

The V3 ‘supergun’ of World War Two

Adolf Hitler’s last Vengeance/Retribution Weapon: the “annihilation weapon”

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Abstract – During World War Two, three unique weapons were proposed to meet Adolf Hitler’s wish for vengeance and retribution against the British which he believed would finally yield victory to the Nazi side. They all required substantial technical development of new concepts. This paper gives a broad description of the last and potentially-devastating V3, which was intended for installation in the Pas de Calais to completely destroy London.

Keywords: weapons; guns; history; WW2; retribution-plans; remote-annihilation.

I. INTRODUCTION

The combined military assets of the Allies (USA, Britain, the Commonwealth countries – Australia, Canada, New Zealand, India etc. – supplemented by other soldiers and airmen who had escaped to Britain from Poland, Norway, Holland and many other countries) in terms of resources, people, technology and with the extreme efforts made by the Russians were clearly making the Nazi aim of world domination un-achievable. There was also no clear prospect of a negotiated armistice, since the aim of Churchill in particular was total defeat of the Nazi ‘Third Reich’. Adolf Hitler was himself totally opposed to any kind of negotiation from the German side (because of his opinion of what had happened at the end of WW1). It seems that he was also afraid that some of the military leaders on the German side, with ‘traditional’ views, as opposed to the Schutzstaffel (SS) views, might be inclined towards negotiation. Hitler was therefore determined to promote the development and use of the three special secret weapons (V1, V2 and V3). His intention was not only that these would ‘win the war’ for Germany, but would also boost the falling morale of the German people, by this promise of a secret means that would really deliver victory. The efforts which he insisted should go into their development moved resources and effort away from the development of a nuclear bomb which was also underway on the German side. Confusion over the interpretation of many intelligence reports about these weapons and belief by some that they were merely propaganda meant that the British did not prepare for them as well as they could have done.

II. PRELIMINARIES ABOUT GUNS

A. The technology of the rifle

Military use of guns goes back to the time of muskets, but a significant advance came with the development of the rifle. It enabled more rapid firing

of a few rounds, and rifling of the barrel meant more stable (spinning) and suitable bullets could be fired. The British 0.303 inch (7.7 mm) Lee Enfield rifle is a good example, designed in 1907 and used from WW1 onwards until after WW2 – still used for training cadets until at least 1950. Figs. 1 and 2 illustrate the essential features.

Its purpose is to kill or quickly incapacitate a human enemy within visible range. This is achieved by propelling a small, solid metal bullet of 0.303 inch diameter at the maximum velocity possible. The bullet is initially held in a cartridge containing a slow burning (cordite) explosive (the propellant) which accelerates the bullet from a stationary position in the gun to the maximum velocity (around double the speed of sound) as it leaves the barrel. The propellant is ignited by a small amount of high explosive set off by the force of the firing pin when the user pulls the trigger. (The propellant is not a high explosive because that could destroy the gun and the person using it!) The aim is that all of the propellant should be just used up as the bullet leaves the barrel, so as to achieve the maximum muzzle velocity possible.



Fig. 1 and 2 Lee-Enfield Rifle, Mk III with magazine and ammunition detail

Once the bullet has left the muzzle, it simply follows a trajectory which would be a parabola were it not for air resistance, without which the calculation is standard elementary physics from Newton’s law:

$$Force = Mass \times Acceleration$$

To reduce the effect of air resistance, the bullet is given a pointed nose, and by having a shallow helical groove on the inside of the barrel (rifling) it can be made to spin, giving it stability in flight rather than tumbling over as it flies, achieving a maximum range of nearly 3000 metres. (Prior to use of rifling, the best shape bullet was a sphere).

The pointed bullet typically comprises a lead centre (to give as much mass as possible) encased in a brass exterior (to keep the shape during acceleration and flight).

