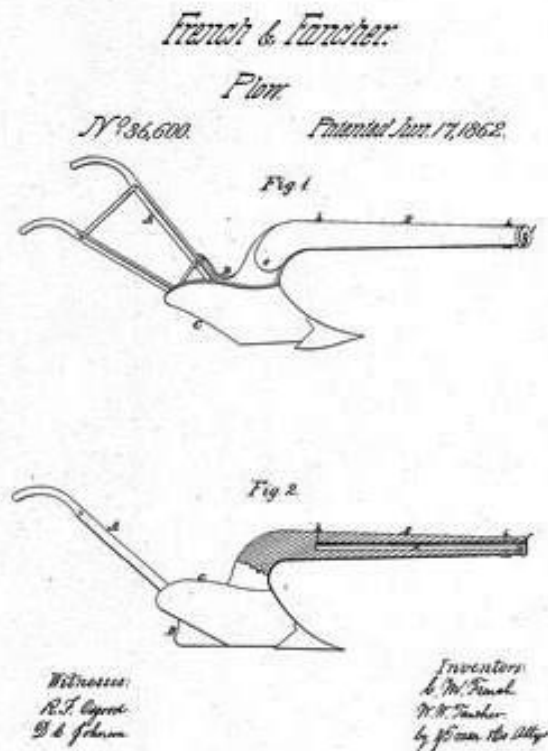
However, this pattern did not spread in practice because the vertical aiming mechanism could not provide for all required high fire angles. Besides, there were difficulties in the battery transporting, setting and serving in combat conditions, which prevailed over its advantages.

**From Geoff Smith**  
**Another Odd Gun**

Like Rob Morgan I have a great affection for the eccentricities of gun designers.

I loved the vertical/horizontal gun. What goes up must come down so I guess that the gunners shield might be better positioned!

Trawling through patents, as you do, I found this one to add to the collection. In June 1862 C.M French and W.H Francher obtained US Patent 35,600 for **Improvement in combined plow and gun.**



Presumably a farmer in troubled times should be prepared for any eventuality!

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**From Frank Garie**  
**Publications Formerly Produced by DP & G Publications**

If members are interested, a better class of reprints are available from Gyan Books, New Delhi ([www.gyanbooks.com/](http://www.gyanbooks.com/)). (This source is normally found on Abebooks, [www.abebooks.com/Gyan-Books-Pvt-Ltd-Delhi/54157392/sf](http://www.abebooks.com/Gyan-Books-Pvt-Ltd-Delhi/54157392/sf) but the Gyan website is quicker to search).

These reprints are properly bound, the frontispieces are in the proper place, and prices are cheaper than the versions published by both Forgotten Books (UK) and those mysterious publishers in the USA. There are a few minor glitches with the Indian reprints, but at least Gyan can be contacted and respond. As you may be aware most of the faults in these reprints occur in the scanning process. Unfortunately [www.archive.org](http://www.archive.org) does not contain all of these scanned books, i.e., in the case that one seeks them out for details of the faults and omissions.

**From Rob Morgan**

### **Aunt Dora's Holiday Photo**

Most of the family know my interest in ordnance and fortifications, so I get odd things passed to me. Like this... taken in Mdina, Malta. A lovely gun on a replica carriage, which doesn't suit it at all. That's it! I should be grateful of course, but it's tantalizing, the decoration is almost visible, almost. There's bound to be a decipherable inscription or two, and the gun looks in magnificent condition. I'm sure lots of OS members take their own holiday photos of cannon.



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### **A WWII Gun Bunker on Guernsey**

I took this photo on holiday, in St Peter Port. It's the interior of, I think, a 47mm gun position, on the sea front covering the harbour.

The basic elements of the gun are obvious, but the use of a hefty weapon like this in the confined spaces of a bunker must require some specific adjustments not seen in a field gun or a tank mounted version.

Can someone provide a little additional information?



Perhaps there should be a 'photo page' in the Newsletter, like there is in many of the ship and railway journals?

