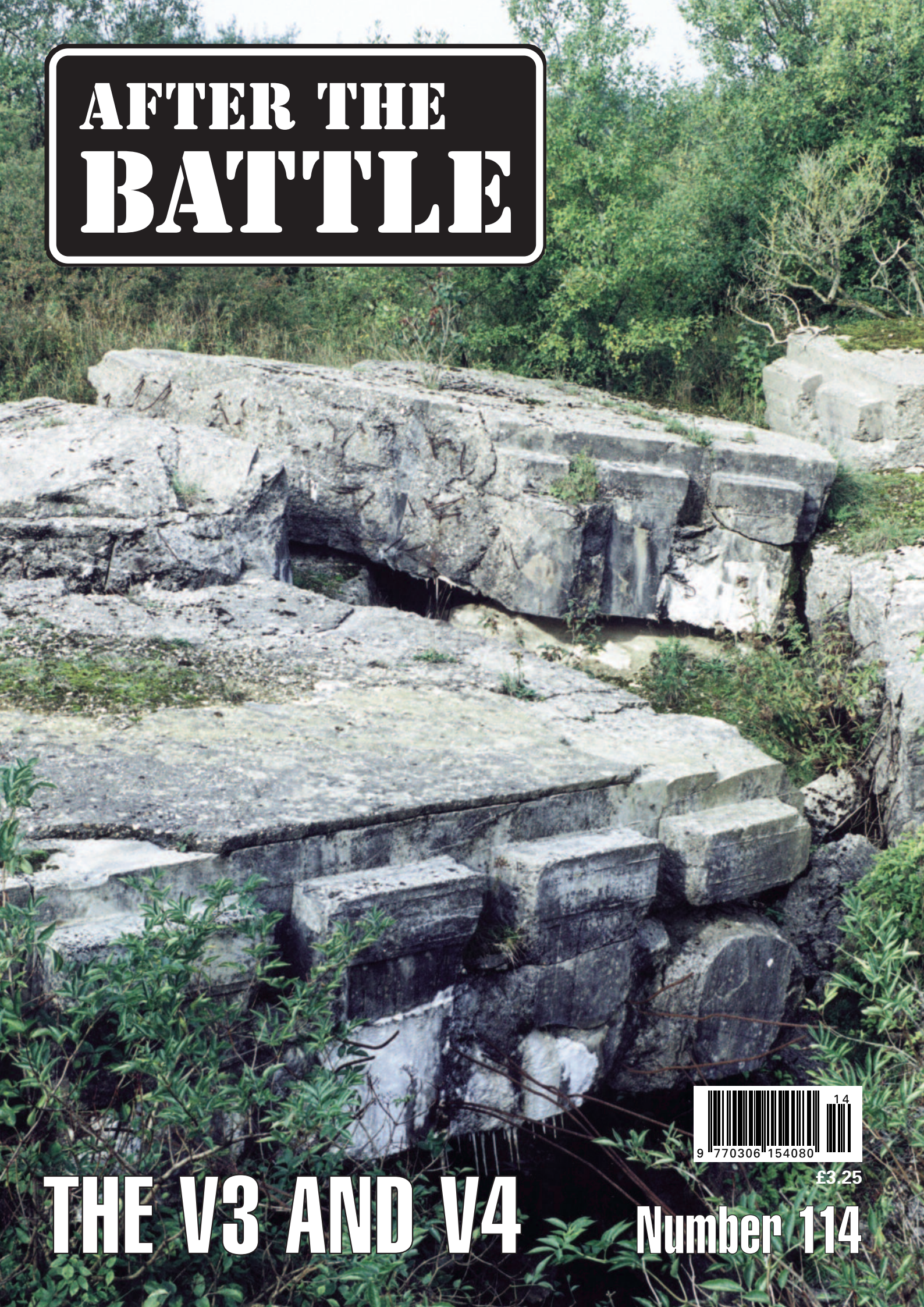
AFTER THE BATTLE



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THE V3 AND V4

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Front cover: In 1945 the Royal Engineers blew up the five-metre-thick concrete slab that protected the V3 installation at Mimoyecques, near Calais. This picture shows a section of the broken firing slot above shaft No. III. (Jean Paul Pallud)

Centre pages: Pictured from the top of shaft No. V, with shaft IV in the centre and No. III beyond, M. Denis Simon of the staff of the Forteresse de Mimoyecques gives an idea of the scale of the project as he stands beside the remains of the slab. (Jean Paul Pallud)

Back cover: The Shot at Dawn Memorial by Andy DeComyn at the National Memorial Arboretum at Arewas, Burton-on-Trent. (Paul Grover)

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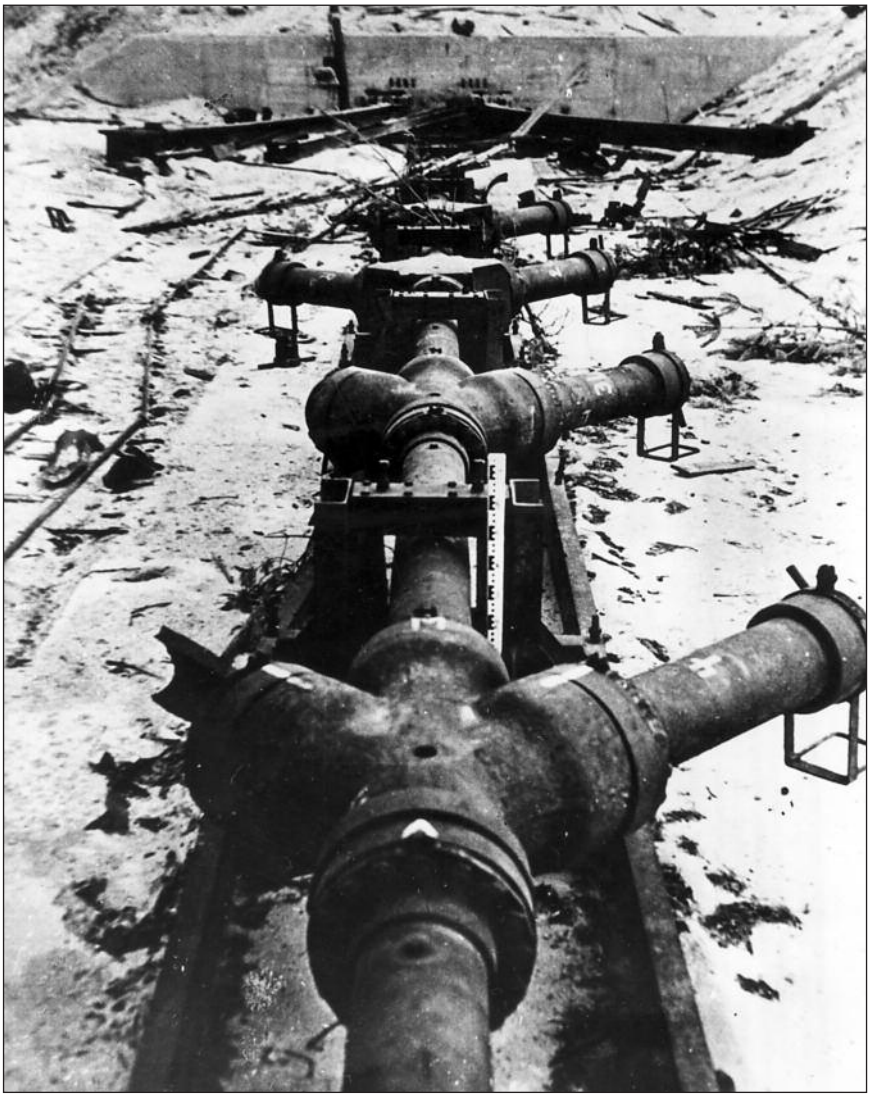
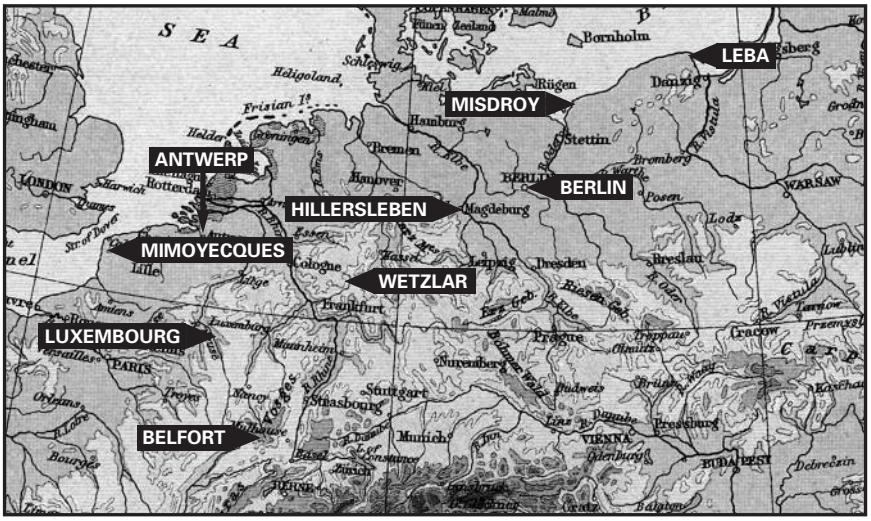
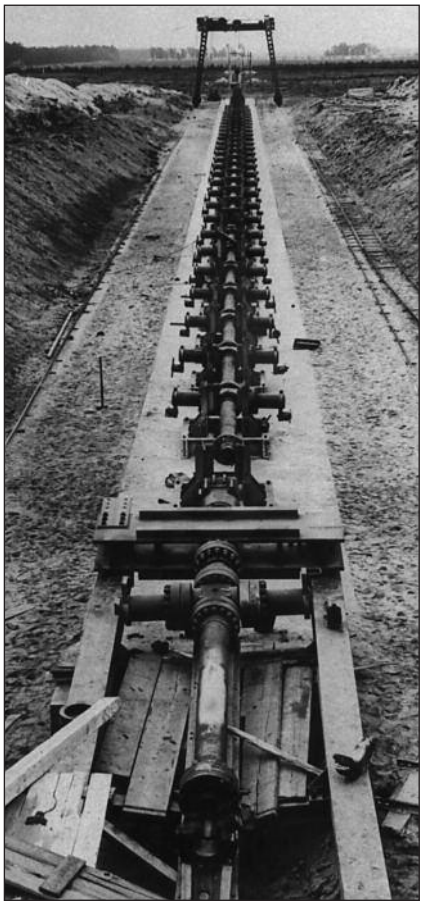
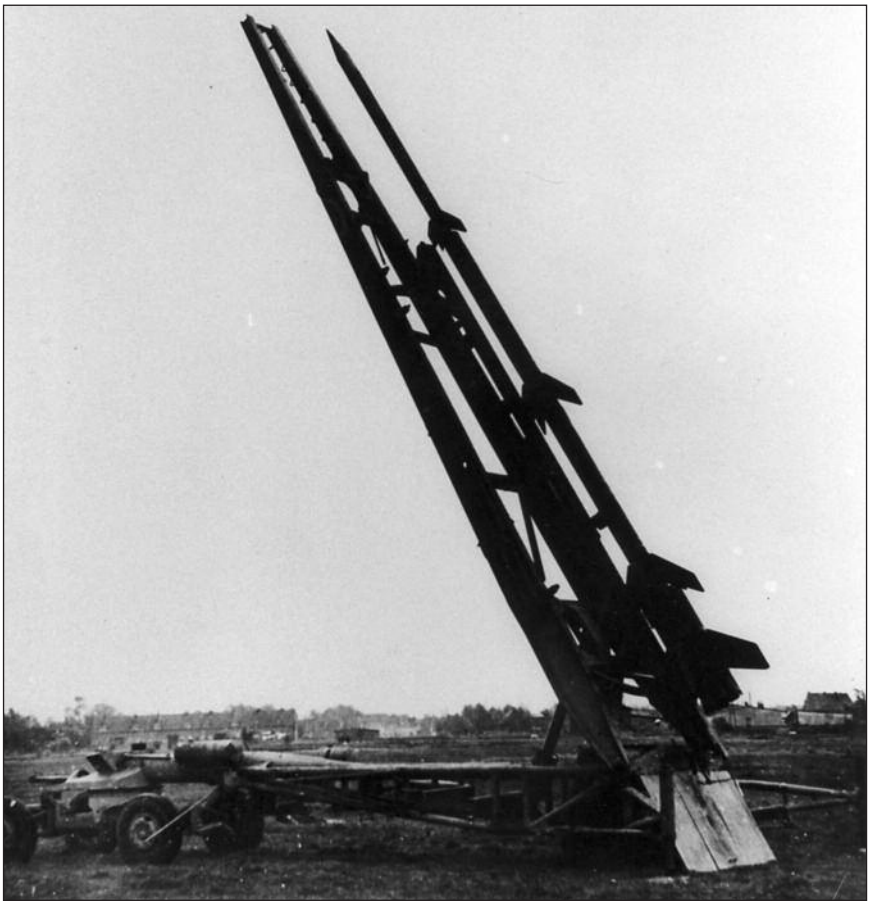


The HDP (Hochdruckpumpe — high-pressure pump) multi-chambered cannon undoubtedly remains as one of the Third Reich's most bizarre weapons. Only four guns went to war and all were withdrawn in the nick of time as the Allied armies approached. They were later found lying dismantled in the yard of the Röchling company at Wetzlar. However, at the Hillersleben test range, the US Ninth Army captured two test cannons in relative good order, one comprising ten cross-sections, the other five. The latter was of a new type, with the lateral chambers angled at 45 degrees so that a plan view resembles a herring bone. This new arrangement was supposed to throw the gas produced by the lateral chambers forward, thus accelerating the shell at a greater velocity. *Above:* **This well-known picture taken at Hillersleben has contributed greatly in misleading historians into thinking that the operational HDP guns had firing chambers angled at 45 degrees: they did not, and all their lateral chambers lay at right-angles to the barrel. (IWM)**







Late in 1944, following the introduction of the V1 flying bombs and the V2 rockets, the Third Reich propagandists added to their arsenal the V3, the multi-chambered HDP gun *(left)*, and the V4, the Rheinbote four-stage rocket *(right)*. (Bundesarchiv)

THE SECRET WEAPONS: V3 AND V4

By Jean Paul Pallud

In June 1944, the propaganda machine of the Third Reich began to claim that it had new weapons of revenge in answer to the bombing attacks being carried out against Germany. Hailing them as V-Waffen (Vergeltungs-Waffen, retaliation weapons), the V1 flying bomb campaign started on June 12 and on the 27th the daily Wehrmacht bulletin for the first time reported strong harassing fire of V1s against London. The V2 rocket opened up against Paris and London on September 8 but it was not before November 11 that the Wehrmacht bulletin announced the entry of this second weapon.