B. Larger guns for artillery

Moving up from hand operated rifles, the much larger guns for artillery have to be mounted on a swivelling base for bearing (*azimuth*) and a mechanism for raising and lowering (*elevation*) to set the range, and need several people to operate them. For anti-aircraft use, they need to be pointed upwards and have the agility to follow and predict the future position of the aircraft. The much heavier object fired can easily contain high-explosive and with the development of proximity fuses, does not even have to strike the aircraft, but simply explode when close enough. By scaling up, higher muzzle velocities are possible and correspondingly greater ranges, so that it becomes feasible and normal to aim at targets well beyond visible range. However, that does not mean that such a gun could be fired from, say, the north coast of France to hit targets in London. That more challenging task was the objective of the V3 'supergun'.

C. Basic concepts of the supergun

For a very large gun, the mobility of the barrel becomes impracticable, so to aim at a number of precise targets at a great distance, either the object fired has to be some kind of steerable missile (of which the V1 was a primitive and inaccurate example) or else there have to be several large gun barrels side by side at slightly differing angles, since all that each one can do is vary the distance but not the direction. The supergun was an idea to meet this requirement, with the basic concept going back as far as the mid-19th century.

In order to get the required range with a huge explosive warhead, a very high muzzle velocity is needed, and to achieve this just by 'scaling' up a normal artillery gun leads to many problems. The supergun idea is to inject charges at several equally spaced locations along the barrel, to give the warhead a sequence of speed boosts.

The plans and origin of the supergun date back to 1857 when an American arms expert built an unsuccessful prototype. US expert Lyman and his partner Haskell worked for years on the same principle of a multi-chamber gun. Their gun was not considered conventional artillery and did not pass a test at Frankfort Arsenal in Philadelphia in 1880.

In the same period, a French designer Louis-Guillaume Perreux was also working on a similar project. He is best known as a pioneer of the

motorcycle, but he was close to making a reality of the supergun and was granted a patent for a multi-chamber gun in 1864. In 1918, the French army tried to create a long range multi-chamber gun using Perreux's patent but did not reach the prototype stage. The plans were archived, and 20 years later, German troops acquired them when France collapsed in June 1940.

Normally a supergun involves two adjacent injection points at each location, one either side, and timing is critical: the warhead is moving rapidly along the barrel and the charge injection must occur immediately after it has passed and never just before it has arrived. Delay of the former would fail to speed it up much and the failure of the latter would slow it down (and perhaps have even worse effects). A realistic way of achieving this is by some kind of electrical process to ignite the charge injection, and getting that to work seems to have defeated all those who tried to make a supergun. It is likely that the Nazi engineers would have failed with the V3, although because they succeeded with many other inventions which were considered to be 'impossible' it is not possible to be sure about that. For example, the control method of the V2 rocket at launch was widely considered to be impracticable or impossible, but the method worked and also later got the Americans to the Moon and back, under the leadership of a Nazi who was aware of and seemingly fully supported the use of death camp workers and who could have been executed with many others but instead was transformed to a famous NASA scientist/engineer (of course this is a reference to Wernher von Braun).

Although it is generally reported that the V3 was a failure and could never have worked, a smaller version with surface mounting rather than underground was used by the German SS to bombard Luxemburg and therefore contradicts the belief that the V3 could never have worked. However, it is reported that in Luxemburg, 10 people were killed and 35 wounded, which is, of course, far short of the intention that the V3s would completely destroy the whole of London. Some experiments were done at Cambridge University in England after WW2 by H. Hunt and C. Adcock [1], who suggested that the charges along the barrel were to be triggered by the heat of the advancing gas behind the projectile rather than by an electrical scheme.

III. THE V3 SITE AT MIMOYECQUES

Construction of the V-3 site was at Mimoyecques, and started in September 1943. This is a limestone hill in the Pas de Calais region (close to other V1 and V2 rocket launching sites). There is now a museum (La Forteresse de Mimoyecques) for the V3 at this site (*closed early in 2020 for the duration of the SARS-CoV-2 pandemic – also referred to as COVID-19*). [2]. There are many internet descriptions of the V3 supergun. It is sure that the site was destroyed by the Barnes Wallis 'Tallboy' bomb.