**Editors Note:** Great idea. This type of 'holiday snap' would be very welcome.

**From Neil Grant**

**Report on OS Visit to Defence Academy Shrivenham**

A group from the Ordnance Society recently visited the Defence Academy at Shrivenham.

We started in the artillery collection, with a detailed briefing on the 105mm Light Gun. While these weapons were first used in action during the Falklands War in 1982, the current version has been significantly updated. In particular, the current version has a ruggedised fire control computer, able to factor in variables such as temperature and relative elevation of gun and target far more quickly than manual calculations could.

Since GPS could potentially be jammed by sophisticated adversaries, each gun also mounts an aircraft-style inertial navigation unit which can locate the gun exactly without external inputs, powered from a battery on each gun. Of course, as the instructor stressed, crews are still trained for fire using "reversionary means" such as maps, and even via direct fire sights for last ditch defence.

We went through to the artillery hall, which does contain a number of unusual historic guns such as an 1889 12pdr QF gun, a 1927 German IG18 75mm infantry howitzer and the inevitable 18 and 25pdrs.



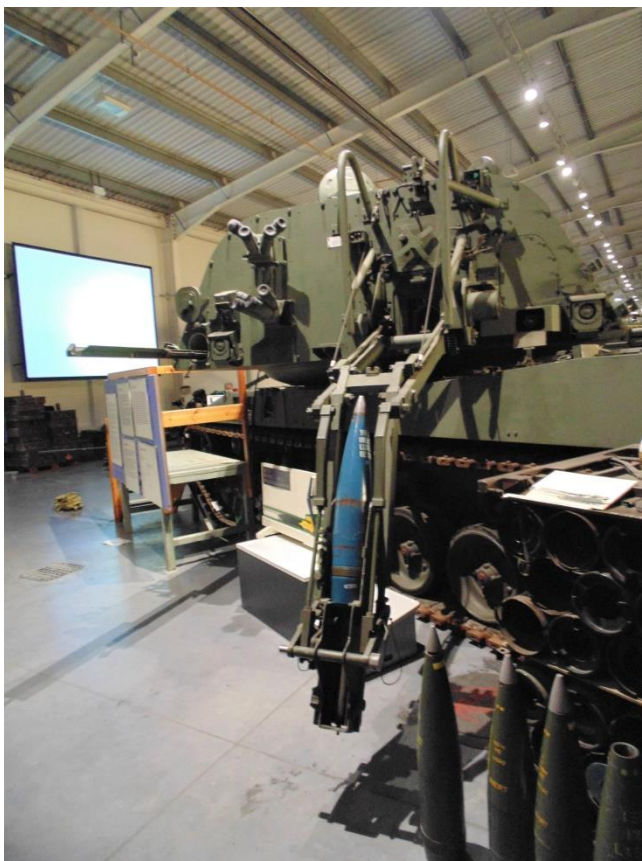
12 pdr QF Gun 1889





IG18 75MM Howitzer

However, as a modern teaching collection, the focus was on more modern weapons, in particular an excellent collection of comparative 155mm towed howitzers, including the current UK FH-70, the new lightweight US M777 and the South African G5, which can even be driven short distances to reposition or evacuate it.

