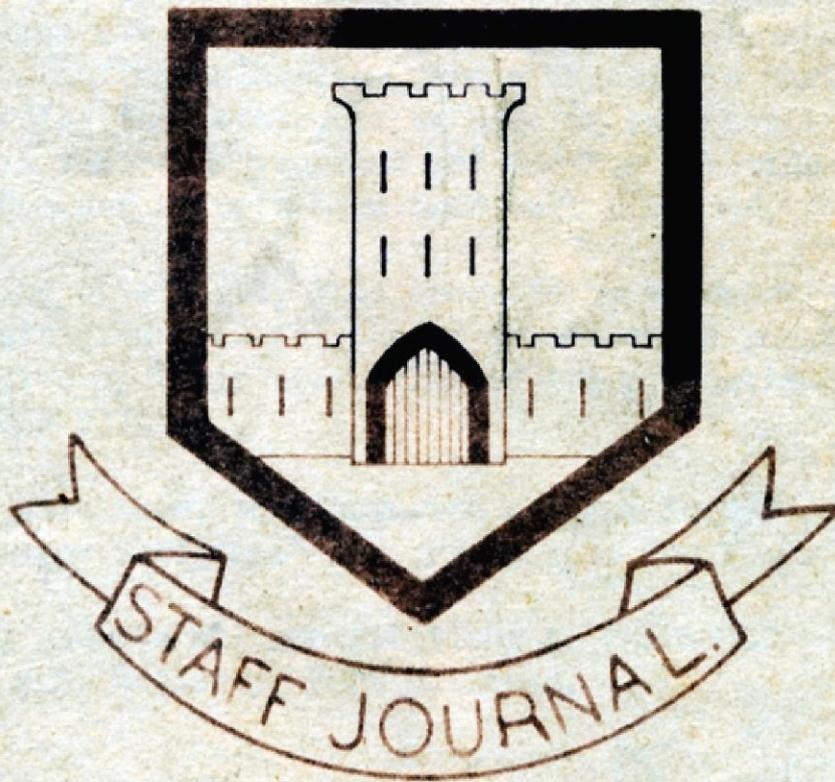


THE BUGLE

ASSOCIATIONS



FORT HALSTEAD

Issue 1

**The Fort Halstead
Heritage Centre**

Special features

- Railguns then and now
- Royal visit 1964

Welcome...

...to *The Bugle*, the new journal of the Fort Halstead Heritage Centre.

It is intended to promote historical activities at The Fort and in particular, interesting artefacts in the Collection.

Why *The Bugle*?

There have been a number of house journals over the years, the longest-running being RARDE News.



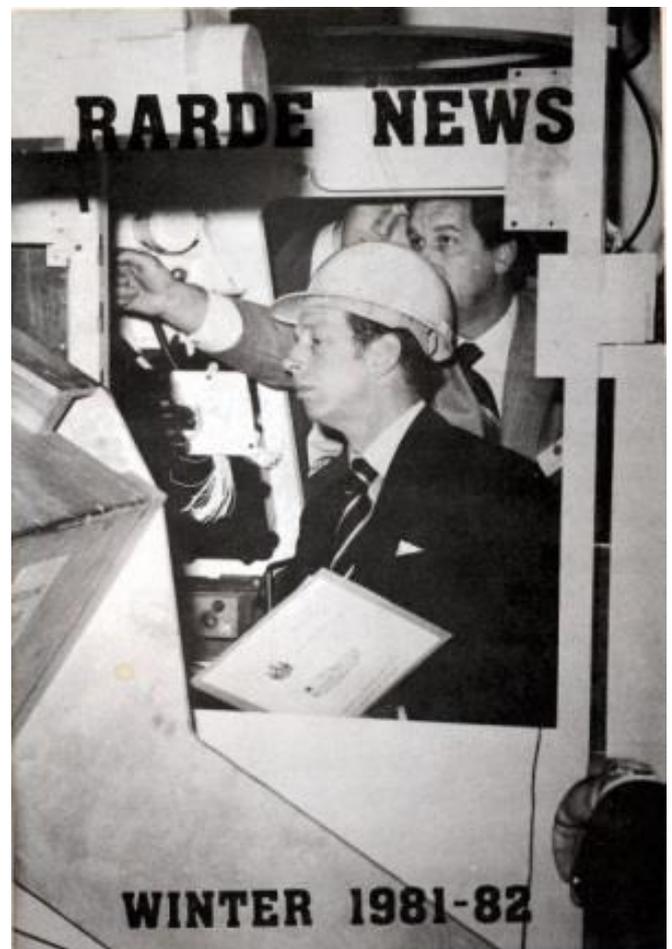
A copy of *The Bugle* from 1948 was recently donated to the Collection.