Whether the V3 would actually have worked is of course still unknown. The many accounts need to be 'interpreted' carefully.

For example, Aleksander Mishkov published the following [3]:

".....August Cönders, one of the chief engineers for the Nazi troops was intrigued by the plans. He managed to construct a full-calibre gun near Magdeburg, but he could not put the gun's basic principle into operation. A year later, the Nazis tried again to build the supergun, but only this time, they were close. *Sadly, the work was never finished* because of British bombing....."

It is curious to use the word 'sadly' ! Many would surely have used the word 'fortunately'.

IV. DETAILS OF THE V3 SITE AT MIMOYECQUES

Initial plans included two parallel gun sites 3000 ft apart, which each supported five gun shafts. Each gun shaft included five gun barrels, so the battery was foreseen to hold 50 guns in total with each one firing 60 shells per day.

The V3, a multi-charge gun, was designed to bomb the central part of London. The secret site was codenamed "Wiese" (meadow) and "Bauwerk 711" (building site) and construction was from Spring 1943 to Summer 1944. Over a thousand people (forced-labour) of various origins were used.

This involved an immense network of underground galleries in a chalk hill with a rail entrance at the lowest level for bringing in supplies.. Each of the two sites had five firing shafts (note these are also called 'drifts') with five V3 guns in each one. One site was supposed to fire 1500 times per day. With the second site 1km away the total from both sites should therefore have sent 3000 shells a day into London. It seems that only the eastern of the two planned sites was actually built.

According to a post-war interrogation of Albert Speer, the gun barrels were 150 metres long with an intended muzzle velocity of 2000 metres/sec. (other information gives the barrels as 175 metres, probably Speer was speaking from memory and had other priorities to try to give a good impression of himself) A television documentary gave the length as 130 metres based on estimates by H. Hunt [4].

Even if these sites had been completed successfully and the V3 made operational as planned, it is easy to see that the 'supply requirements' of materials to make the shells and explosives would have been immense and surely far beyond the resources of Germany at that time (especially in view of the thorough destruction of rail and road links by the Allies).

Despite several air raids from November 1943 to Spring 1944, it was not until 6th July 1944 that the Mimoyecques underground galleries were damaged beyond further development and use by the *Tallboy* bomb. The bombing raids were carried out without having any real ideas of what they were trying to destroy.

V. MORE ABOUT THE CONTEXT OF THE V3

The Nazi intention was that Sea Air and Army forces would work harmoniously together, and abandon their principles of military 'honour'. They were to combine as the Wehrmacht, under the full control of the Schutzstaffel (SS) who had no principles of 'honour' and believed only in control by terror and unlimited atrocities.

In reality, each was jealous of the other, and also retained a sense of 'proper and honourable' behaviour inherited from the past. The Kriegsmarine, Luftwaffe and Heer remained distinguishable entities.

Given the failures and the evidence that Nazi Germany was 'losing' the war, Hitler decided that only 'terror weapons' would persuade the British to get rid of Churchill and ask for peace. He apparently still supposed that the British would then assist Germany in the war against Russia.

He also believed that 'terror weapons' could never work against what he considered to be the 'inferior' Slavic 'races', only against the 'superior' European 'races'. Although the British were in the latter category, they were of course well below the largely-hypothetical so-called 'Aryan' idealised Germans (people so completely different in appearance from Hitler himself). It seems that Hitler picked up the 'Aryan ideal race' notion from the influence and ideas of Heinrich Himmler.

The 'Vengeance / Retribution' weapons (Vergeltungswaffen) were Hitler's last hope to achieve this, and resulted in the diversion of much effort and resources from other aspects required to keep the war going. These-weapons were named and categorised by Hitler and the SS office in Paris as follows [5, page 79]:

- V1: *störungswaffe*.
"harassing weapon"
- V2: *richtige vergeltungswaffe*.
"real vengeance weapon"
- V3: *vernichtungswaffe*.
"annihilation weapon"

The V1 was what is now called a cruise missile, the V2 was a ballistic rocket, and the V3 was in one sense just a very simple long-range gun.