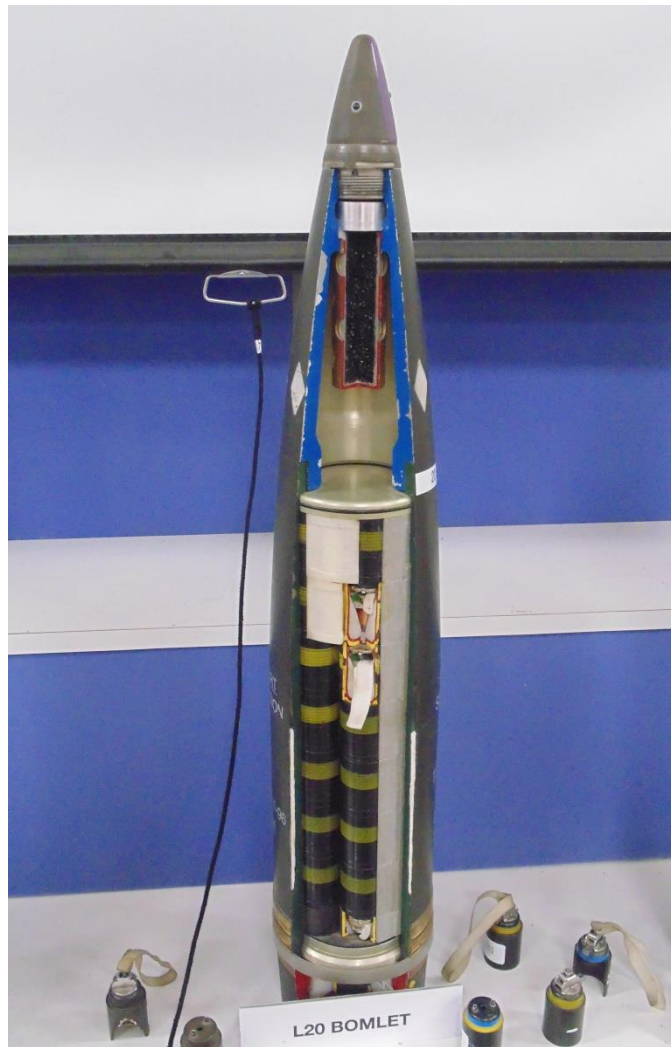


Of course, while the towed guns have the advantage of being deployable by helicopter as underslung loads, most 155mm systems these days are self-propelled, and the artillery collection includes examples of both the current British AS-90 and one of the SP-70 prototypes. The later was an attempt to develop a common European vehicle, and followed programmes like the equally ill-fated MBT-70 to failure, but did have an interesting mechanical ammunition handling system that would load shells from pallets on the ground or on a supply vehicle directly into the vehicles' autoloader.

← SP 70 Mechanical Loader

We also got to look about the rest of the artillery collection, including observation drones, a complete towed Rapier SAM set up (...requiring three separate trailers for launch unit, radar unit and fire control unit, and thus rather making the case for the all-in-one tracked version we saw at Larkhill earlier in the year) and a 105mm pack howitzer.

They also had a number of interesting cutaway 105mm and 155mm rounds, including bomblet carrier munitions. These are prohibited under current UK rules of engagement, but it's comforting to know we have some tucked away in case of emergency. We also got to handle inert drill rounds, always a nice reminder that they vary from "Not that heavy" (105mm) to "Heavy" (155mm) to "Stupidly heavy" (175mm).



We then moved on to the armour collection, which has a series of British and Soviet vehicles illustrating armoured vehicle development and various design possibilities, including British Centurion, Chieftain and Challenger tanks and Sabre and Spartan light vehicles, Soviet T-34/85, T-62 and T-72 tanks and BMD and BMP light vehicles, and a Swedish S-tank.



Sectioned Leopard

One of the nice things about the Defence Academy being a working collection rather than a museum is that the staff were entirely happy for us to climb (or squeeze ourselves, in the case of the Soviet vehicles) into the various crew positions, which gave a useful insight into the lives of tank crewmen one doesn't generally get.

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***From Terry Gander***

### **LOCAT – A Late Air Gun Development**

Military air guns have cropped up throughout the history of ordnance but seem to have ceased to exist after the end of the Great War. Even then their employment was more down to a scarcity of conventional propellants or their manufacturing facilities than any other reason. After 1918 air guns virtually vanished from the military scene.

But not entirely. While sorting through some negatives taken in about 1990-91 I came across an odd item known as the Low Cost Artillery Trainer (LOCAT), proposed by Ferranti International, Mitchell Division. It was intended to be a relatively low cost system for the training of artillery or mortar forward



observers without the need for swathes of safety range real estate by using compressed air to propel 80mm fin-stabilised aluminium-bodied projectiles to a maximum range of 5000m. On landing 600g of high explosive inside the projectiles produced a realistic smoke puff and flash for a trainee observer to make appropriate fire corrections under live field conditions rather than in the rather basic indoor training systems then in use.