Goebbels' propagandists had prepared the ground for a third V-Waffe, and a fourth, etc., all of them long-range weapons. They had given the name V3 to the multi-chambered HDP gun, certainly a new weapon, and V4 to the Rheinbote, a four-stage solid-fuel rocket. Then, to continue the V-Waffe series, would have come the V5 — actually the K5 280mm railway gun — and then the V6, the huge Gustav 800mm railway gun. The latter were not new weapons but it was hoped that both would have had their range greatly enlarged, up to about 150 kilometres, with new dart-like sub-projectiles.

Thousands of V1s and V2s were launched in the last months of the war and though they caused much damage in England (8,938 people killed and 24,504 wounded and over 31,000 houses destroyed) and Belgium (6,448 people killed and 22,524 wounded, most of them in Antwerp and its suburbs), they did little to change the course of the war. They even proved detrimental for Germany's already overstrained war economy, utilising a work-force and materials out of all proportion to the end result. In January 1944, Hans Kehrl, a departmental manager within the

Peenemünde, spring of 1944. Generalmajor Walter Dornberger (right) shows the test stand of the A4 rocket — the future V2 — to Generalfeldmarschall Wilhelm Keitel and Generaloberst Friedrich Fromm. (Deutsches Museum)

Ministry of Armaments and Munitions, advised the Minister, Albert Speer: 'This [the V2] is in no way a wonder weapon. In fact, it does not even seem wise to continue its production. The expenditure involved in sending a small quantity of explosives to a place which is so difficult to accurately target is simply a useless waste.'

Actually, the V1 and the V2 came too early. Both required a great deal of refinement before they performed as useful military weapons and greater accuracy was out of reach with the technical means available at the time, the age of computers and microelectronics being still far in the future. However, both weapons, and particularly the V2 rocket, were revolutionary trail-blazing designs and their significance cannot be underestimated. The United States built 1,200 copies of the V1 to enable the US Army and Navy to enter the missile age with a minimum of time and effort. The V2 provided the Americans and the Soviets with invaluable experience of large liquid-fuel rockets, and on both sides the Peenemünde rocket led to the intercontinental ballistic missiles of the Cold War and on to the rockets of the conquest of space.

If the V1 and the V2 were worthless militarily, what therefore of the immature V3 and V4 projects? Having attended a demonstration of the HDP at Misdroy (now Miedzyzdroje in Poland) on Wollin in the Pomeranian Bight on November 14, 1944, Generalmajor Walter Dornberger commented: 'Everyone present at the demonstration was agreed that the gun would have no effect whatever on the outcome of the war. But Hitler had ordered experimental work on it to be wound up immediately and demanded its employment at the front.' The following day, Dornberger was shown the firing of four Rheinbote units at Leba on the Pomeranian coast and he noted: 'We agreed that this weapon, in view of its performance and slight effect, would be absolutely useless. Yet Hitler and Kammler had ordered it to be employed operationally.'

By 1944 Dornberger was Beauftragter zbV Heer (Commissioner for Special Duties in the Army) in which capacity he was in charge of not only the development of the A4 (the V2), but also of the organisation and training of the operational units.

Actually, Hitler was not a strong supporter of these new weapons and throughout the war his technical interest was oriented more towards traditional weapons. As Speer wrote: 'He had no comprehension of developments such as radar, the construction of an atomic bomb, jet fighters or rockets'. It was the failure of the Luftwaffe to stop the Allied bombers from raiding Germany, and their usefulness as a means of retaliating against Britain, which made Hitler turn to the long-range weapons. He remained however irresolute and fickle and the long delays in development of the Fi-103 flying bomb (the V1) and the A4 rocket (the V2) throughout 1943 did not help to gain his confidence. From mid-1943, Hitler put his faith in the A4 as the ultimate weapon which would force Britain to her knees as he did not expect much of the Fi-103 because of its poor accuracy. Only by the end of June 1944, after the first two weeks of operations, did he finally show satisfaction with the flying bomb. Yet the only V-weapon which Hitler personally supported was the HDP because it corresponded with his own idea of a traditional long-range gun. As to the Rheinbote rocket, it seems possible that he was never even informed about its existence.

It was the SS which, in their claim to power, manoeuvred to take command of these supposed 'super weapons'. Following the attempt on his life on July 20, Hitler appointed Reichsführer-SS Heinrich Himmler as the successor to Generaloberst Friedrich Fromm (who was involved in this attempt) as Chef der Heeresrüstung und Befehlshaber des Ersatzheeres (Chief of Army Equipment and Commander of the Replacement Training Army). On August 8, Himmler appointed SS-Gruppenführer Hans Kammler as his commissioner for the A4 programme and by the end of the month, a Division zV (zur Vergeltung — for retaliation) was created under his command for the control of operations.

In September, Kammler was granted responsibility in all matters of importance in the V2 programme and Dornberger, who was made Kammler's deputy, had to adapt to the SS taking over. In the months that followed, the SS progressively took control of the entire secret weapon programme, including the HDP. By the end of 1944, Kammler had pressed the HDP and the Rheinbote to the front and by January 1945, he had finally wrested command of V1 operations from the Luftwaffe. On February 7, he could claim that he alone 'was responsible to the Reichsführer-SS for development, testing and production of all long-range weapons and anti-aircraft devices for all military and civil matters'.

Implicated in the bomb plot against Hitler on July 20, 1944, Fromm was removed from his command (he was tried and finally shot in March 1945) whereupon Reichsführer-SS Heinrich Himmler was appointed to replace him as chief of army equipment and commander of the replacement training army. Here Dornberger (centre) greets Himmler and a party of SS officers at Peenemünde. (Bundesarchiv)

In August, Himmler appointed SS-Gruppenführer Hans Kammler as his commissioner (Sonderbevollmächtigter 2 or Sb 2 in short) for the A4 programme. Although Dornberger quickly adjusted to the SS taking over the V-weapon programme, it was not easy for him to work under Kammler: 'I found it impossible to go into anything thoroughly with him. He darted from one subject to another. He had no time for discussion or reflection. He made his decisions without due consideration. He rarely conceded any point. It was quite out of question to get him to change his mind. Owing to the many tasks he undertook, he was on the go day and night and spread nothing but unrest, hurry and nervousness around him.' Speer, on the other hand, recognised his positive qualities and commented that Kammler was extraordinarily energetic, fresh and ruthless. (R. Wachtel)

For testing, the first 150mm HDP cannon was built at Hillersleben, an artillery test range on the Colbitz-Letzlinger heath, 20 kilometres north-west of Magdeburg. *Above:* **Four cross-sections of the multi-chambered cannon can be seen in this picture of the test gun as well as the screwed breeches which closed the side chambers. (Bundesarchiv)**

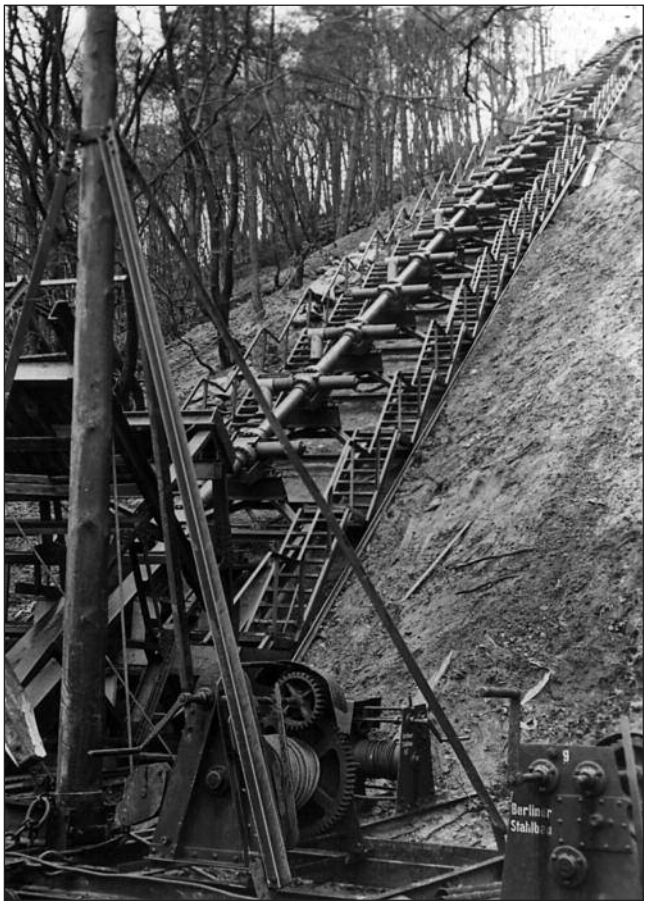
HOCHDRUCKPUMPE, V3

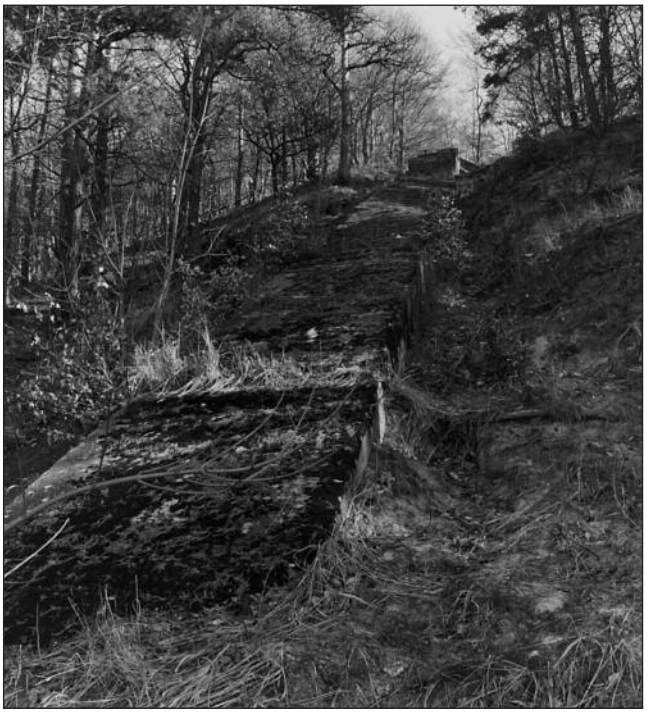
The idea of a multi-chambered gun had reappeared from time to time since the middle of the 19th century and in 1918 a patent for such a long-range weapon had been registered in France to retaliate against the German 'Paris Cannon' which had been shelling the French capital from March that year. However, the German armies soon withdrew, the Armistice was signed and that cannon never materialised. However, the tables were turned in June 1940 when, following the French defeat, the Germans came across the old patent and in 1942 the chief engineer of the Röchling Eisen- und Stahlwerke, August Coenders, adapted the concept. He produced plans for a smooth-bore multi-chambered gun which consisted of a very long barrel with pairs of lateral chambers at periodic intervals. After the shell was loaded in the breech, a first charge started the projectile up the barrel. As the shell passed each pair of lateral chambers, additional propellant charges were ignited by the flash, thus adding a fresh quantity of gas and further accelerating the shell until a very high muzzle velocity was achieved.

By early 1943, Röchling had built a model on a reduced scale proving that a 2cm prototype worked quite well. Convinced of the soundness of the design, Röchling then approached Albert Speer, the Minister of Armaments and Munitions, and told him of their plan for a gun which would be able to fire fin-stabilised shells of 140kg over a distance of 160 kilometres. A 50-barrel battery of that kind, with a rate of fire of one shot per barrel every five minutes, could fire 600 shells at London every hour.

Speer was favourably impressed and in May he informed Hitler about the proposed long-range cannon which would be able to bombard London. The idea of an 'England Cannon' captured Hitler's imagination and he demanded its immediate development.

Left: **The gun was under repair when the picture was taken. The breech had been unscrewed from the barrel (off the picture to the right) and turned upside down, consequently, the rear of the breech is facing the barrel (see also page 3, top left). (Bundesarchiv)** *Right:* **The Hillersleben test range lies north of the village of that name, with the guns positioned to fire to the north. The two long trenches for the HDP installations were located side by side in the south-eastern corner of the range. Used until 1990 by the Red Army, the range with all its buildings and gun positions now lies derelict and overgrown.**





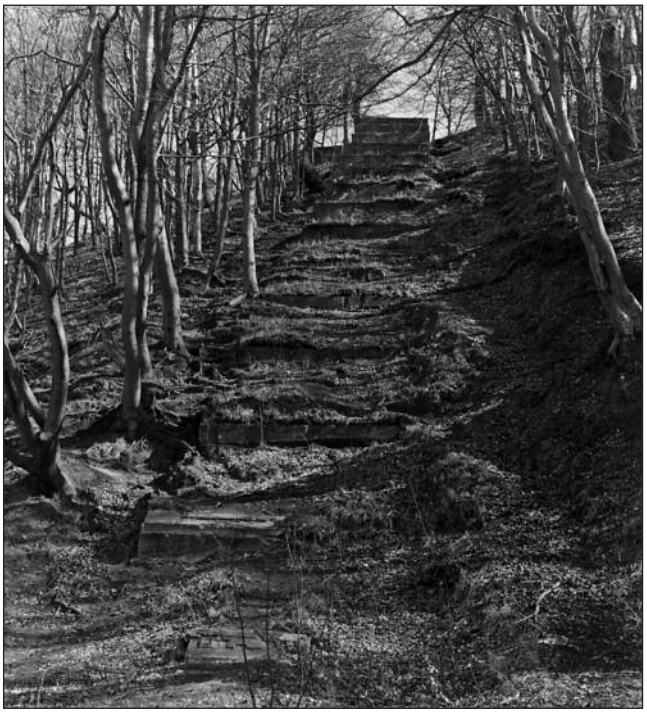
Left: **Having attended a demonstration of the HDP at Misdroy, Generalmajor Dornberger wrote: 'An enormous number of gunners was required to service the weapon, standing on the staircases that ran to right and left sides of the barrel, and reloading the T-pieces with propellant charges between rounds'. (Bundesarchiv)** *Above:* **Alvin Gilens discovered this surviving ramp which still shows — as does the 1944 picture left — the long one-piece concrete slab which lay beneath it.**

The project was given the code-name HDP (Hochdruckpumpe — high pressure pump) and the construction of two 15cm cannons was started for development and testing, the first at Hillersleben, an artillery test range about 20 kilometres north-west of Magdeburg, the second at Misdroy.