Limitations of a fixed-position gun such as the V3 are that there is no means of changing the azimuth, so all shells go in the same direction. The elevation also cannot be changed, so the only way to vary the distance is to have an adjustment for the muzzle velocity, which would enable the range to be altered.

Fig. 3 shows a simplified arrangement using four guns each pointing in slightly different directions, with a circular target area. Assuming some means of adjusting the muzzle velocity, it is seen that this can distribute 16 target points in the circular target area.

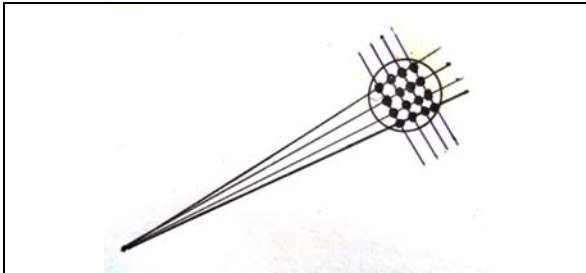


Fig. 3 Idealised example of four un-moveable guns and circular target area

Applying this idea to the Mimoyecques installation may enable the planned 3000 shells per day into the London target area to be understood more easily.

Apparently, the target area was centred on Westminster Bridge, no doubt chosen because that is close to the main places of government (e.g. Houses of Parliament, and many military and civil government headquarters).

The plan of the Eastern site is shown in Fig. 4 [6] and the Western site would presumably have been almost identical