Accuracy was stated to be good with optimum dispersion results at around 4000m and a maximum rate of burst fire being three rounds in 40 seconds. The prototype's smooth-bore barrel was held at a fixed elevation angle on a 25-pounder carriage which was intended to be only a system demonstrator – virtually any other platform could be utilised, including trucks or trailers. Range variations were produced by varying the degree of compressed air involved. Despite its promise as a training system LOCAT faded from the scene. It was only finding the prototype images among my negatives that brought it back to mind. In these days of restricted military budgets something like it may well appear again.



**From Rob Morgan**  
**In 'The Times'....**

Quite often, the small column bordering the weather page in 'The Thunderer' provides items of great interest to the curious. On this particular day, a device invented in rather unusual circumstances during WWI was mentioned, though I think poorly described.

Weather Eye – Paul Simons

During the First World War the Allies developed a tool that recorded the sound of hidden enemy artillery guns and helped to reveal their locations. An array of microphones spread over long distances had been tried, but they did not work. If the wind blew, the sound waves would get lost and the microphones couldn't tell the difference between the blast of a gun and the shock wave from a shell.

William Lawrence Bragg, a brilliant young physicist from Australia, was brought in and made an unexpected discovery. In 1916 he was sitting on a privy in a hut some 10km from the battlefield at Ypres. The only outside airflow came through the waste pipe beneath the toilet, but when a nearby gun fired, its low-frequency sound wave - although hardly audible - was so powerful that Bragg was lifted off the privy. Shock waves of shells flying through the air did not have this effect - how to exploit this difference? William Tucker, a member of Bragg's team, made another astonishing breakthrough while resting in a hut covered in a waterproof stiff paper. When artillery guns fired, cold puffs of air hit his face through holes in the paper. It wasn't the wind, however, it was the change in air pressure from the guns.

Tucker and Bragg invented a microphone that utilised this cooling effect. They inserted a wire through a hole in an empty ammunition box, stretched and heated the wire, then passed an electric current through it. When a gun's sound wave passed through the hole, it cooled the wire and made more current flow. A shock wave from a passing shell had no effect.

The electrical signals from the microphones were then passed through long copper wires stretched between magnets, making the wires move enough to record the movement on film. Within minutes the timing of the electrical pulses was used to calculate the exact location of a gun. This made a big difference in the ability of the Allies to destroy German artillery.

In ordnance terms this unnamed detector must have been critical to much gunnery work, though the writer seems intent on concentrating on the "Eureka!" moments (hm?) which inspired its creation at the outset.

Does anyone have more information on what Paul Simons describes, 'the Tucker and Bragg' microphone?



**From Andrew Cormack**  
**A Surprising Find**

During a trip to look at Clifford's Fort on the northern bank of the River Tyne, I was delighted to find that the late seventeenth century battery was still there. It was garrisoned in the C18th by an Invalid Company, the personnel of which was found from Out-pensioners of the Royal Hospital, Chelsea.

Two nineteenth century guns are displayed in the fourteen remaining embrasures, though plans in the British Library indicate that the original number of guns was supposed to be 30. A plaque records that in 1672 the armament was twenty 20 Pounders - culverins - and ten 10 Pounders - demi-culverins. The battery was intended to defend the mouth of the river and prevent incursions by the Dutch or the French who intended to damage the shipping or port facilities of Newcastle.

One of the original buildings that housed the Low Light, which when sighted in line with the High Light on the hill behind the fort, guided ships safely into the river, is now a local authority museum. It houses a pleasant display about the fort and the general area. However, in the courtyard behind I was astonished to find two ancient guns. The images, with my brother's shoes acting as a scale at about 12 inches long, show these two interesting pieces.



Both are breech-loaders of, I reckon, the late sixteenth century. The longer gun, of very small calibre with a hexagonal muzzle, has lost the rear part of the breech frame. The shorter and larger calibre gun shows very stubby trunnions and the broken remains of an aiming filler. Presumably both pieces were originally equipped with stemmed yokes that could be slotted into holes in the bulwarks of a ship.

The provenance of both pieces was said to be that they had been dredged up out of the river some decades ago and had been acquired by a local antiquary. On his death, they passed to the museum. It seemed to me that they were A. interesting and B. rather "unloved" and worthy of more care and attention than they were receiving at the time of my visit.