It started at Woolwich Arsenal but evidently continued at Fort Halstead.

The cover was scanned and forms the logo we are using for the new journal.

The journal is being produced by current Dstl and QinetiQ staff.

When the new Fort Halstead Staff Association is up and running, it is intended that *The Bugle* will transfer to that organisation for them to take forward.



The Collection

The collection has been gathered from items donated by staff leaving Fort Halstead or which are surplus and were most likely to end up in a skip.

The original curator, Dave Perry, concentrated on physical artefacts.

Since 2016, we have added printed material, imagery and sound-recordings of staff who previously worked at The Fort.

It is currently situated in the original caretaker's cottage from the 1897 origin of Fort Halstead.

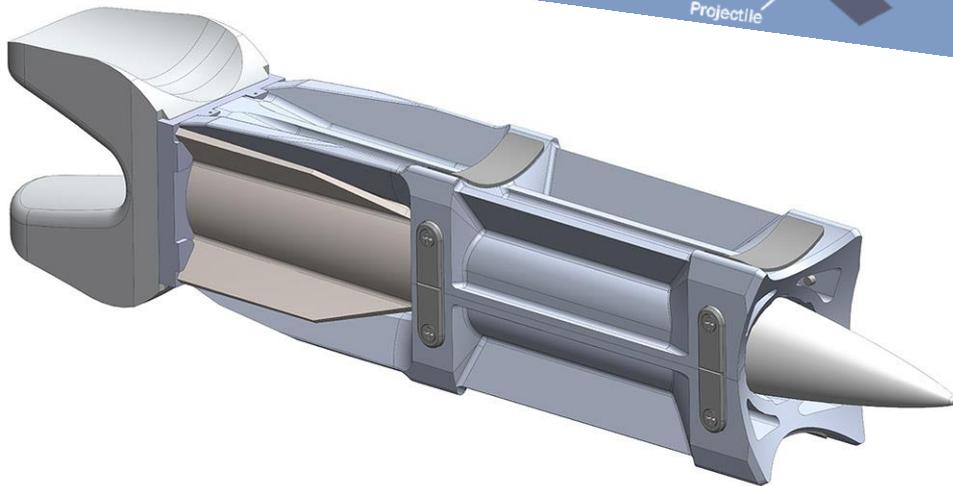
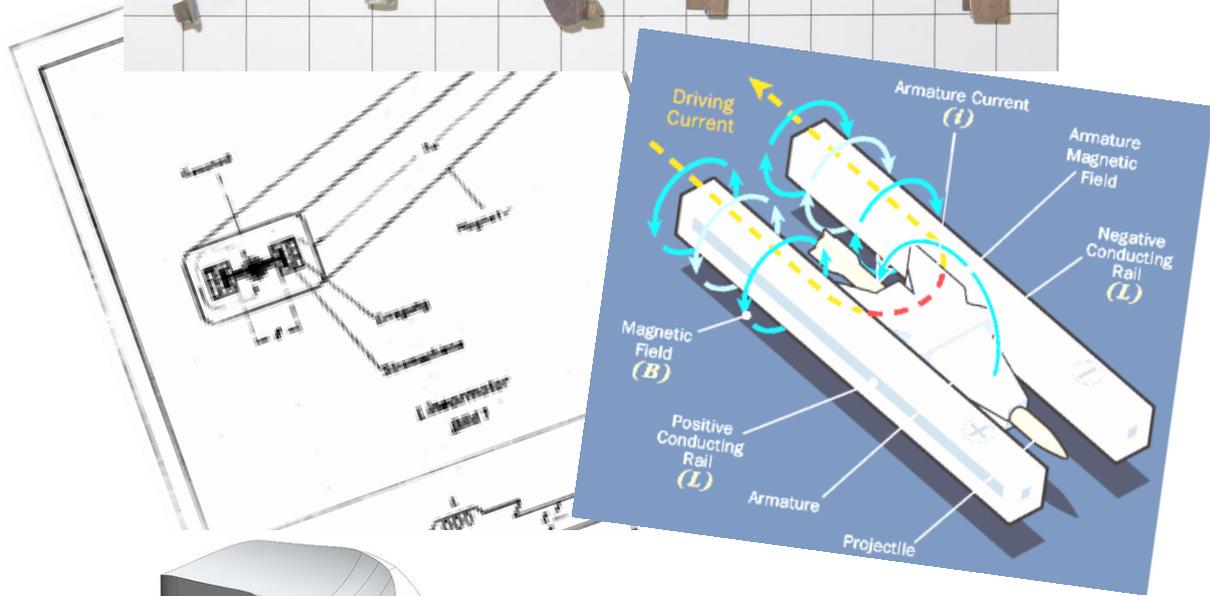