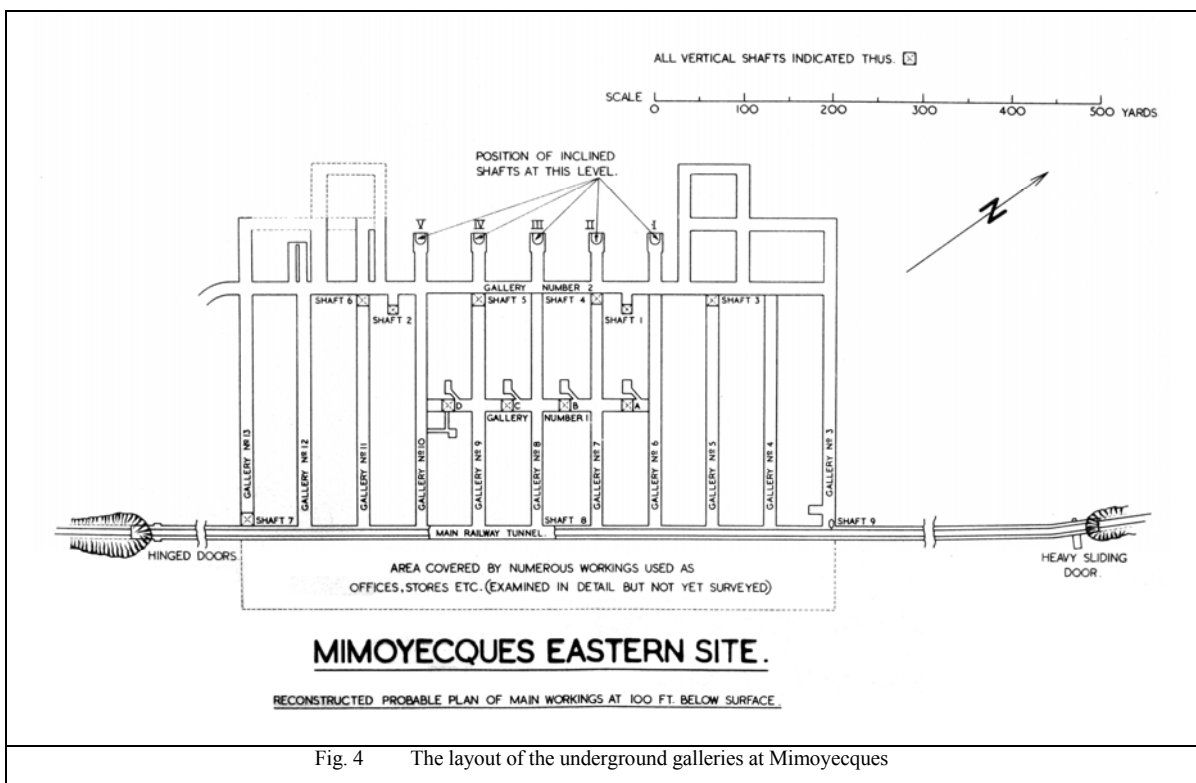


Fig. 4 The layout of the underground galleries at Mimoyecques

The rail entrance to the galleries is shown in Fig. 5 which is where the rail line originally went.



Fig. 5 Gallery Entrance at Eastern Site (photo: Arthur Wyatt)

documentary. Actual protecting huge steel plates with five holes were made, and some are now returned for display at the Mimoyecques V3 museum. Photos of these can currently be seen at the TripAdvisor website, submitted by visitors to the museum.

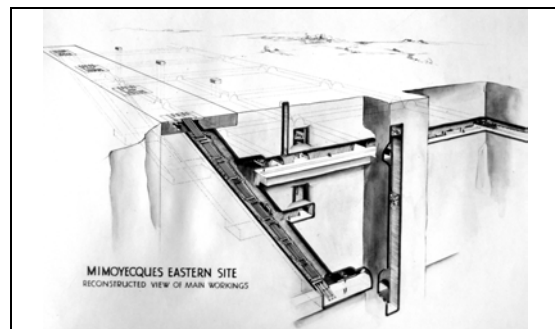


Fig. 6 Diagram of Eastern site (one of five shafts)

Fig. 6 [6] and Fig. 7 show the underground arrangements for the V3. The latter is not a photograph, it is an image made for a TV

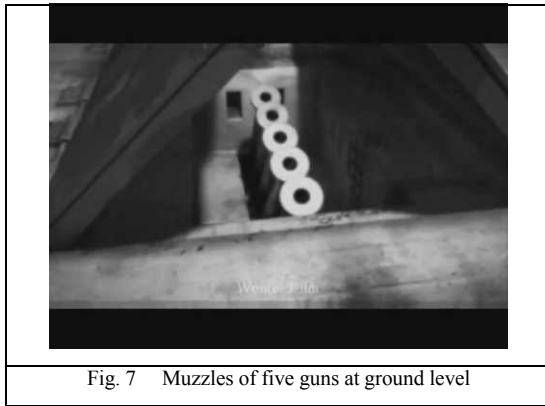


Fig. 7 Muzzles of five guns at ground level

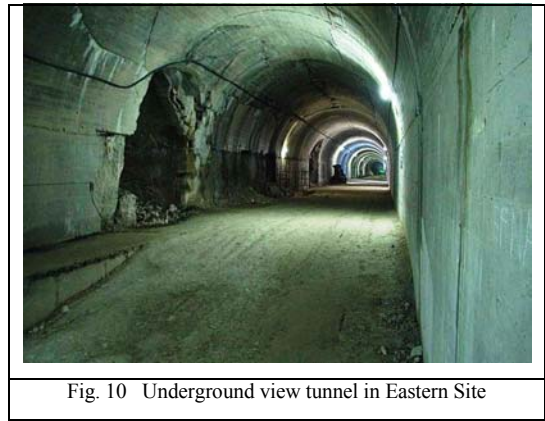


Fig. 10 Underground view tunnel in Eastern Site

Fig. 8 shows a V3 mounted in a surface position, probably one set up in Poland (at Zalesie, then called Laatsig), for experiments [8].