I wonder if any Ordnance Society member who lives nearby would be interested in recording them properly.

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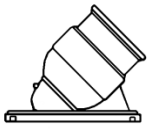
**Query From Rob Morgan**  
**History of British Minefields**

That splendid quarterly - 'The Mariner's Mirror' - is immensely valuable for its frequent ventures into ordnance at sea and for coastal defence.

The May 2019 issue (Vol 105:2) contains an excellent article by Innes McCartney on the subject of U-Boats. Specifically their substantial losses in the English Channel during WW1 Now, among the references quoted as having been consulted is this.

L.Leith... 'History of British Minefields 1914-1918' unpublished manuscript (Naval Historical Branch, Portsmouth, 1920)

Simple question - does anyone know of an accessible source for this manuscript?



## THE ORDNANCE SOCIETY

### Minutes of the Board meeting held in Shoreham on 30 June 2019

#### 1. In Attendance and Apologies for absence.

In attendance: Neil Grant, Nick Hall, Peta Knott, Geoff Smith, Graham Whittington.

Apologies: Trevor Parker, Ian McKenzie, Nick Reed, Peter Norris [TP joined the meeting for a short while by conference call].

#### 2. Minutes of the meeting on 10<sup>th</sup> Feb 2019 were accepted.

#### 3. Matters arising. Taken during the meeting.

#### 4. Chairman's Report.

TP sent the following, read out at the meeting:

Our first Journal printed in colour (Vol 25) has been well received and is not significantly more expensive than B&W. We are also getting up to date with publishing our Journals thanks to a super effort by Clive Woodley and Kay Smith; Clive is looking to produce the next one before the end of this year. I believe that our finances can cope with this and recommend that we proceed.

I have been handling the packing and posing of the last two Journals but want to hand this over to another board member. The procurement of stamps and sticking them to the envelopes has been made much simpler and quicker by using the Post Office "Drop and Go" system. The recent batch of Journal envelopes also had a return address printed on the back in case of non-delivery; and I'm in the process of printing an OS logo on the front of future envelopes as well. These printing additions will also apply to Newsletter envelopes.

The plans for the joint Conference sound well in hand and I'll leave it up to the OS lead for the project, Graham to give his update.

Although Bryan Martin's electronic files seem to have been lost, one of our Australian members, Frank Garie, has recommended a web-site that has similar items available; this is still to be investigated.

Posters and a 'DL' folded brochure are still awaiting designs from Peta. My local printer produces these types of items at a very reasonable cost. [Peta has designed these, NH].

ISSN number for the Newsletters is awaited from GW [see below].

Still waiting for additional Newsletter indices from Peter Norris.

I am awaiting the files from Kay Smith for Vols 24 and 25 then I will add to the web-site as well as complete the indexing. We will then have all Journals fully indexed and downloadable.

The Royal Artillery *ArtilleryFest* 2019 event has apparently run into problems, but Rick Hatton will keep us up to date with developments.

#### 5. Treasurer's Report.

Total current funds £9187

Business Current Account Current balance £ 814.99

Journal printing<sup>1</sup> £1332  
Journal postage<sup>2</sup> £ 691  
Total journal costs £2023 i.e. £8 per journal  
Business savings account Current balance £ 8372.01  
(£1000 transferred to current account to balance journal expenses)

Current funds are sufficient to allow us to catch up with Journal issues. The change to full colour printing has significantly increased the cost per journal. However postage costs continue to escalate. The Board should consider the cost of back numbers "Non-members are of course welcome to access and download these Journals, at the same cost as a paper copy, i.e. £5 each". Previous journals were printed at the lower cost and are currently a reducing asset but future editions will carry the current cost. There is no current estimate for any costs associated with the November conference

## **6. Secretary's Report.**

Routine business conducted; some inquiries forwarded by TP answered. Glad to hear that GW replied to Mr Boucher-Hayes for Irish Radio, regarding Spanish Armada wrecks. It was agreed that dates for future Board meetings could not be fixed before we establish the use of conference calling. However, there would be a short Board meeting after this year's AGM. This AGM will be later than usual, so that it can be held concurrently with that of the NAS, at our joint conference. So the date will be Saturday 16 November 2019, probably at the end of the day's papers. Arrangements will be made to admit any OS members that wish to attend only the OS AGM.