In the summer of 1943, with the V1 still suffering technical problems and the V2 program badly hit by the Bomber Command attack on Peenemünde (see *After the Battle* No. 74), Hitler's interest in the England Cannon was confirmed. Speer's minutes of a meeting in late August read: 'On the basis of my proposal, the Führer commands that it is essential to order the Hochdruckpumpe immediately, without waiting for the results of a test-firing. Test stands at Hillersleben and Misdroy, as well as the immediate construction of a permanent operational site, have to be given full support.'

Speer kept Hitler regularly informed of the tests of the 2cm HDP prototype and after a conference with him on September 30 and October 1 he noted: 'After successful tests with the 2cm barrel of the Hochdruckpumpe

Left: **In 1944, the Wollin area was German but now it lies in Poland and Misdroy has been renamed Miedzyzdroje. (Kalkofen is Wapnica and Lebbin Lubin.)** *Above*: **The HDP test gun was built on the side of a hill, with the lower part of the ramp standing directly on the ground (see top) and with large concrete supports to carry the upper part of the cannon. (A. Gilens)**



Left: **Careful examination of the two pictures taken in 1944 proves that they actually show one and the same gun. (Bundesarchiv)** *Above:* **Two test guns were built at Misdroy and Alvin found out this second ramp 100 metres away from the first one shown opposite. The lower part of this ramp appears to have been built in a series of steps and not as a continuous concrete slab which indicates that this is not the same ramp shown in the two contemporary pictures. (A. Gilens)**

the Führer wants to be informed continuously about results of the test of the 15cm barrel at Hillersleben and Misdroy. Contrary to planning hitherto, the tests are to be given priority under all circumstances and with considerable support.'

The construction of an operational site in the West was decided and a new code-name was chosen: 'Tausendfüssler' ('Millepede'). Excavation of a huge underground launching bunker was begun in the summer under a limestone hill at Mimoyecques in the Pas-de-Calais, about eight kilometres from the Channel coast from where the range to London was 160 kilometres (see *After the Battle* No. 6). Five batteries, with a total of 25 barrels, each about 130 metres long, were to be installed in five inclined shafts. The bunker would have two floors to service the weapon, at 30 metres and 100 metres, respectively, below the surface. A concrete roof five metres thick was designed to protect the openings of the shaft on the surface. To complete this gigantic work code-named 'Bauvorhaben 711' (Construction Plan 711), the Organisation Todt engaged 5,000 skilled workers and, according to a note of November 25, the first battery was scheduled to be completed by March 1, 1944, although, at this stage, neither a full-scale HDP gun nor even a projectile had yet been made to work!

The first 15cm HDP cannon was ready at Hillersleben at the end of October 1943 when trial firings started. The projectile of Röchling's design was about three metres long and weighed 140kg. This prototype, however, had a shortened barrel as it was only intended to test the internal ballistics and other basic technical problems so the range reached during these early experiments was less than ten kilometres.

Nevertheless, Hitler pressed on as the minutes of his meetings with Speer held between January 25-28 at the Führerhauptquartier disclose: 'The Führer has read with great interest the report on the trial firings of the Hochdruckpumpe which took place January 18-19, 1944. He orders development as well as production to be pushed ahead vigorously, and demands that output of ammunition be shortly increased from the 2,500, which until now was reported as the maximum possible, to 10,000 rounds per month, as had been ordered a long time ago.'

On January 15, a special unit — Artillerie-Abteilung 705 — was set up with two batteries to operate the HDP. This was under the command of Oberstleutnant Georg Borttscheller who had previously taken part in the development and testing of the weapon as a member of the Heereswaffenamt, the Army ordnance department responsible for weapon design.

By mid-January, the full-length barrel for the HDP erected at Misdroy was ready. It was 130 metres long and consisted of 32 cross-sections (each with two side chambers). The first trial firings were disappointing for not only were the muzzle velocities only 1100 metres per second — far from the 1500 metres per second needed to reach England — but the projectiles themselves appeared to be unstable in flight.

The chief of the Heereswaffenamt, General Emil Leeb, had observed some of the trials and he soon drafted in ballistics experts to tackle the defects of the Röchling design. The Reichsforschungsrat (RFR — Reich Research Council) was called in to solve the stability problem of the projectiles and from April wind-tunnel measurements were conducted at the Aerodynamics Research Institute at Göttingen. There, Professor A. Walchner commented critically on the work carried out so far by Röchling: 'Until now there has only a lot of nonsense been done in the development of projectile designs. With such matter, one has to use a bit of common sense and it will all go well.' When the chief of the development branch of the Heereswaffenamt, Generalleutnant Erich Schneider, looked further into the results achieved so far, he made it clear that in his opinion the project was a total failure and that it should be cancelled forthwith. However, with Hitler fully supporting the HDP, nobody dared to endorse his recommendation.

Nevertheless, Speer's deputy (Speer was ill), Karl-Otto Saur, had also become cautious and he broached the subject to Hitler on April 6-7. The Führer agreed to reduce the HDP operational site in the Pas-de-Calais to only three batteries instead of the five originally planned and he also approved the reduction of shell production to 5,000 rounds.

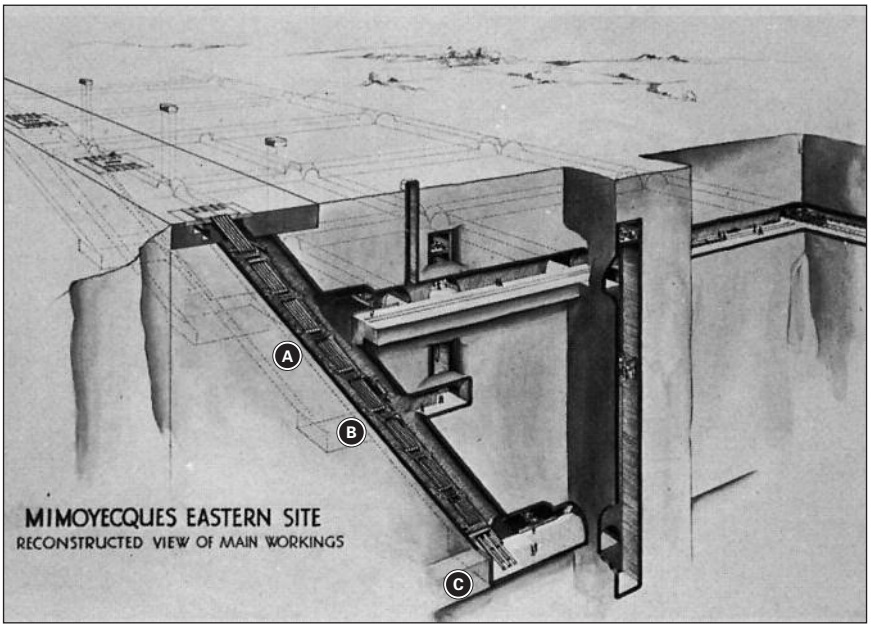
At the end of April, two sections of the barrel exploded at Misdroy after having fired only 25 rounds and an investigation quickly revealed the cause of the failure: because of faulty heat treatment during its manufacture, the barrel was not strong enough to withstand the multiple explosions. This failure lay with Röchling but the firm appeared unable to produce barrel sections with the specified strength and the Reichsforschungsrat refused to spend more effort on such an immature project. On May 8 the chief of the RFR's planning office, Professor Werner Osenberg, wrote to Reichsleiter Martin Bormann: 'I regard it as my duty to draw your attention to the Hochdruckpumpe project, which is being carried out by order of the Führer at this moment. In my view, it has to be regarded as a failure as far as barrel construction, projectile shape and uneconomical use of explosive material is concerned. For that reason, the use of personnel at the present time cannot be justified.' There is no recorded reaction from Hitler and it is probable that Osenberg's analysis was not even made known to him.

A new series of test-firings was carried out at Misdroy between May 20-24 when different shell designs were tried, including the one from Röchling, with others from Deutsche Faserstoff, Bochumer Verein and Witkowitz Eisenwerk. Reaching a muzzle velocity of 1370 metres per second, the latter design — 1.8 metre long and weighing 65kg in flight —

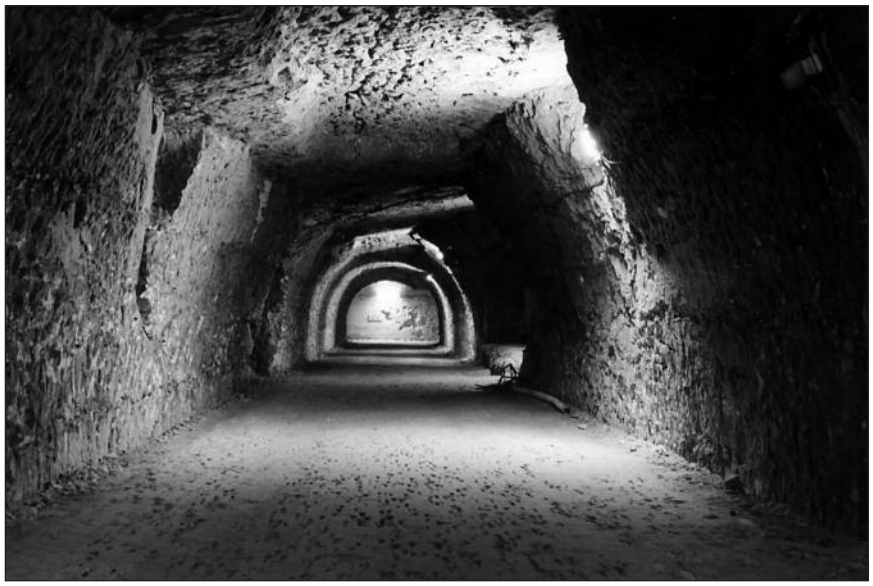
The bottom of the first ramp (see page 6) is now in the back garden of a private dwelling and the owner, Artur Jakisz, kindly allowed Alvin to take these pictures. Mr Jakisz recalled that the last pieces of metal and other non-concrete parts were removed from the bottom of the ramp in the mid-1990s. The long concrete slab that supported the lower part of this ramp ended in the middle, from which point the concrete supports took over. (A. Gilens)

This is the series of nine concrete supports that carried the upper part of the second ramp (see page 7). When compared to what had happened to the first ramp (see top), the foundations appear to have been of better quality here and none of the supports had given way. Another 100 metres down the road, visible only as an earthwork on the side of the hill, Alvin found what may have been a third ramp. It had probably been the test ramp for the operational shortened version of the HDP, a cannon with 12 cross-sections mounted on a wood and steel framework and not on concrete supports. (A. Gilens)

At Mimoyecques, the construction of the huge installation code-named 'Bauvorhaben 711' or 'Wiese' begun in the summer of 1943. Work proceeded well in spite of bombing attacks in November, and on January 6, 1944, a report stated that the first inclined shaft was to be completed by February 15. Three weeks were scheduled for mounting the barrels and the first five HDP cannons were to be ready by March 15. The same report stated that 5,000 rounds could be stored there and that from April the first battery would be able to fire an average of 120 shells at London each day. After its capture, an investigative team under Colonel T. R. B. Sanders inspected the installation and produced this sketch plan. It was noted that work on another site had been started 1000 metres to the west, although abandoned after the bombing in 1943. Hence, the initial plans for Mimoyecques were for two underground installations, each with five clusters of five barrels: a total of 50 HDP cannons. The shafts were inclined at 50 degrees from the horizontal, each housing a cluster of five 127-metre-long barrels.

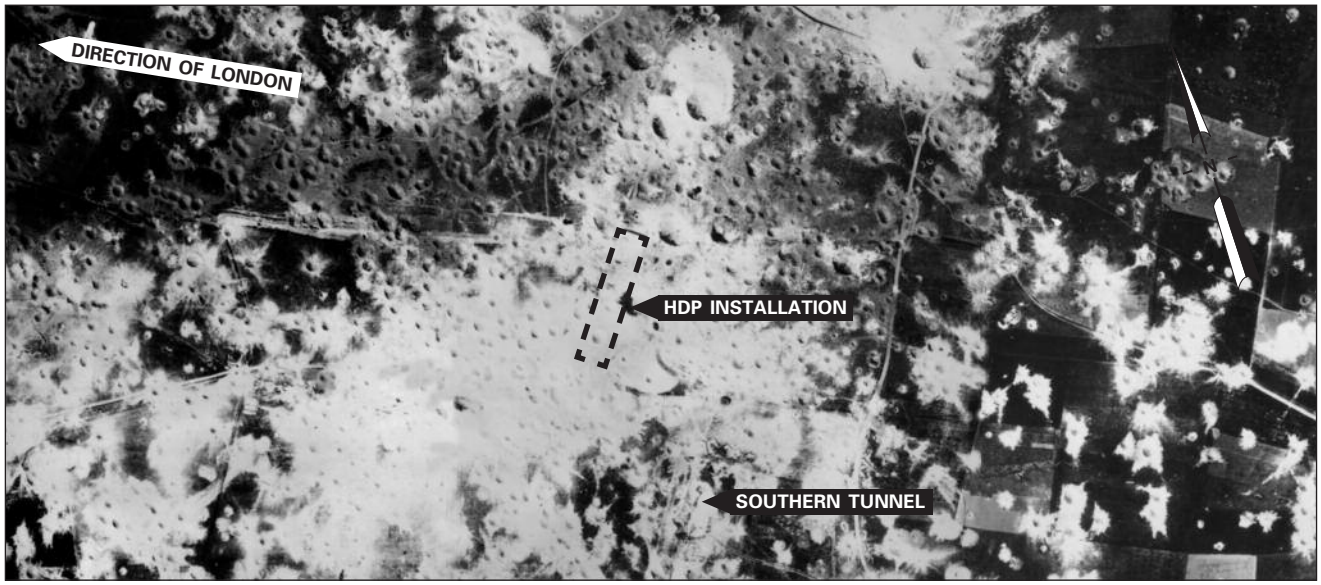


This is the main gallery as it appears today, looking towards the northern entrance.