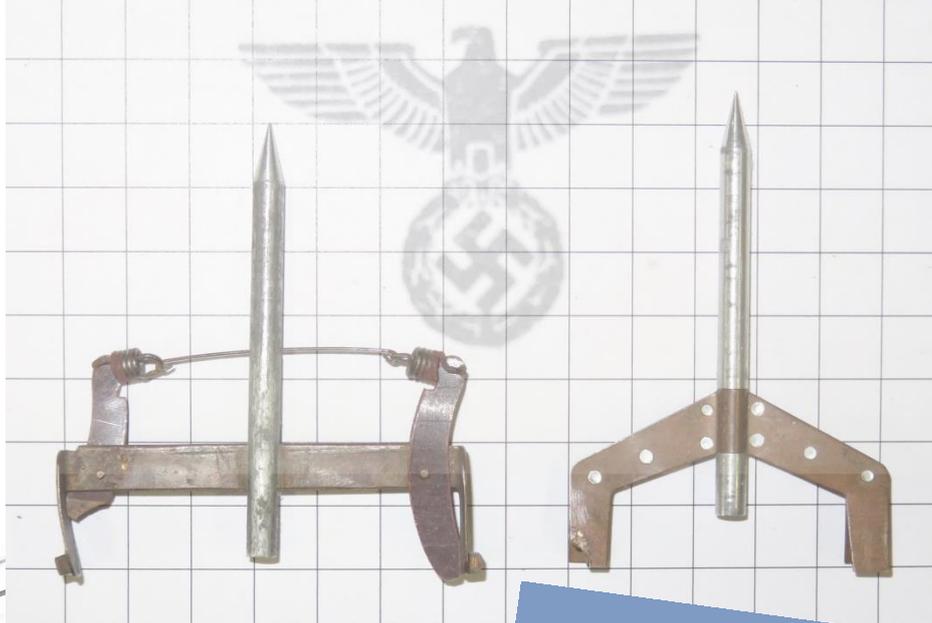


Here are some images of the Collection.



Rail Guns

Then and Now



The Collection contains two Nazi-era railgun projectiles which were recovered from a house in Germany in 1945 from within which was a room stacked with car batteries to power the gun.

Both comprise a "dart" which appears to be made from Aluminium rod of just under 5mm dia., differing only slightly in length (A) 68.6mm and (B) 67.5mm, the armature overall widths are (A) 67.5 and (B) 50.7.

The fundamental purpose of the gun would have been to propel just the dart to its target, not the armature. Modern railguns are comprised of the armature, sabot and projectile, the armature being used as a "pusher" at the rear of the round; these two items would therefore appear to be examples of development models to trial different schemes for applying armature contact pressure affixed to ostensibly the same dart projectile.