Regarding the composition of the Board, NG proposed that ALL Board Members should have a job. This would need an adjustment to the Constitution but was agreed in principle *nem. con.*

The best day of the week for face-to-face Board meetings was discussed. It was agreed that Sunday remained the most suitable.

Conference call meetings.

Members were very grateful to PK for trying to set up a conference call meeting instead of this one, but it had been felt that we should keep to the arranged face-to-face meeting in Shoreham. However, we were glad to try out the system provided by PK, so at about 1.30pm, PK activated the system on her laptop and we were able to try it out, with TP successfully joining us for a short while. The program seemed to be excellent and the Board agreed to try to use it for alternate meetings, or as seems best.

## **7. Membership Secretary's Report.**

Ian McKenzie provided a written report and a list of new members. Membership had increased to 168 and several prospective members were interested in joining. But several deceased members were reported. He also wrote that copies of the OSJ for sale must be at a cost that at least covered production and postal costs for J24 [CW's first] onwards, and possibly for J23 also. Otherwise we risked devaluing the benefits of OS membership. And we needed to be able to fund future issues. He believed that TP had all the stock of Js 24 and 25: he had none.

It would be assumed that any new members supplying an email address will receive the N/L by email; but they will be given the option of receiving the N/L by



post instead. GW would revise the membership form for inclusion in the N/L. TP queried the number of members on the mailing list compared with the number of paid-up members – he will contact Ian direct regarding this matter. Mr Jensen-Jones Journal was returned, so we need his new address: Nick Reed is believed to have it and is asked to provide it to IMcK. (TP has already updated IM with this.)

### **8. Journal Editor's Report**

Volume 25 (2018) of the OSJ had been produced successfully for distribution early in June. Sincere thanks were recorded to Kay Smith and Trevor Parker for all their assistance and support. The Editor also thanked the Board particularly for agreeing the use of full colour; he hoped it would be possible to continue the use of colour.

Volume 25 had been intended to contain the remaining papers from the Guns from the Sea III conference [2015] not printed in Volume 24 due to lack of space or not being ready in time.

There are sufficient papers to fill up Volumes 26 and 27, including a 57 page paper from Rudi Roth. A concern was the time delay before Volume 26 and then 27 are published. No date had been tentatively set for the publication of Volume 26. The preference is earlier rather than later. December 2019 would be good, subject to the OS finances being able to bear the production and postage costs.

Any questions or comments will be gratefully received. It is gratifying to have received several supportive emails already following the publication of Volume 24.

The Board agreed that the change to colour was really good, both in appearance and because it allows a better understanding of the pieces illustrated; but of course, B&W images could still be used when appropriate. Finances permit the continued use of colour and the printing time suggested.

The Board offered its warm congratulations to CW. Considering Rudi Roth's paper, which none of the Board had seen, it was felt that we needed to see it but that it was too long for the Journal. Perhaps it should be published on our website, with a 'Print Option'.

The new membership pricing structure agreed at the last Board Meeting needs to be put into action.

This should lead to cost savings needed, as identified by TP. Further discussion was needed on making the Journal available online.

### **9. Newsletter Editor's Report.**

July's N/L ready so NH to send minutes asap. It will contain a new membership form.

GW had investigated the matter of getting an ISSN for the N/L. It was confirmed to be optional and not usually obtained for this type of newsletter. After discussion, it was worth looking into but the Board considered it unnecessary to use ISSNs for the OSN/L. No action needed.

Regarding TP's concern over posting costs, GW reported that 'Fulfilment Centres' have mailing facilities, they can print material, put it in envelopes and post. Or they will take printed item ready to send and post it at good rate. It could offer a worthwhile saving per Journal posting: the current postage including envelopes and labels was £691. GW happy

to get quotations but needs numbers and details from TP eg for where all the Journals are sent. NG supported and the meeting agreed. NH to ask TP for the info.  
GW had plenty of articles coming in for the N/L.  
It was agreed that the N/L to be free to all on OS website. *Nem. con.*  
Members congratulated GW on the continuing excellent N/L.