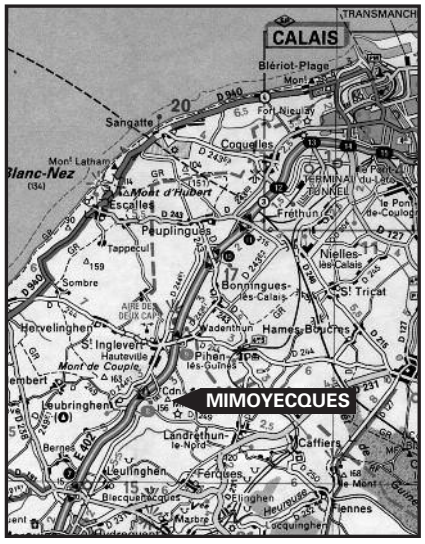


Gallery No. 9 with the railway tunnel in the background. Shaft No. IV is just behind the photographer.

The main service floor [A] was 30 metres below ground. It comprised the railway tunnel (on the right in the sketch) some 650 metres long. In the centre, the gallery was larger for about 250 metres and an unloading platform was just beside the line. Parallel, and about 100 metres apart, lay another gallery and in between, and perpendicular to them, were another eleven numbered 3 to 13. Nos. 6, 7, 8, 9 and 10, served the five inclined shafts numbered Nos. I, II, II, IV and V. At their lower ends [C], 100 metres below ground, the shafts were serviced by another level of galleries and there was also a third intermediary level of service tunnels [B]. There were several vertical shafts, both between the various levels and to the surface. Some were intended to accomodate lifts to move personnel, powder charges and ammunition down to the lower levels while others were to ventilate the fumes when the breeches were opened after firing. By the beginning of 1944 there were so many problems with the development of the HDP cannon and projectiles that it was questionable as to whether the weapon would ever be made to work and reach the planned range so in March the Heereswaffenamt proposed to reduce the installation to just three batteries and work concentrated solely on Nos. III, IV and V. On the surface, a five-metre-thick concrete slab was cast to protect the shafts where they emerged on the hilltop. Covering just the three completed shafts, some 24 metres apart, it was 70 metres long and 30 metres wide. When abandoned in July, 60 per cent of the galleries of the main floor had been concreted but not the inclined shafts as this was to be done when the steel supports of the five-barrel clusters were in place. On November 5, 1943, the US Ninth Air Force bombed Mimoyecques for the first time, and again on the 8th and 10th. After three months of respite (the interval used by the Germans to cast the protective slab), B-17s and B-24s of the US Eighth Air Force launched ten raids between March 19 and June 22. Nevertheless, work continued and on June 2 a report stated that the installation of the first five barrels would begin on July 15 and would be completed by August 15. The installation of the second cluster of five barrels was planned to be completed by September 15 and the third on October 15.



RAF Bomber Command hit the area on June 22 when 98 Lancasters dropped 400 tonnes and three more raids followed until July 6 when No. 617 Squadron dropped 16 12,000lb Tallboy bombs. One clipped the concrete slab and five were near misses causing the collapse of one of the shafts and some of the galleries. Having inspected the damage, German engineers reported the following day that installation of the HDP barrels was now totally impossible. On August 4, the Eighth Air Force launched a B-17 'Aphrodite' — a radio-controlled aircraft packed with explosive — against the target but it was mis-directed at the tunnel entrance of the western site which had been abandoned in November 1943. In spite of all these attacks, aerial reconnaissance indicated that work appeared to be continuing (the Germans were actually repairing the railway tunnel entrance) so Bomber Command launched yet another attack on August 27. With over 200 aircraft dropping 800 tonnes of bombs, it was the heaviest raid to hit Mimoyecques. Less than ten days later, on September 5, the 3rd Canadian Division overran the abandoned workings.

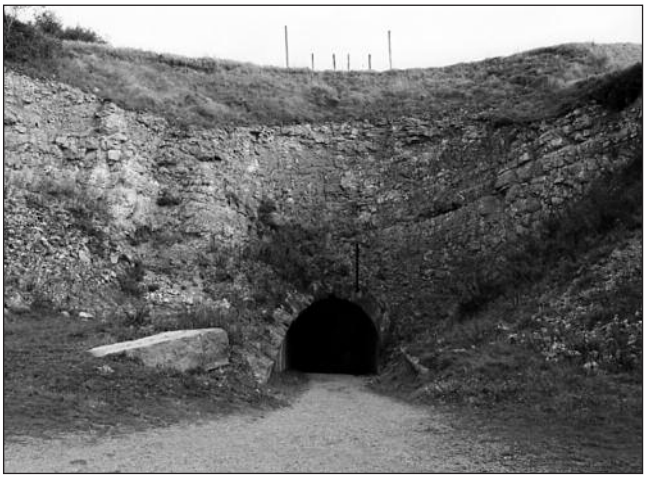


There is no village called Mimoyecques, the workings actually being located at Landrethun-le-Nord, between Marquise and Guînes. To reach the HDP site, take the A16 motorway at Calais, drive southwards and take exit No. 9.

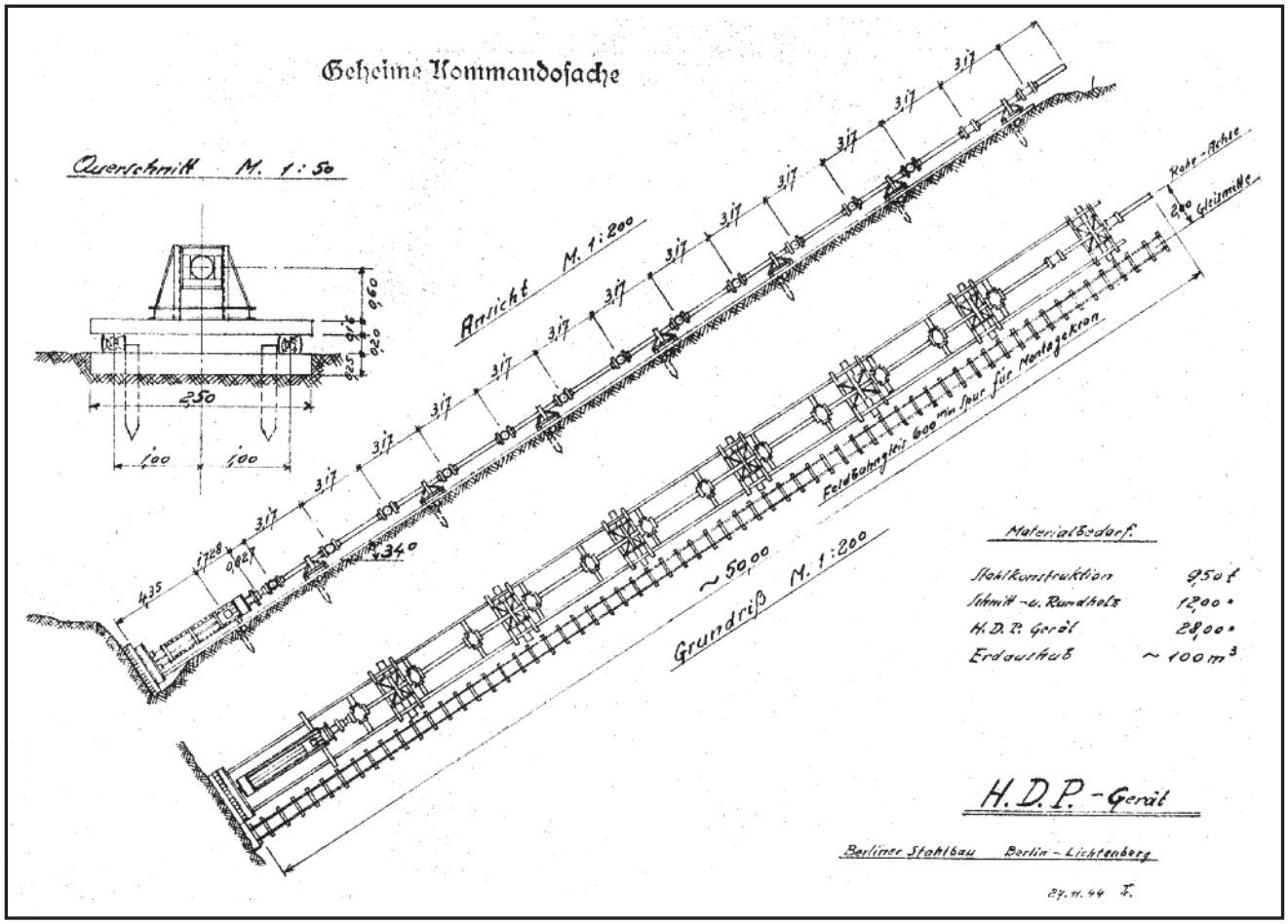
Above: **This picture was taken on August 4, a month after the raid by No. 617 Squadron. Six Tallboy craters are visible amid the cratered landscape.**

This picture of one of the firing slots in the concrete slab was taken in 1945 by Colonel Sanders' team. It was by then still in good shape but the Royal Engineers destroyed this part of the installation so that none of the three slots survived.

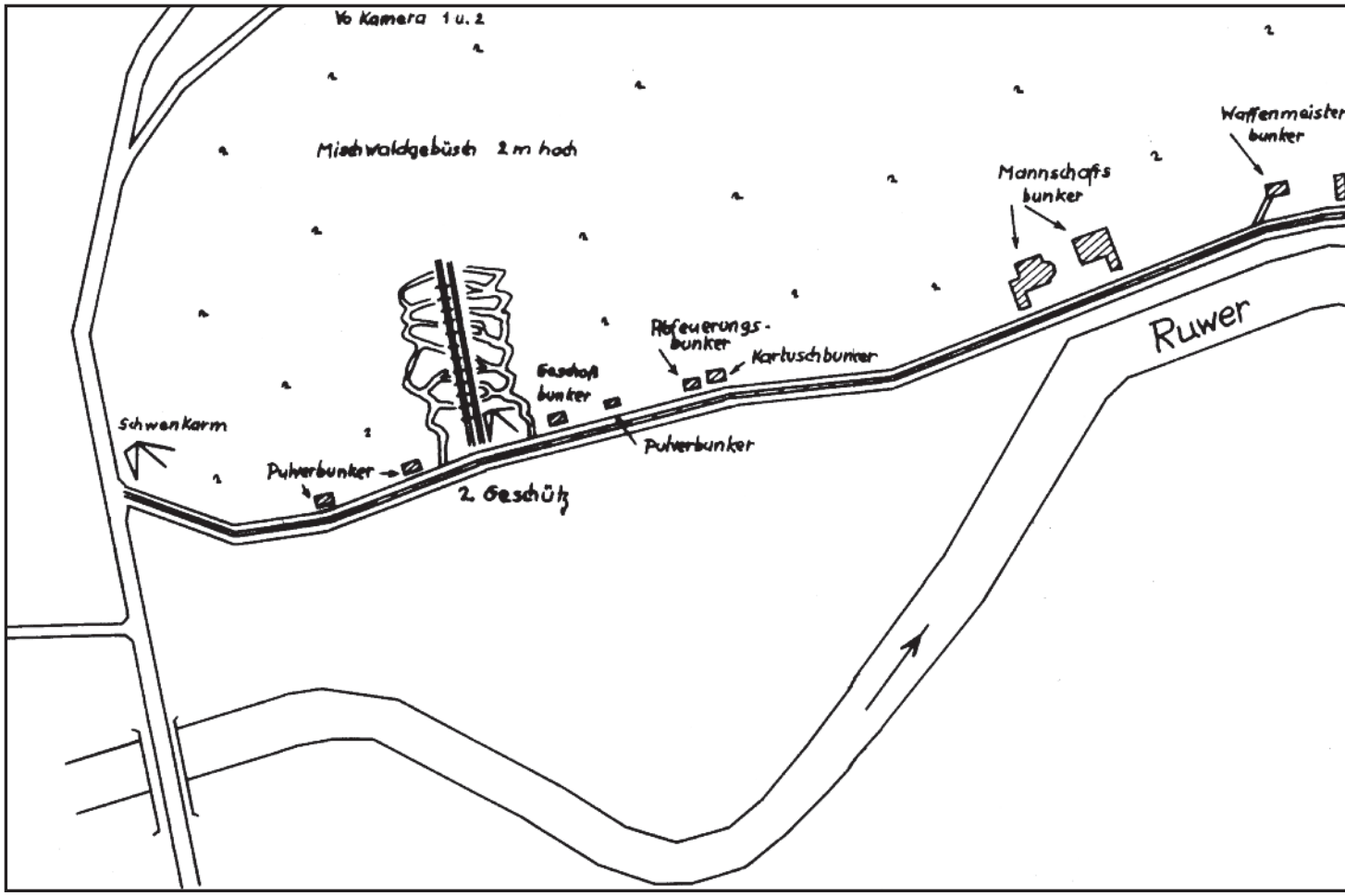
Our comparison shows a surviving corner at the top of shaft No. V. In the background, the crater of the Tallboy which clipped a corner of the concrete slab.