Item A



Item B

A - The armature appears to be constructed from a single sheet of copper which has been shaped then folded; rail contact pieces are bonded to the copper armature, probably with silver solder. It has a cumbersome tensioning spring arrangement attached to pivoted phenolic resin composite arms which apply pressure to the copper armature limbs which in turn maintain contact pressure with the gun rails.

B - In contrast, this item is rather elegantly finessed with its two part, rivet laminated, beryllium copper armature "wings", fitted neatly around the dart, providing integrated spring contacts with the, presumably slotted, gun rails. In comparison to Item A, the profile of this type of projectile construction would allow a much simpler barrel / rail design.



In the above picture it can be seen that one of Item B's wing tips appears to have been damaged, possibly by contact erosion and melting from a firing. Item A exhibits a bent left hand armature leg, a missing left upper composite arm and damage to its corresponding lower arm, possibly from a firing incident.

The slotted tail of Item B's projectile is clearly necessary for its construction. However, the purpose of the hollow base of Item A's projectile is less clear; it may have been for C of G consideration or overall mass reduction. However, it may also be a feature resulting from the method employed to construct the projectile.

As well as the projectiles, we also have a copy of the original intelligence report.

GESELLSCHAFT FÜR GERÄTEBAU, SCHLOSS KRANZBACH,
NEAR ELAIS NEAR GARMISCH-PARTENKIRCHEN

THE ELECTRICAL ACCELERATION OF PROJECTILES

The "Gesellschaft für Gerätebau," which was formerly part of the Heereswaffenamt in Berlin, is an experimental station for the study of electrical means for accelerating projectiles. Although it has not yet produced practical results (only laboratory tests have so far been made), the project merits the attention of Army Ordnance.

Attempts to replace powder by electricity are not new. Many schemes were tried by this Laboratory, and the method developed during the last war by Fanchon-Villiplee was finally adopted. The great difficulty is, of course, the developing of enough power to launch a projectile. It has been possible here to accelerate a body weighing 12 g to 1100 m/sec. in a 2-motor tube, which corresponds to an acceleration of about 30,000 times gravity. Coupling two such tubes was not very successful, 1200 m/sec. being obtained.

The projectile is accelerated by a "linear motor", which consists in its simplest form of two conductors (parallel rails) across which the projectile completes the circuit by means of fins attached to its rear. (See the photograph with this report.) When current passes through the circuit, the projectile travels forward. The conventional electromagnetic equations apply to the process.

The principle was demonstrated to me in a 50 cm. tube with projectiles like that in the photograph. After firing, the edges of the copper fins are melted. The muzzle velocity in the demonstration was low.

The difficulties in the way of a suitable power source are formidable. Lead-sulfuric acid storage batteries with very thin plates are used for experimental work; 9000 kw is available from this source. Condensers to give 2000 volts with 24,000 microfarads capacity are also installed.

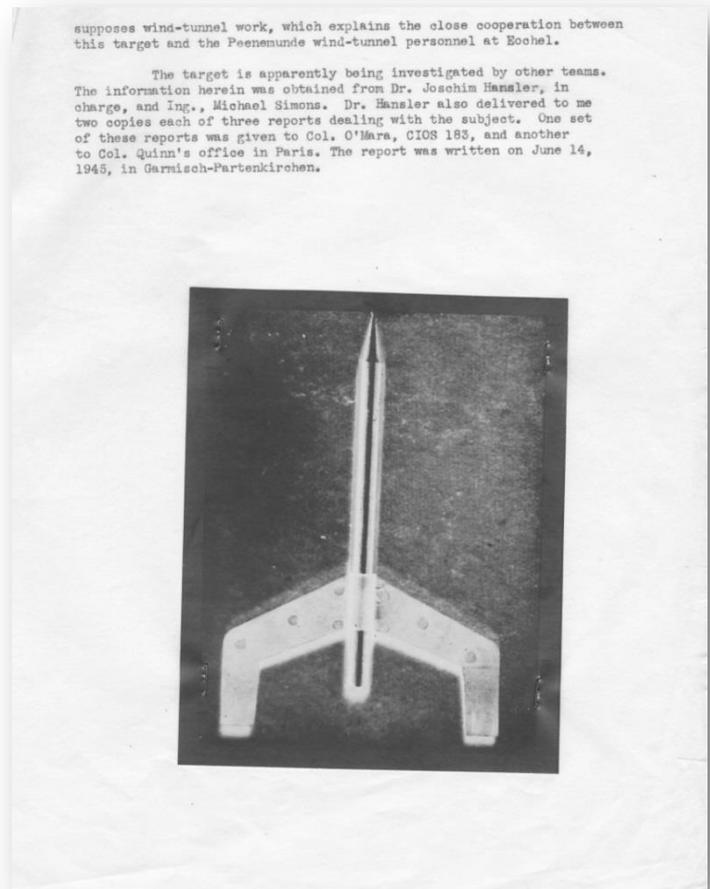
The great advantages of the electrical scheme would be (1) negligible wear of the barrel (2) higher velocity than is attainable with powder (3) higher efficiency than with powder (4) lower energy cost than with powder.