### **10. Visits Secretary's Report.**

Visits have been well-attended and appreciated, the programme will continue.  
Shrivenham most popular, limited to 20, will be repeated.  
The Board much appreciated the variety and interest of the Visits, and NG's posts on FB.  
His comments extended into the next item.

### **11. Publicity Officer's Report.**

494 on FB and Twitter. Some of the old B&W archive photos are particularly popular.  
Regarding our need to increase OS membership the Tank Museum Friends achieved a large increase by a much greater use of social media. It takes time and OS is not at this level of social media activity but should aim do more here to increase membership. Board members were encouraged to provide material to NG if they could not post it themselves. Especially on pre-20<sup>th</sup> C, since this was his main field. NH said he would try to do more.  
NAS/OS Conference November 2019 [to include AGM]  
PK would like to get some OS posters and flyers printed for NASOS, including 'pull-up' banners for the OS stand.  
Board agreed to spend £100 on printing. NH suggested that if more was needed, PK to contact GS. The deadline for the call for papers had ended: Peta reported that 12 papers had been submitted but 8 more needed. Each paper will last 20 minutes maximum. The submissions were varied but all sounded interesting. The NASOS group would meet soon to review them [9<sup>th</sup> July at Fort Cumberland fixed after the close of the meeting].  
Sponsorship: NAS is happy with the level of sponsorship achieved. NH mentioned that he had had an offer in principle of a special visit to the Royal Armouries Fort Nelson as a pre- or post-conference event. He mentioned that there will be no gun-firing as this had been suspended for review.  
IMcK wrote to suggest that for the Conference we could include money-off vouchers as part of the delegates pack or offer Journals at a non-postage rate. He would bring some old Journals to the conference. Board members might like to consider which issues will have the most appeal.  
I might also bring some bulk stocks of some that I have boxes and boxes of (eg. J7, 8, 9) that we could either give away or sell for a token pound or two.  
Action. Any comments on this to Ian please.  
The OS stand at NASOS was discussed, and it was agreed that plenty of Journals would be good to have. [Presentation of the stand was discussed above].

**12. Any other business** ONLY if notified in advance. None.

### **13. Date and place of next meeting:**

There will be a short meeting on 16<sup>th</sup> November after our AGM in Portsmouth.

The Meeting closed at 1530 with thanks to Graham for his hospitality.

# ORDNANCE SOCIETY – Membership Renewal

website <http://ordnancesociety.org.uk>

If you would like to continue your membership of The Ordnance Society, please fill in your name and indicate any changes/additions of information and return this form together with your payment to the Membership Secretary:

**Mr Ian McKenzie, 3 Maskell Way, Farnborough, HANTS, GU14 0PU, United Kingdom**

**imckenzie2011@btinternet.com**

Our annual subscriptions are:

Student members	£ 10.00
Individual members	£ 25.00
Corporate members	£ 35.00
Life membership	£250.00

<b>Membership:</b>	<b>Student</b>	<b>Individual</b>	<b>Corporate</b>	<b>Subscription</b>	<b>Life</b>
<b>Subscription:</b>	<b>£10.00</b>	<b>£25.00</b>	<b>£35.00</b>	<b>for .... years</b>	<b>£250.00</b>

Please note: Applications for Student membership must include a copy of your N.U.S. card, or equivalent.

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Country ..... Fax: .....

e-mail ..... Date.....

**To save paper and printing and distribution costs all members who have provided an email address will receive the OS Newsletter via the website. If you require a hard copy tick this box**

**The Society policy on data protection is detailed on the Membership page of the website. Completion and submission of this form indicates agreement for members' data to be used only in the limited manner described.**

**Payment** should be in £ sterling by personal cheque, banker's draft or International Money Order, payable to "*The Ordnance Society*". Overseas sterling cheques must be drawn on a London bank.

Alternatively for payment by direct credit transfer our Bank details are.

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