Left: **This was the southern entrance of the railway tunnel as it appeared late in 1944 during the inspection by Colonel Sanders. Note the pipe bottom right, probably one being used to pump out flooded chambers. Colonel Sanders' mission was on site for four months and in his report dated February 21, 1945, he concluded that the installation could be repaired and pose a threat to London. It was therefore decided to destroy the underground facilities and Royal Engineers packed ten tons of explosives in the galleries. The resulting explosion on May 9 failed to close the entrances and a further 25 tons was blown at either end of the railway tunnel on May 14 (see *After the Battle* No. 6).** *Right:* **When in the early 1960s it was decided to use the abandoned tunnels for a mushroom farm, 30 metres of the hillside above the old southern railway entrance had to be removed to establish a safe access. This is now the entrance to the 'Forteresse de Mimoyecques' — note the remains of the tunnel walls in the foreground. A fascinating one-hour tour of the galleries at the 30-metre level shows how, in spite of the Royal Engineers efforts, most of the underground tunnels and galleries have survived. A full-size section of a mock-up of an HDP cannon can be seen angled skywards in what remains of shaft No. IV. There is a memorial to Lieutenant Joseph Kennedy, brother of the late US President, killed in 1944 when piloting a B-24 'Aphrodite'; another memorial to the bomber crews killed while attacking the installation, and a third to those many conscript workers who lost their lives during these attacks. The 'Forteresse de Mimoyecques' is open from April to November (Telephone: 03 21 87 10 34). Take warm clothing for the interior is always cold.**



The huge and mysterious installation at Mimoyecques became to personify the HDP weapon even though no barrels were installed or any shots fired. Compared to these 127-metre-long barrels planned to be installed near the coast at Calais, the four HDP cannons that went to war inland were of a 50-metre-long shortened variety. This plan of an operational cannon was drawn on November 26, 1944. It shows the breech-block in a pit dug out at the bottom of a slope, the 12 cross-sections of the cannon, the wood framework and the seven steel substructures that supported it. On the right of the barrel can be seen the 60cm rail track for the mobile crane used to assemble the gun. Cannons Nos. 1 and 2 were deployed at Lampaden in Germany, target Luxembourg, and Nos. 3 and 4 at Buhl in Alsace, targeted at Belfort.



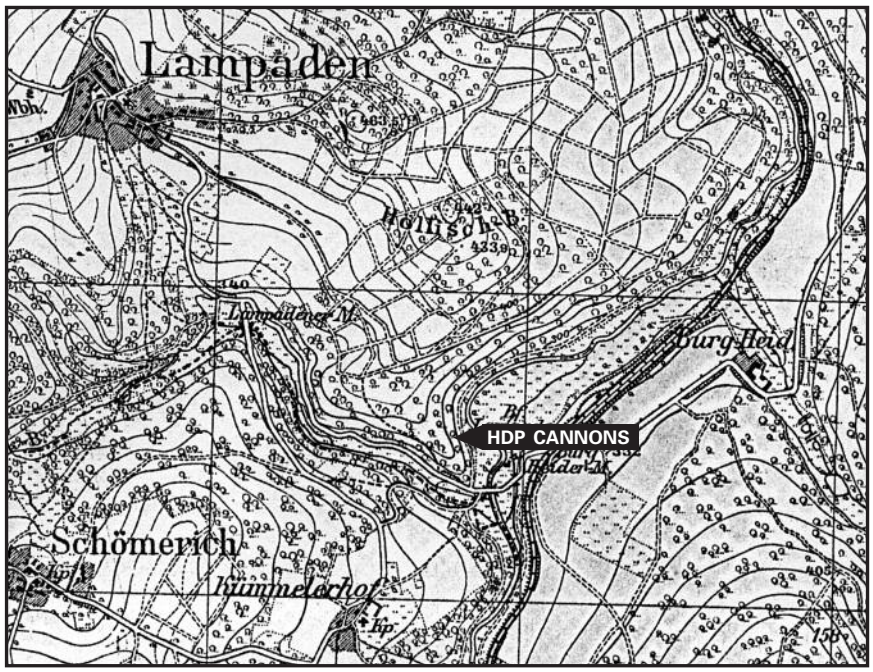
The two HDP cannons of the 1. Batterie of Artillerie-Abteilung 705 were installed near Lampaden, 12 kilometres south of Trier. This detailed plan of the firing site appeared as an annex to the report on the first employment of the HDP dated January 15, 1945. The site extended over 300 metres along the western bank of the river. At the beginning of the railway, by the side of the road on the left, a 2-tonne crane (Schwenkarm) was provided to off-load the various parts of the guns from trucks to the railway carriages. When the cannon was operational, this same crane was used to move the crates of shells and propellant charges. At the bottom of each cannon, another crane bridged the gap from the railway. Running alongside the cannon was a 60cm-gauge railway carrying the mobile crane used to assemble the barrel. At the bottom of the slope, a series of sheds held a total of 50 rounds, 25 for each cannon. There were three sheds for the propellant charges (for the side chambers, 18 of them for each shot), one for the cartridges (to load the breech, one for each shot) and one for the shells. Though this sketch named these constructions 'Bunker', the report called them 'Hütte' and an annex clearly showed what they were: quite simple wood constructions 3.5 metres long, 1 metre wide and 1.25 metres in height. There was also one firing shed for each cannon and two larger sheds were provided in between them, one each for the crews and the gunners.

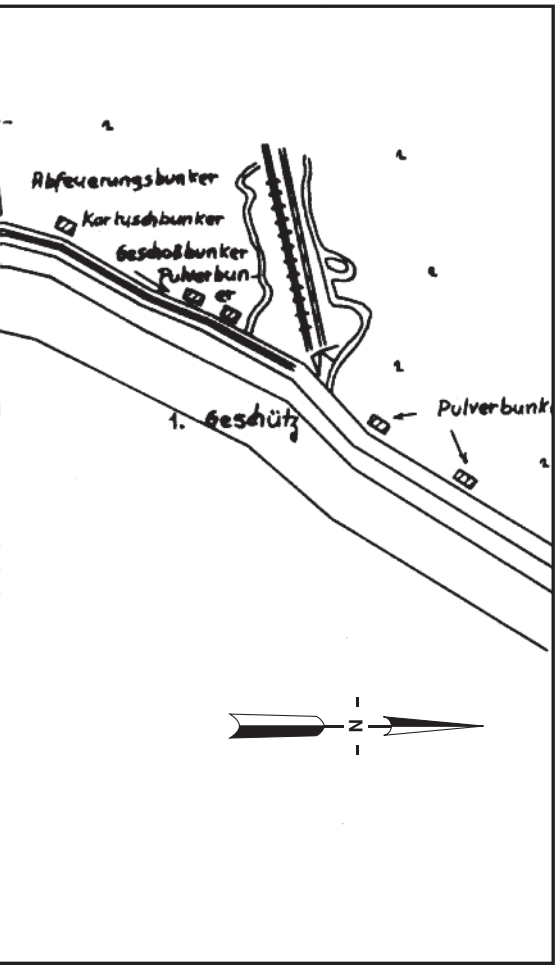
attained a range of 90 kilometres. By the end of the month, the Heereswaffenamt reported confidently that it was possible that the required range would be reached.

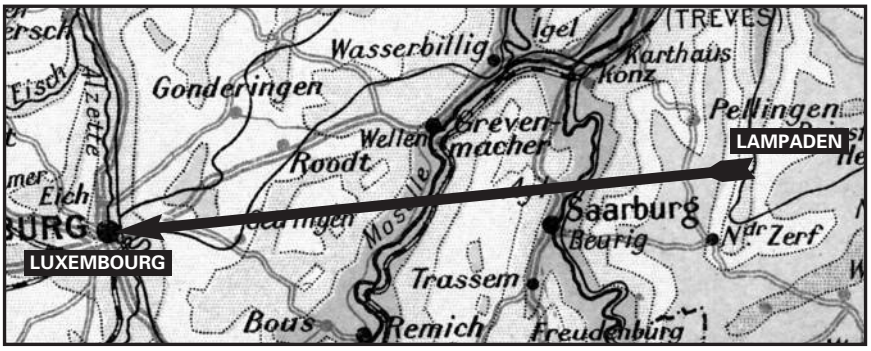
After further meetings with Hitler during the course of May 22-25, Saur recorded: 'Have informed the Führer about the result of the latest trial firings with the Hochdruckpumpe at Misdroy. He expects the continuation of tests in view of the special task as England Cannon, as well as for the possible employment of the principle of the Tausendfüssler for other purposes.'

However, the 'England Cannon' was destined never to fire any shots in anger. The Allies had kept a close watch on the construction at Mimoyecques and the first air attack hit the HDP bunker in November 1943. Up to August 1944, a total of 18 further bombing raids were carried out against the site during which a total of 4,100 tons of bombs were dropped. Then, in the first days of September, Canadian troops overran the abandoned site.

From June 1944, the subject of the HDP was no longer raised by Speer at the regular armament conferences with Hitler but, following the attempt on Hitler's life, the SS progressively took it over. At the beginning of July another defect caused another section of the barrel to rupture at Misdroy as a result of which a third of the barrel had to be







The southern ramp at Lampaden as it appears today. The January 15 report states that to build one ramp — dig out the earthworks and build the wood framework — required 35 men working for eight to ten days. The actual assembly of the gun took a 28-man team four days, ten men being required to bring the parts of the cannon to the bottom of the ramp and load them on the mobile crane; 12 men to manoeuvre that crane up and down along the slope as no motorised winch was available, and six to fit and assemble together the many pieces of the cannon.

replaced. Consequently, Röchling was directed to use a steel richer in nickel and to pre-test each section to a pressure of 2,500 atmospheres in the factory.

From August, a muzzle velocity of 1500 metres per second was known to be unrealistic so a shorter range was accepted as being practical for purposes other than what was originally intended. The development of the long HDP barrel — the 130 metres as envisaged for the England Cannon — was abandoned and instead shortened versions were planned. It seems that plans were made for a 60-metre-long cannon and an 80-metre-long cannon and by mid-August a plan was agreed for the LRK 15 F 58 (LRK, Langrohrkanone — long-barrelled cannon) which could be brought into action at the fighting front. This version comprised 12 cross-sections and was about 50 metres long.

A demonstration of this 12 cross-section HDP cannon was held at Misdroy on November 14 and it went off without any unusual occurrences. Plans were already being made for the deployment of the weapon and two days after this demonstration a report gave the basic data for the construction of an operational firing site. To build a site for one gun would need 40 men working for ten days; three to ten tonnes of steel; about ten cubic metres of wood, with 150 to 200 cubic metres of earth to be excavated. The hillside on which the gun was to be set should be at an angle of 30 degrees, or better 34 degrees, and 30 to 50 metres long and, of course, facing the enemy front. As the dispersion of shots was reported as being three kilometres in length and up to 800 metres laterally, it was recommended that the target area should be at least five kilometres long and one kilometre wide. The rate of fire was to be two to three shots per hour. In this report, the gun was referred to as 'Fleissiges Lieschen' (Busy Lizzie).

The 1945 report says that the engineers of Organisation Todt excavated a total of 250 cubic metres of earth and rocks at Lampaden, all by hand save for the digging out of a larger excavation at the top of the ramps where a four-metre clearance had to be provided at the muzzle end. Explosives had to be used to excavate this pit which is still clearly visible at the top of the southern ramp. Jean Paul was standing in it when he took this picture. The Ruwer can be seen in the background, beyond the field.

Left: **This is the northern ramp as it appears today, looking down towards the Ruwer river.** *Right:* **The same northern ramp, pictured in the direction of the fire: Luxembourg is 42.5 kilometres away to the west. Although the HDP cannons were installed rigidly on the slope (the 1945 report specified that they had to be adjusted with great precision, plus or minus one tenth of degree of the theoretical aiming point), their range was adjusted by varying the charges in the side chambers. The first eight pairs of chambers were always loaded with full charges (3.1kg of explosive each) but, depending on the range to the target, the remaining side chambers would be loaded with either full or half charges (2kg only) or not at all. To hit Luxembourg from Lampaden, the first nine pairs of chambers were loaded with full charges but none in the 10th, 11th and 12th. Together with the charge in the breech, the total propellant was over 60kg and the muzzle velocity was then 884 metres per second.**

In the 1945 report on the first employment of the HDP, the commander of the 1. Batterie described how much time and effort had been spent in hiding the Lampaden site from Allied aircraft. This was all the more difficult when the barrel heated up as this in turn warmed the camouflage lying on top of the installation, thus melting the snow. So despite the white paint disguising the installation, the outline of the gun became identifiable. The slopes of the Ruwer river valley at Lampaden were — and still are — covered by bushes and trees but these were not high or thick enough to camouflage the guns from the air. *Above:* **The narrow-gauge railway running along the track at the bottom of the slope ended at the bottom of the northern ramp (see the sketch plan on pages 12-13). Here (the northern ramp was just off this picture to the right), by the side of the track, stood two sheds, one for propellant charges and the other for the shells.**

Although the report said that 700 rounds of ammunition would be produced before January 13, 1945, and a further 800 rounds by February 1, as late as the end of November no decision had been made as to the type of shell to be used. The minutes of a discussion between Dornberger and Kammler in Berlin on the 29th read: 'Results of the HDP firings at M[isdroy] must be received as soon as possible in order to determine the type of projectile to be used'. On December 22, ten rounds of the 0-Serie, the pilot production batch, were test-fired at Hillersleben and the result was reported as good. The following day, Major Axster (who at BzbV Heer, Dornberger's staff, had assumed responsibility for the HDP and Rheinbote projects) reported to Kammler that 50 rounds of ammunition would be available at the front on December 29, and another 150 rounds by the end of the first week of January.

By mid-November, Röchling had delivered two shortened HDP cannons and Kammler ordered their immediate deployment in support of 'Wacht am Rhein', the major offensive then planned in the West. The chosen operational site was at Lampaden, 12 kilometres south of Trier, and work began to install the two cannons on the slope on the western side of the Ruwer river. Their target was to be Luxembourg, 42.5 kilometres away.

Under Kammler's Division zV, Artillerie-Abteilung 705 took over and, as from November 30, the men of its 1. Batterie (7 officers, 33 NCOs and 96 men) started to assemble at Zerf, a town five kilometres to the south of Lampaden. From mid-December the battalion was under the command of Hauptmann Patzig.

WAR DIARY, ARTILLERIE-REGIMENT zV 901

22 November
SS-Gruppenführer Kammler visiting Artillerie-Abteilung 836. Discussion between SS-Gruppenführer and Oberstleutnant Honig regarding construction of emplacements for HDP.

30 November
Artillerie-Abteilung 705 with 7 officers, 33 NCOs and 96 men arrive at Zerf.

16 December
Preparations continuing for installation of HDP at Lampaden. Transportation situation difficult – this resulting in sparse and erratic arrival of equipment.

20 December
Impossible to continue with further construction work for HDP at Lampaden as transports not arriving.

22 December
HDP still able to proceed only to a very limited extent with installation because transports with essential overhead sections are still missing. Work carried out on underground shelters for personnel.