Work was about to begin on a projectile 1 cm. in diameter weighing 60 to 70 grams. One A.A. gun was planned (see the German report), which would have required a maximum current of 1,500,000 amperes at 1300 volts to launch a 4 cm. projectile. The power was to be obtained from 3 unipolar generators weighing 150 tons each.

Projectiles electrically launched would have to be fin-stabilized since they could not be rotated. Fin-stabilization pro-

-2-

CONFIDENTIAL



We know that Dr Joachim Hänsler's work went to the US after the war, but not before he was interrogated by Fort Halstead scientists

The story of interrogations of captured German personnel at the Halstead Exploiting Centre, Halstead Place, will be covered in a later issue of *The Bugle*.

In the 1980s, Fort Halstead led the way in developing an electromagnetic gun for UK applications. A large homopolar generator was installed in the gun ranges (shown in a screen capture from a RARDE promotional film) and an experimental gun was set up at Kirkcudbright in the 1990s where the world's first long-range firings of railgun projectiles were conducted.



And to bring the story full circle, we also have in the collection a projectile from that experimental gun.

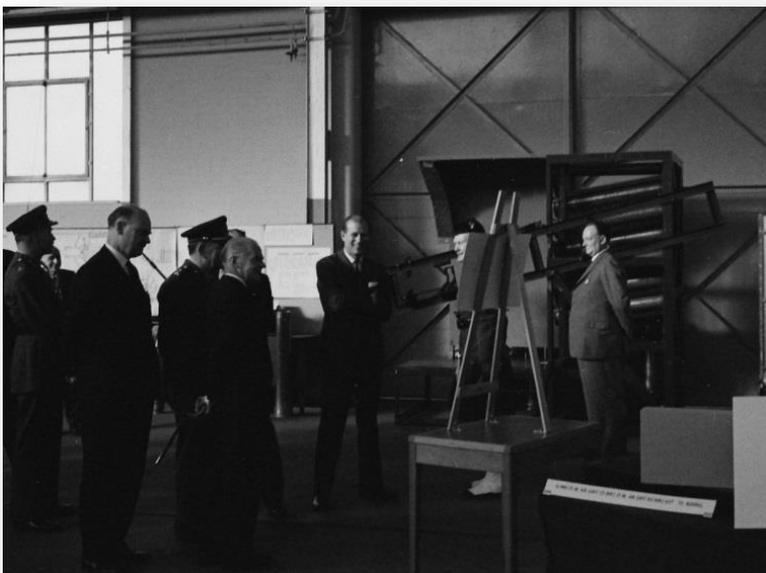


The Royal Visit 1964

You're now thinking – that's wrong, the Royal Visit was in 1972

The Queen and Prince Philip did visit in 1972, but that was his third visit to the site.

We've recently found a photographic record of the 1964 visit, a selection shown below. It looks like he had a great time!





Next issue

- The Fort's first computer
- The owners of the site return

Send feedback via the website

www.forthalstead.org

or in writing to :

The Curation Team

Fort Halstead Heritage Centre

Sevenoaks

Kent TN14 7BP

[dstl]

QINETIQ