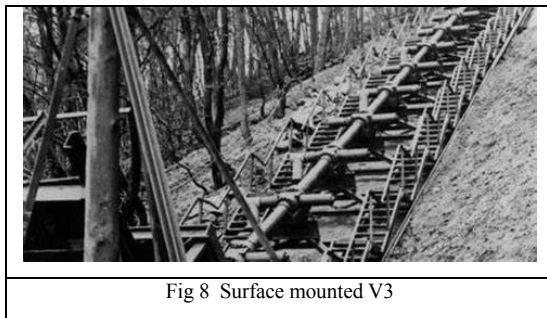


Fig 8 Surface mounted V3

To disguise the real purpose of the V3 plans, the project was called *Hochdruckpumpe* (high-pressure pump) and also *Fleißiges Lieschen* (translated as busy Lizzie).

Fig. 9 illustrates the planned shells for the V3. The ‘fins’ appear after launch, and avoid the need for the axial spinning of a rifle bullet. The weight of each shell was 140 kg, with a 150mm calibre (diameter).

The shell fitted loosely in the barrel, so that the latter would not have to be cleaned out frequently as a result of debris from firing shells. Notice the “sabots” in Fig. 9 which are there to compensate for the loose fitting and keep the shell in the centre of the barrel. Most reports indicate that in test firings, the V3 shell did not fly as intended but tumbled erratically.

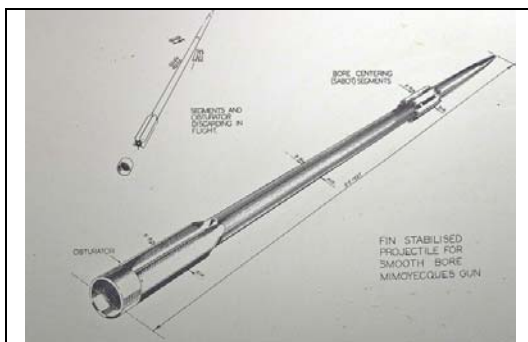


Fig. 9 design of V3 shell

A detailed sketch of the V3 and comparison with the size and form of other objects including weapons is available, credited to Max Gadney [9].

Fig. 10 and Fig. 11 show underground images from the Mimoyecques museum website.

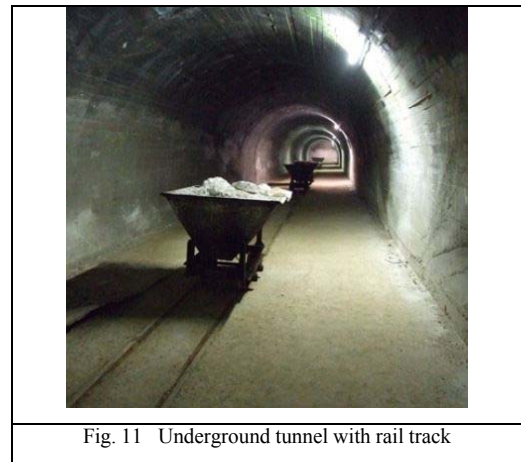


Fig. 11 Underground tunnel with rail track

V. CONCLUDING REMARKS

Many technical advances took place in the context of WW2 in all participating nations, many of which influence our lives today. Examples are travel by jet aircraft, radar with its many applications and the microwave oven. The V1 can be considered as the precursor of the modern cruise missile and the V2 as the basis for space travel and exploration. On the other hand, perhaps uniquely, the V3 appears to have led to nothing at all of significance; perhaps a huge gun with fixed azimuth and elevation is of very limited value and not a stimulus for developing anything useful, other than a few incomplete or unsuccessful attempts to make something similar, the best known being the plan to supply a similar weapon to Iraq around 1990. A piece of the barrel of this gun is on display at Fort Nelson, on Portsdown Hill, near Portsmouth, England. La Forteresse de Mimoyecques is now the winter home to many species of bats, including some unusual and perhaps endangered ones, and is registered as a nature reserve for this purpose. This is perhaps a most fitting epilogue to the V3 supergun project.

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