25 December
Steel substructure for HDP cannon No. 1 at Lampaden completed; breechblock and five cross-sections with tubes assembled.

26 December
Hauptmann Patzig, the newly arrived officer commanding Artillerie-Abteilung 705, arrives at Gruppe and reports that the assembly of HDP cannon No. 1 at Lampaden should be completed by December 28. He is presently unable to say when the assembly of cannon No. 2 will be completed as this depends on recovery of parts from the bombed railway sidings at Trier. Gruppe promises him two cranes for this recovery operation.

28 December
HDP cannon No. 1 at Lampaden ready for firing, albeit without munitions at this stage.

29 December
Arrival of first munitions (44 projectiles) for HDP. Substructure for cannon No. 2 being assembled. Arrival of crane for recovery of parts from bombed railway sidings at Trier. The division commander demands that cannon No. 2 be made ready for firing by December 30.

30 December
In the presence of the division commander and the commander of Artillerie-Abteilung 836, HDP opens fire with five projectiles against Luxembourg.

31 December
HDP fires 23 projectiles against Luxembourg. Following the recovery of parts, assembly has commenced of superstructure for HDP cannon No. 2 at Lampaden.

1 January
No HDP firing because on orders from Division zV a munitions stock of some 20 projectiles is to be retained at all times for firing at targets in conjunction with spotter planes. Luftwaffenkommando West has authorised observation flights by the Hecht detachment. Construction of cannon No. 2 at Lampaden completed. Ready for firing following adjustments to cannon.

2 January
No HDP firing.

3 January
No HDP firing. Two more HDP installations have been completed at the factory. Oberstleutnant Honig receives order from division commander to reconnoitre positions in the Eifel area from which to attack Verviers.

4 January
HDP fires 16 projectiles from cannon No. 1 against Luxembourg. Provisional results of Oberstleutnant Honig's reconnaissance are as follows: HDP cannons for use against Verviers should be set up around Hellental-Hollerath, 45km to the west of Ahrweiler.

5 January
No HDP firing due to lack of munitions. Fresh heavy snowfalls making transportation even more difficult. Troops continually having to clear snow to keep roads passable.

6 January
No HDP firing due to lack of munitions. Further heavy snowfalls making transportation considerably more difficult – especially for the specialist heavy vehicles.

7 January
No HDP firing due to lack of munitions. On orders from Division, Oberstleutnant Honig's reconnaissance for HDP positions in the Eifel area for use against Verviers to cease forthwith. An immediate reconnaissance for positions for use against Belfort to commence in the Vosges area around Colmar-Munster-Guebwiller. Division orders cannons No. 3 and No. 4 to be positioned there.

9 January
Eighty projectiles delivered by lorry for HDP. Cartridges for these also on the way by lorry. Heavy snowfalls continuing.

The transport system in the West — railways and roads — was overstrained by the preparations already in hand for the coming offensive with the result that the parts for the HDP arrived piecemeal. When the offensive commenced on December 16, neither of the two guns was ready for action nor was any ammunition available. Nevertheless, two days later, Kammler sent a telex to Generalleutnant Siegfried Westphal, Chief-of-Staff of Ob.West, to describe the operations planned: 'The HDP will be brought into action with two barrels in a troop trial at the operational area of Ruwer at Trier, with the target being Luxembourg. Both barrels have been ready for action since December 15, 1944. During the month of December, 50 rounds will be made available. Operational and target areas have been chosen with regard to firing range (60km) and spread (2.5 - 5km), as well as the angle of inclination of the barrels, which are rigidly installed upon mountain slopes with special trestles (34 degrees). The shells weigh 90kg, of which 7 to 9kg for the explosive charge. Request agreement in principle with making of first attempt from December 20.'

Anticipating that the left wing of the 7. Armee might soon reach the Luxemburg sector, Ob.West immediately replied:

In the middle of the Lampaden HDP site, in between the two cannons, two underground shelters had been built for the gun crews (see Mannschafts-Bunker on the sketch on page 12-13). *Left:* **This is where the plan places these shelters and traces of digging still appear today at the bottom of the slope. The narrow-gauge railway that served the whole length of the HDP site ran on this track, the southern gun being 100 metres or so ahead of the turn of the track and the northern one 100 metres behind the photographer. Though the sketch plan named the sheds and shelters built at Lampaden as 'Bunker', nothing solid was built there, save for the concrete wall that supported the breech-block at the bottom of each ramp.** *Right:* **This would appear to be the remains of one of the underground shelters provided for personnel.**

WAR DIARY, ARTILLERIE-REGIMENT zV 901

11 January
HDP fires 20 projectiles from cannon No. 1 against Luxembourg.

12 January
Eighteen projectiles fired by cannons No. 1 and No. 2 against Luxembourg.

13 January
HDP fires 22 projectiles from cannons No. 1 and No. 2 against Luxembourg. Oberstleutnant Honig reports reconnaissance of suitable positions 3km to the north-west of Guebwiller as emplacements for HDP cannons No. 3 and No. 4.

14 January
No HDP firing. Following orders from the Reichsführer-SS, an SS cameraman filmed installations and firing at HDP.

15 January
No firing as munitions all expended apart from 20 projectiles held in reserve on orders from Division. Order issued for transfer of 2./705 to the sector Guebwiller-Schweighouse in the Vosges.

16 January
HDP fires six projectiles from cannons No. 1 and No. 2 against Luxembourg.

17 January
Sixty projectiles for HDP transported overland from Feucht.

18 January
HDP fires 19 projectiles from cannons No. 1 and No. 2 against Luxembourg.

20 January
HDP fires 24 projectiles from cannons No. 1 and No. 2 against Luxembourg.

21 January
No HDP firing.

23 January
As during preceding days, no HDP firing since only 30 projectiles remain (these to be held back for firing in conjunction with spotter aircraft).

24 January
No HDP firing whatsoever as munitions situation remains unchanged.

25 January
Planned firing in conjunction with spotter aircraft has to be abandoned, as the Hecht Luftwaffe detachment does not take off.

26 January
No HDP firing.

27 January
Construction proceeding of cannons No. 3 and No. 4 in the Vosges. Preparatory earth-moving works almost complete. Cannon No. 3 is on the way by rail transport. Cannon No. 4 to be moved up. Production of munitions for HDP most seriously jeopardised by events in the east.

28 January
Munitions situation at HDP remains unchanged – no firing.

29 January
No HDP firing in Lampaden area; assembly of cannon No. 3 commenced in the Vosges area. Heavy enemy pressure on the Alsace bridgehead making situation highly critical for 2./705.

30 January
Munitions situation at HDP remains unchanged – no firing.

1 February
Due to events on the Eastern Front, there is no prospect of an early supply of munitions to HDP. The next batch of 70 projectiles cannot be delivered for four weeks. At the same time, the situation in the Alsace bridgehead is becoming very critical. According to information from the army group in that sector, it is therefore not possible to count on long-term engagement by 2./705 against Belfort from the Guebwiller area. It is therefore decided that cannon No. 4 will not be transferred to the left bank of the Rhine, but instead stay entrained on the right bank. Assembly of cannon No. 3 is complete. Twenty projectiles are to be taken from the munitions stock of 1./705 (30 projectiles) and transferred to 2./705. After the firing of these 20 projectiles, cannon No. 3 is to be rapidly dismantled and moved over to the right bank of the Rhine so as to be transferred with cannon No. 4 over to the area of Hellenthal in the Eifel region. There both cannons are to be set up in the previously reconnoitred position for action against Verviers.

5 February
Orders received from division commander to the effect that 2./705 is not to be committed against Verviers, but rather against Thionville from the Trier area. Oberstleutnant Honig instructed to carry out fresh reconnaissance for the setting up of two cannons. The unfavourable development of the situation necessitates the rapid dismantling of the cannon of 2./705 at its present location at Guebwiller without any projectiles having been fired. The munitions which had been transferred overland (20 missiles) are to be returned to 1./705.

'Regarding the current fighting of Heeresgruppe B, Ob.West ask that the target for the HDP, which has been mentioned in the telex, not be used, as this could endanger own troops. In any case, it is requested that an inquiry be made on December 20 regarding the continued possibility of firing against that target.'

Equipment and material had still not arrived at Lampaden by December 20 so Artillerie-Abteilung 705 had to report that construction of the HDP had not made any progress. The breech and the first five cross-sections were finally in place by the 25th and three days later the first cannon was ready for action although no shells were available. Construction of the second gun was at a standstill because many parts for it were still on board a train that was caught up in the bombed-out Trier railway yards.

Delivered by the Heeresmunitionsanstalt (HMA — Army Ammunition Establishment) at Feucht near Nuremberg, the first 44 shells finally arrived at Lampaden on December 29. On the 30th, at 11.16 p.m., in the presence of Kammler, Artillerie-Abteilung 705 opened fire with five shots against Luxembourg. The HDP resumed firing early next morning with 12 shots until at 9.44 a.m. it appeared that the barrel needed to be re-adjusted. That work took most of the day, firing being resumed at 7.43 p.m. with a series of 11 shots. Meanwhile, an investigation was conducted in the area between the firing site and the front line, some 30 kilometres away, to check that no shorts had occurred. None were reported.

The second HDP cannon was ready for action on January 2 but could not begin firing because of the lack of ammunition. Actually, 20 shells were available but these had been held back as Kammler had ordered that they only be fired when aerial observation was available over Luxembourg to report the fall of shot. The Luftwaffe had detailed Kommando Hecht, a unit equipped with Arado 234 jet aircraft, to fly this mission but the aircraft failed to show up so in the end the last 16 shells were fired blind on the 4th.

By the side of the road between Lampaden (to the left) and Schillingen (to the right) lay the beginning of the narrow-gauge railway that served the HDP site. The bush on the right stands where the crane once stood. However, nothing remains today of the railway station where the HDP parts were unloaded which stood two kilometres up the road to the right across river. Even the rails have been lifted.

Left: **On January 16, the two HDP guns at Lampaden fired six shots against Luxembourg city. At around 5.18 p.m., one shell hit this spire of the Cathédrale Notre-Dame causing little damage. (G. Mirgain)** *Right:* **Alain Feltes, the cathedral sacristan, took this superb comparison for us from a narrow balcony at the top of the roof.**

The effect of the HDP bombardment of Luxembourg was insignificant. This list of recorded impacts is quoted by E. T. Melchers in his book *Bombenangriffe auf Luxemburg in zwei Weltkriegen* and indicates that 10 people were killed and 35 injured. (In his original list, M. Melchers included casualties for March 11 but these cannot be accredited to the HDP as the guns had been withdrawn from Lampaden by that date.) The 'Recorded shots' have been compiled from the war diary of Artillerie-Abteilung 705. Symptomatic of the military uselessness of the HDP shelling of Luxembourg, the only military damage that we could trace was that suffered by a US mobile laundry hit on January 12: 'An enemy rocket projectile of an unidentified type landed in the area of the semi-mobile laundry located with the 104th Evacuation Hospital in the city of Luxemburg, injuring seven men, three of them seriously, and causing damage to two vans and one tractor.'

CASUALTIES FROM THE HDP SHELLING OF LUXEMBOURG

	Recorded shots	*Recorded impacts*	*Dead*	*Wounded*
December 30:	5			3
December 31:	23	12		
January 4:	16	11	3	4
January 11:	20	17	2	3
January 12:	18	20		2
January 13:	22	23	1	
January 15:		6		
January 16:	6	7	4	3
January 18:	19	9		7
January 20:	24	12		13
February 15:	20	20		
February 16:	4	3		
February 22:	6	2		
Total:	183	142	10	35

The shelling of Luxembourg by the HDP came as a complete surprise to the Allies. Reconnaissance aircraft failed to detect the two cannons so the only measures taken were reprisal attacks against Trier and, for each HDP projectile exploding in Luxembourg, eight 155mm shells were fired at Trier by the artillery of the US XII Corps. *Above:* **An HDP shell is now on display in the military museum of Diekirch, 15 kilometres north of Luxembourg. The body is that of a genuine Röchling shell of unknown origin but the nose and tail have been rebuilt by the museum staff.**

When Röchling advised that the third cannon would be ready for delivery on January 5 and the fourth a few days later, on January 3 Kammler ordered that a new firing site be surveyed in the Eifel between Hellenthal and Hollerath. From there, the two new guns could be brought into action against Verviers, a major Allied communication centre in Belgium. For that purpose, a second battery of Artillerie-Abteilung 705 was set up under the command of Oberleutnant Fiedler. However, the military situation was changing by the day and on the 7th Kammler cancelled this plan and instead ordered the immediate construction of a new firing site in the Vosges mountains for operations against Belfort.

On January 5, Heinz Kunze, the director of the Sonderausschuss zbV (Special Committee for Special Duties) in charge of long-range weapons at the Ministry of Armaments and Munitions, demanded the production of 5,000 rounds of HDP ammunition and, three days later, another directive specified the production of 1,000 rounds per month from January to March. According to

a document dated January 8, and signed by Kammler himself, it was then planned to increase the size of Artillerie-Abteilung 705 to three batteries. Each one, with a strength of 157 men and two officers, was to have two HDP cannons, plus two replacement guns. Together with battery staff and other personnel, the total strength of Artillerie-Abteilung 705 would then be 557 men.

Also in January, plans were made to bring the HDP into action against a new target, Antwerp. From the part of the Netherlands south of Rotterdam which was still held by the Germans, the range to Antwerp was over 60 kilometres. Consequently, the 50 metre-long HDP would have to be used to its maximum range with a total powder charge of 120kg per shot (just over 60kg was necessary to fire at Luxembourg). The muzzle velocity was expected to reach 1050 metres per second. All these plans were illusory and never materialised.

On January 9, another 80 shells were delivered to Lampaden and both cannons opened up again on the 11th. Over three days, 60 shells were fired with the last 20 again held back for the planned aerial shoot. When a further 60 shells were delivered on the 17th, firing resumed on the 18th and the 20th, now with the last 30 shells being retained in case the Luftwaffe showed up.

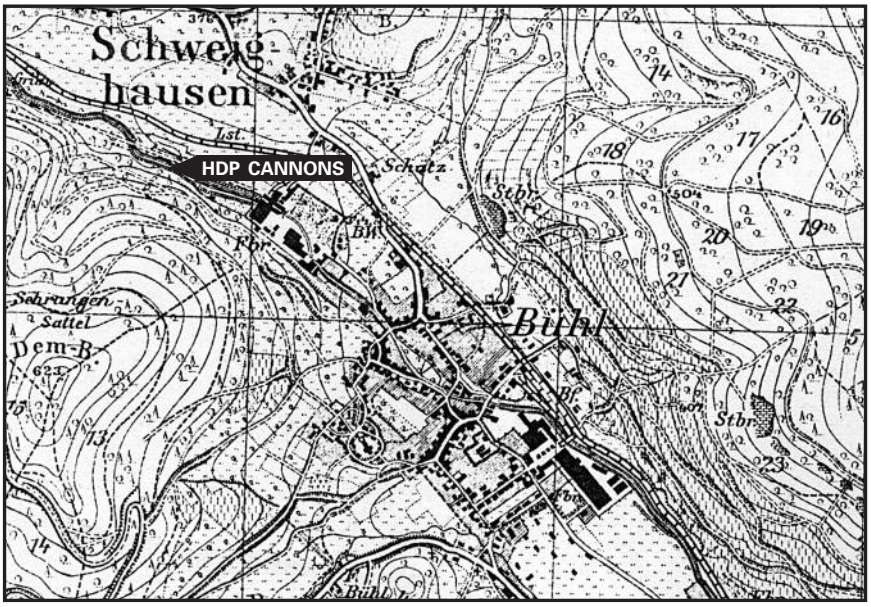
Meanwhile, at Buhl in the Vosges, construction work at the second firing site was proceeding apace. By mid-January, the elements of the third cannon were already on their way by rail with those for the fourth following on. However, the military situation in Alsace was deteriorating badly with the position of the 2. Batterie at Buhl becoming more and more untenable and on February 1 Kammler cancelled the installation of the fourth piece. He also ordered the third, the mounting of which had by then been completed, to quickly fire off 20 shells against Belfort before it was dismantled and moved, together with the fourth, back to Hellenthal in the Eifel with Verviers as the target. However, this plan had to be abandoned on the 5th whereupon the 2. Batterie with its two guns was diverted to a new location 30 kilometres south of Trier, at Niederlosheim, to fire at Thionville.

On February 12, Kammler was informed that no further ammunition would be supplied after the delivery of the final lot of 70 shells which were scheduled to arrive by the end of the month. He therefore ordered that the construction of the new firing site at Niederlosheim be abandoned and for the remaining shells to be sent to Lampaden to be fired off against Luxembourg. He also ordered Hauptmann Patzig, the Artillerie-Abteilung 705 commander, to turn his unit into a normal artillery group, detailing him to find his own guns.

While the men of the 2. Batterie started to assemble at Vielbach, near Koblenz, at Lampaden the 1. Batterie was still waiting for the promised aerial observation, However, with the situation at the front worsening, on the 15th, the two guns resumed firing. The same day the order came to start the immediate disassembly of one cannon to move it back to the eastern bank of the Rhine and to fire off the remaining shells with the other. The last six shells were fired on February 22 and the disassembly of the last cannon began immediately. The German gunners completed their withdrawal just in time as the US 10th Armored Division reached Zerf, five kilometres to the south, on the 26th.

On February 27, all the 'special equipment' of the two companies of Artillerie-Abteilung 705 — the four HDP cannons — was on its way back to the Röchling works at Wetzlar. Meanwhile, Hauptmann Patzig had obtained 12 105mm guns (schwere 10cm Kanone), and he re-organised Artillerie-Abteilung 705 with two batteries of six guns each at Herschbach, near Koblenz.

As Oberstleutnant Honig reported the construction of a new HDP site at a place '3 km nordwestlich Guebwiller', Jean Paul's detective nose focussed on Buhl, a small town in the Lauch river valley. There he contacted the local historian, Jean Bader, who said that although there were reports that the Germans carried out some mysterious activities at a place just upstream in January 1945, he confessed that nobody really knew what they were. Speculations had been made in the past, some even appearing in the Press, but overall it appears that the brief presence of the HDP at Buhl was unknown locally.



The HDP site had been completely cordoned off and none of the villagers saw or knew what was happening . . . only that the Germans were working day and night at the bottom of the Demberg hill. Even the windows in the toilets of a factory that faced the hillside from across the Lauch river were bricked up so that nobody could see out in that direction. Three Flak guns were set up and guards patrolled the woods around the site, turning back any children that wandered into the area. This is the upstream ramp, looking down, with the pit still visible at the bottom.

WAR DIARY, ARTILLERIE-REGIMENT zV 901

6 February
Still no further firing by 1./705 as munitions situation is unchanged and what little munitions remain still to be held back for firing in co-operation with spotter aircraft of the Hecht detachment.

7 February
Situation at HDP remains unchanged. Under the prudent leadership of the officer commanding Artillerie-Abteilung 705, Hauptmann Patzig, the entire operation to dismantle and reposition 2./705 to the right bank of the Rhine has been carried out under heavy enemy fire without loss to men or materiel.

9 February
Situation at HDP unchanged.

10 February
No HDP firing as munitions are still being conserved for firing in conjunction with spotter aircraft. Oberstleutnant Honig's reconnaissance of positions for cannons No. 3 and 4 (2./705) against Thionville is complete. The cannons are to be positioned near Niederlosheim.

11 February
Munitions situation at HDP remains unchanged – no firing.

12 February
SS-Gruppenführer Kammler advised by BzbV Heer that the manufacture of munitions for HDP is to end. Apart from the 70 projectiles expected at the end of the month, there will be no further supplies. At the suggestion of Gruppe Süd, SS-Gruppenführer Kammler orders that there is now no longer question of a new emplacement for 2./705 for firing against Thionville. He issues a verbal order to the officer commanding Artillerie-Abteilung 705 that the battalion is to convert to a conventional artillery unit.

13 February
No HDP firing as it is still envisaged there will be firing in conjunction with spotter aircraft.

14 February
Munitions situation at HDP remains unchanged – no firing.

15 February
Despite on-going discussions, the Hecht detail has failed to take off for days; accordingly 20 projectiles fired by 1./705 against Luxembourg from cannon No. 1 without target spotting from the air. Due to the tense situation in the Trier area, 1./705 (upon its own suggestion) is ordered to dismantle forthwith one of the two cannons at Lampaden and withdraw it by rail to the right bank of the Rhine and fire the remaining projectiles from one cannon. In order to assist in the event of any breakdown during the firing of the 80 projectiles which are expected to be available, some barrel sections of the dismantled cannon are to be held back in reserve.

16 February
HDP fires four projectiles against Luxembourg.

17 February
No firing by 1./705 as an attempt will be made to fire at least the last six projectiles currently available with the co-operation of target spotting aircraft.

19 February
No HDP firing.

22 February
The last six projectiles fired by 1./705 against Luxembourg as the situation to the west of Lampaden has become so tense that Division has ordered the immediate dismantling of the last cannon still in position and its removal to safety on the right bank of the Rhine. It is not possible to wait for the opportunity for firing with spotter aircraft due to the urgency of the situation.

23 February
Dismantling and withdrawal of the last HDP cannon commences. Supply of the final batch of 70 projectiles has been halted as permission has been refused for the setting up of another installation.

25 February
HDP must expedite the dismantling of the last cannon and carry out a phased withdrawal of the cannon as the leading enemy tanks have advanced to within 3km of the emplacement.

26 February
1./705 continuing withdrawal of cannon.

27 February
1./705 has without loss withdrawn the entire special installation together with all personnel and miscellaneous equipment and is now proceeding to the sector of the Gruppe where the battery is to undergo artillery training in Herschbach. The entire special equipment of Artillerie-Abteilung 705 is being transported by rail to the Röchling works at Wetzlar.

Following the liberation of Buhl, curiousity led local villagers to explore the place where the Germans had worked so secretively but all they found were two ramps on the slope, pieces of wood and an excavation at the lower end. *Left:* **A concrete wall was built in the pit at the bottom of the downstream ramp but this was covered over when the hole was filled in by German prisoners of war at the end of the war.** *Right:* **The POWs were detailed to clear the site and remove all the wooden supports — this is all that remains to be seen of the upstream ramp.**

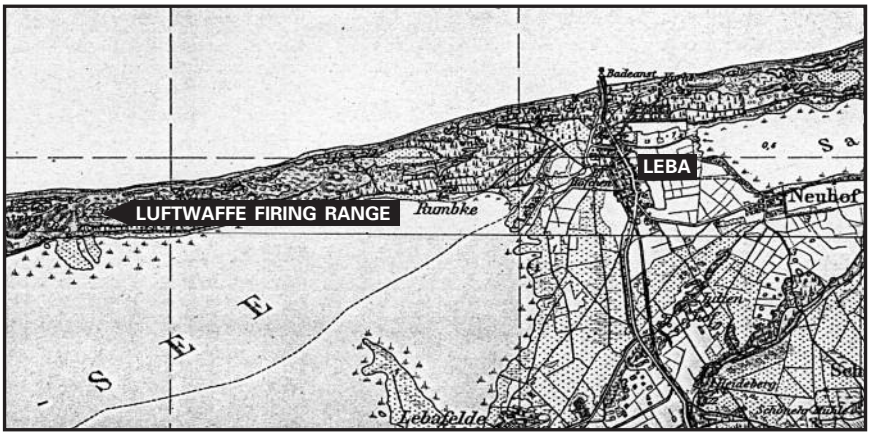
RHEINBOTE, V4

From the mid-1930s, while the Heereswaffenamt held the monopoly in the field of liquid-fuel rockets, Rheinmetall-Borsig AG developed small solid-fuel rockets and began test-firing them in 1936. In 1940, following a request from the Reichsluftfahrtministerium (RLM — Reich Air Ministry), the company started developing assisted take-off (ATO) rockets for cargo gliders and in 1941, upon receiving a new request from the RLM, the rocket research team directed by Dr Heinrich Klein started to work on an ATO unit with a thrust of 50 tonnes.

From these beginnings, plans were set in motion to develop a long-range solid-fuel rocket and in April 1941 Dr Klein approached the Heereswaffenamt with the proposal. He was referred to Generalleutnant Dornberger, then the head of WaPrüf 11 which was the office responsible for the development of rockets. From the beginning, Dornberger had strongly supported the development of the A4 liquid-fuel rocket, consequently he was not ready to see his prodigy endangered by competition. Arguing about the shortage of propellant powder, he refused to approve the development of the Rheinmetall-Borsig rocket but Dr Klein soon got support from the inspector of heavy artillery, Oberst Gerhard Hüther, who was in the process of asking for heavy artillery rockets. With the A4 still far from being operational, the chief of the Heereswaffenamt, General Leeb, supported Hüther's demand and in June approved the development of long-range rockets by Rheinmetall-Borsig.

Following this decision, the inspectorate for heavy artillery laid down a specification for the rockets in that they were to carry warheads in the range of 200 to 1000kg over distances of 100 to 120 kilometres. Rheinmetall-Borsig started working on a variety of plans for four-stage rockets but these grandiose schemes were soon discarded due to the shortage of propellant powder. Development therefore concentrated on a smaller project, a rocket weighing about 1.7 tonnes, of which the company said it could increase the range to up to 200 kilometres if the warhead was reduced to 40kg.

By the end of 1941, Rheinmetall-Borsig started to test its first designs and, as it was engaged on numerous developments for the Luftwaffe, it was allowed to share the use of the air force firing range at Leba on the Pomeranian coast. There, 30 kilometres

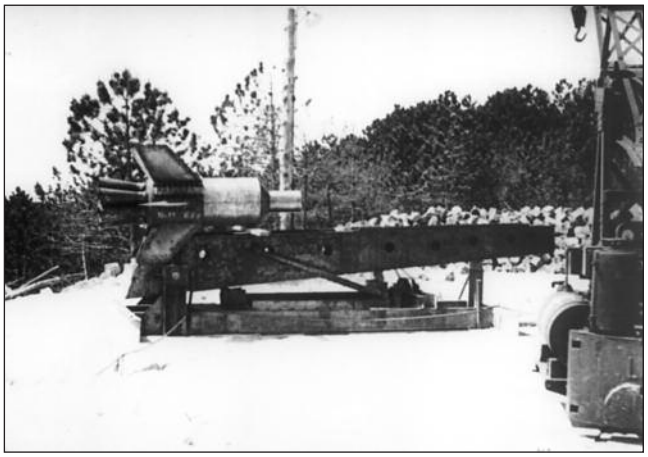


The first Rheinbote trial rockets were launched from the firing range developed by the Luftwaffe in the sand dunes six kilometres west of Leba. Now in Poland, Leba has retained its name but the nearby Rumbke is now Rabka.

Leba is a seaside resort and 'Klein Peenemünde', the former Luftwaffe experimentation centre, is now open to the public. Remains of an assembly hall, an observation post and a command station can still be seen and a small museum has been opened in the latter building. In the dunes to the west of the compound, Krzysztof Rogala took this picture of an abandoned shelter for a sentry. (K. Rogala)

The best preserved part of the former Luftwaffe firing range is undoubtedly this concrete pit that was once the firing ramp for the Rheintochter anti-aircraft rocket. Developed — as the Rheinbote had been — by Rheinmetall-Borsig, this rocket could carry a 150kg warhead of high explosive up to 15000 metres (50,000 feet). Using optical tracking, the operator guided it by radio signals into a flight of enemy bombers at which point the warhead would be detonated by an acoustic proximity fuse. (K. Rogala)

This device which had been installed to measure the speed of the missiles test-fired from Leba was probably also used for the Rheinbote trial launches. (The picture is now available as a postcard at the nearby village of Rabka.)



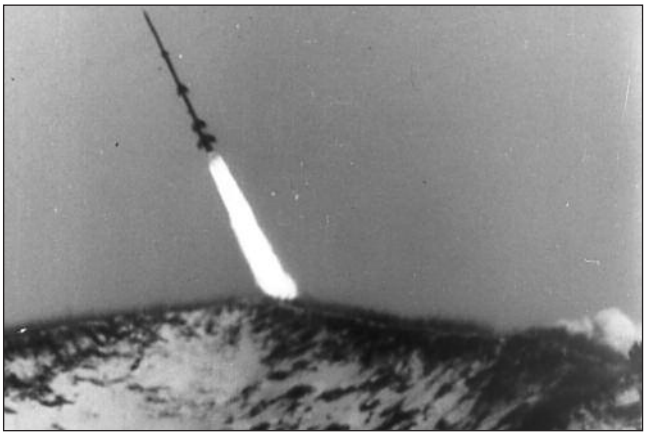
A launching ramp had been specially built at Leba for the firing trials of the Rheinbote. *Left:* **The first take-off stage was mounted on the ramp. Note the guide on which the second stage is to be mounted — the cylindrical part of unpainted light alloy in front of it. (IWM)** *Right:* **The second stage has been fitted while the crane raises the third stage. Note the star-shaped configuration of the six stabilising fins at the rear of this section and the cylindrical guide at the front. (IWM)**

Left: **With the third stage in place, technicians are seen here inserting the cylindrical guide which was the rear of the fourth stage. Obviously, the support equipment available at Leba was makeshift if not crude. The technical team seen at work in these pictures included military personnel from Versuchskommando Tröller and civilian engineers from Rheinmetall-Borsig. (IWM)** *Right*: **The warhead was already attached to the fourth stage when this was fitted (see picture left), which might suggest that it was not live. Here technicians mount the nose cone of the rocket on top of the percussion fuse. (IWM)**

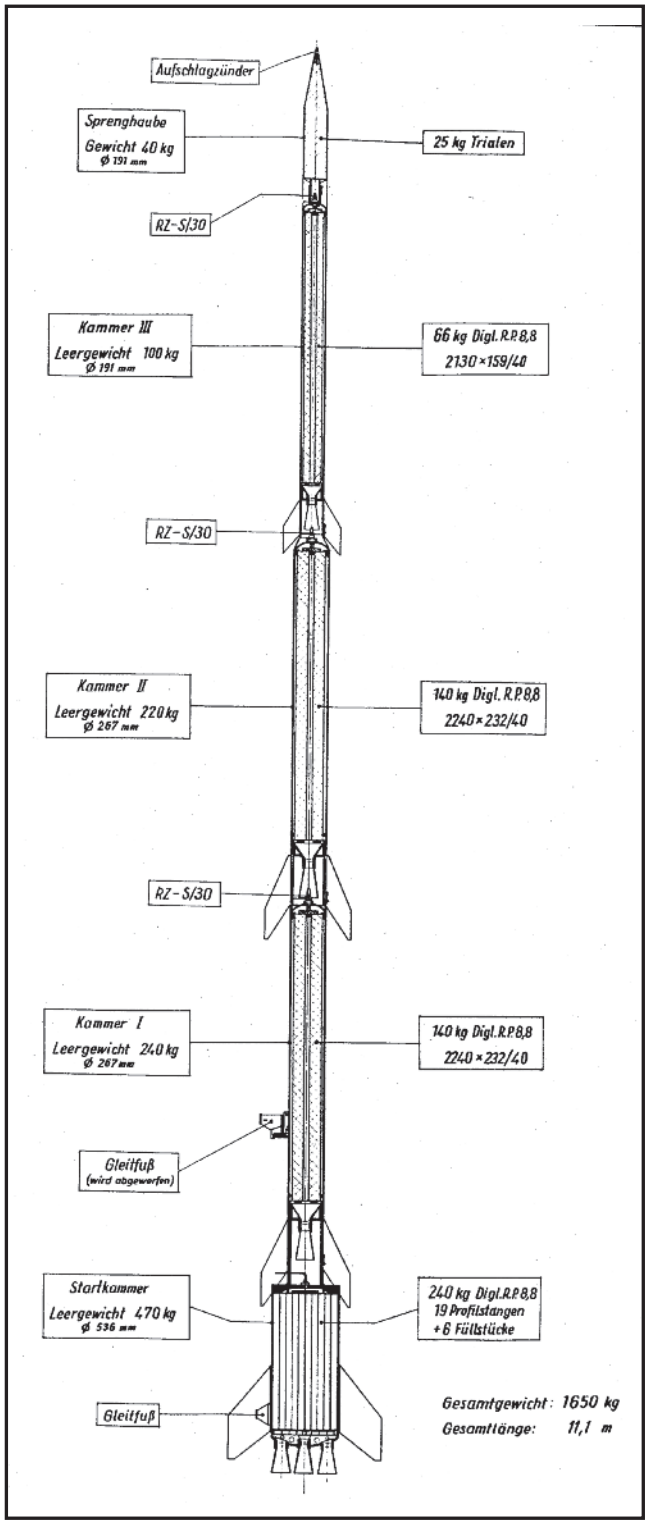
north of Lauenburg (now Lebork in Poland), the Luftwaffe had developed an experimentation centre, with proving stands for engines and a complete set of ranging measurements, to such a degree that the place was dubbed Klein Peenemünde — little Peenemünde. From there, the trial rockets could be fired on a north-westerly course across the Baltic in the direction of Bornholm, a Danish island occupied by Germany which provided a grandstand view for observation and ranging. The distance from Leba to Bornholm was about 170 kilometres.

In the meantime, the multi-stage rocket had been given the name Raketensprenggranate 4831 with the code-name 'Rheinbote'. Rheinmetall-Borsig had designed projectile Rh-Z-61, Rh standing for Rheinmetall-Borsig, Z for long-range rocket, while 61 hinted at the planned range (160 kilometres) with inverted number.

The first series of tests at Leba spread over a year and saw the successive launch of ten test rockets. The first was a single-stage



Left: **With the rocket ready for the launch, the ramp was raised by hand-cranking it up to the proper elevation of 64 degrees which had been calculated as giving the maximum practical range. (IWM)** *Right:* **From the shelter of a dune some distance away, the cameraman filmed the launch of the rocket which left the ground with a deafening roar trailing a 50-foot sheet of flame. These pictures are stills lifted from German cine films taken during the summer of 1944 when 20 test rockets were test-fired from Leba to help solve the Rheinbote's teething troubles. (IWM)**



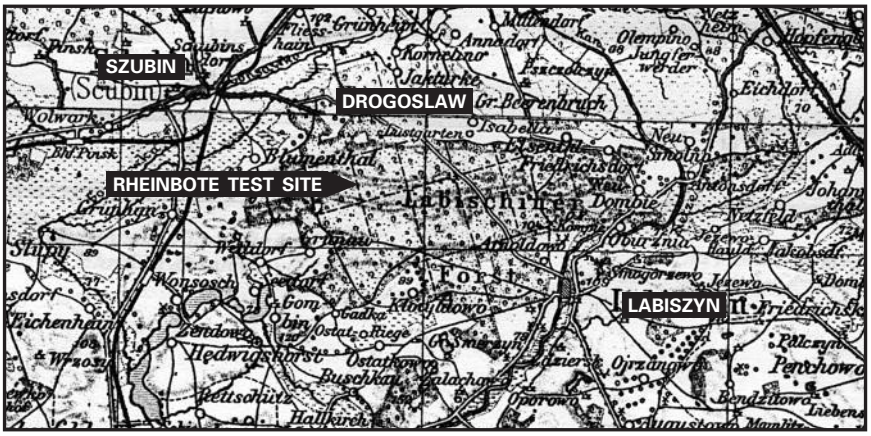
The Rh-Z-61/9 — the operational version of the Rheinbote — was 11.1 metres in length and had a weight of 1650kg. For the launch, two sliding clamps (Gleitfuss), one on the take-off stage (Startkammer) and another on the second stage (Kammer I), allowed guidance on the slide-bar of the ramp, the latter clamp falling free when the rocket cleared the ramp. Ignition was by means of an electrical igniter for the first stage, thereafter each of the other three stages were fired by means of a time fuse (RZ-S/30) primed by the acceleration of the take-off. Together with the fourth stage (Kammer III) attached to it, the warhead (Sprenghaube) weighed about 140kg, of which 25kg was Trialen explosive. Detonation of the warhead was initiated by a percussion fuse (Aufschlagzünder). As this 1944 drawing shows, the German engineers did not identify the take-off stage of the rocket as the first stage, hence they named the second stage Kammer I, the third Kammer II and so on. For clarity, we have numbered the four stages of the rocket consecutively.

Above: **To obtain maximum power the solid propellant in the take-off stage was cast in separate pieces to give as large a burning area as possible. The exhaust discharged through one central and six peripheral nozzles giving a thrust of about 9800kg (21,000lbs). The first stage burnt only for one second, bringing the speed of the rocket up to 275 metres per second (900 feet per second). This stage then detached to fall some three kilometres down range. In the next three stages, the propellant was shaped in the form of a tube so that burning occurred on the inner and outer surfaces with the exhaust discharging through one central nozzle. The second and third stages each gave a thrust of 5600kg (12,300lbs) for five seconds.** *Below*: **Igniting one second after the extinction of the first stage, the second stage brought the speed of the rocket up to 500 metres per second (1,640 ft/sec). The third stage lit up three seconds after the extinction of the second and raised the speed to 850 metres per second (2,788 ft/sec). Burnt out and discarded, these two stages fell to earth some 10 and 20 kilometres down range respectively. Igniting three seconds after the extinction of the third, the fourth stage gave a thrust of 2400kg (5,280lb) for 3.5 seconds bringing the speed of the rocket to 1330 metres per second (4,360 ft/sec). Stage separation was achieved by inserting a cylindrical guide attached to the rear of one stage into another guide attached to the top of the stage behind it. (IWM)**

Unlike the V1 and the V2, internal guidance and control was not part of the Rheinbote design and the rocket reached its target merely on a ballistic trajectory in the manner of an artillery shell. Hence its precision depended solely on how its course was adjusted at the start so the launching ramp had to be precisely oriented in height and direction. At first, it was intended to use the stable and finely-adjustable mount of a 88mm Flak gun as the base for the Rheinbote launching ramp. However, when it proved impossible to lose the production of even one gun, the Meiller trailer, used to bring the V2 rockets to their launching site and raise them to the vertical, was chosen instead. It was hoped that it could be quickly adapted into an efficient launching ramp for the Rheinbote but it turned out that the chassis and the lever arm were not stable enough to withstand the stresses of the launch of a Rheinbote. Too much vibration occurred which led to considerable inaccuracy and at its maximum range, the lateral deviation of the Rheinbote amounted to some 20 kilometres!

rocket, followed by a two-stage and then three-stage before the Rh-Z-V25 — the four-stage prototype — was finally tested. Rheinmetall-Borsig then finalised the design and in April 1943, the Rh-Z-61/2 — the four-stage rocket in its final form — was demonstrated to Generalleutnant Schneider, the chief of the development branch of the Heereswaffenamt. Three rockets were launched over the Baltic and one was sighted coming down off Bornholm.

The Rheinmetall-Borsig design having proved sound, the Heereswaffenamt agreed to further development although Speer's ministry would not give any priority to the project. To be allocated the required material for the production of 30 rockets, Oberstleutnant Alfred Tröller in charge of the project disguised them under a cover name in the overall V-weapons programme. Nevertheless, it still took more than ten months to get the first batch of the combustion chambers delivered from the Rheinmetall-Borsig factory at Berlin-Marienfelde. By early 1944 Speer's priority rules were applied even more strictly so in April Tröller invoked a further subterfuge. Taking advantage of the



Although it has been said that Rheinbote trials were conducted from the German town of Waldheim, 30 kilometres north of Chemnitz, we discovered that the relevant Waldheim was actually a small village of Poland! A document dated November 23, 1944, made it clear that Waldheim was '6 km ostwärts Alt-Burgund (Szubin)': hence the correct Waldheim is the Drogoslaw of today, about 20 kilometres south of Bydgoszcz (then Bromberg).

Following the evacuation of the Blizna test site further to the east, a new rocket test range for the V2s was established on the Tucheler Heide (now Tuchola) in Poland where Monika found this piece of rusting equipment *(left)*. **To keep the target area within range, the firing point for the Rheinbote was moved to Waldheim, nearly 100 kilometres to the south of Tucheler Heide.**

Right: **Near Drogoslaw, beyond the road between Szubin and Labiszyn, these are the woods 'südlich Waldheim' from where the engineers of Rheinmetall-Borsig had test-fired Rheinbote rockets in November and December 1944. Nothing solid was built for these tests so nothing remains to be seen. Even the exact launch sites can only be guessed at. (Monika Stranc)**

The Meiller trailer (Meillerwagen or Fahrzeug 102) had been developed for transporting the V2s to their launching site and raising them before launch for which it proved to be a great success. When it was decided to use the Meiller trailer to adjust the direction for firing the Rheinbote, the launching slide-bar was mounted on the hydraulically-adjustable lever arm in such a way that it could be moved 14 degrees on either side. Thus, the rocket could be adjusted in height (by raising the lever arm at a given angle) and in direction (by angling the slide bar on the arm). The first two operational FR-Wagen (FR standing for Fernrakete, long-range rocket) were tested at Waldheim at the beginning of December.

competition between the army and the SS, he told his chief, Generalmajor Hüther (promoted to that rank in March), that the SS ordnance department was interested in the Rheinmetall-Borsig solid-fuel rockets. Hüther immediately turned to General Friedrich Olbricht, the head of the general army branch, and to Generaloberst Fromm, the director of army equipment, both well-known for their opposition to the SS's push for power. They immediately gave their support and 200 Rheinbote rockets were ordered for military deployment. To this end, the programme was allocated 150 tons of powder, 250 tons of steel and 30 tonnes of non-ferrous metal. A Versuchskommando Tröller (Test Command Tröller) was also set up to supervise development and production.

There were still some problems with unexplained airbursts of the rocket, faulty powder burning in the fourth stage, and stabilising fins breaking off when the rocket broke the sound barrier, so experts from the Luftfahrtforschungsanstalt (LFA — Air Research Institute) in Braunschweig were called in. With the help of wind-tunnel experiments and 20 test launches from Leba in the summer, the causes of the troubles were progressively identified and by August 1944 most of Rheinbote's teething troubles had been solved.

The first rockets of the pilot production batch, the type Rh-Z-61/9, left the Berlin-Marienfelde factory in October and one of them fired from Leba reached a distance of 157 kilometres at the end of the month.

On the morning of November 15, four Rheinbote rockets were demonstrated to SS-Gruppenführer Kammler, Generalmajor Dornberger and experts from the Heereswaffenamt and the Waffen-SS. The first three rockets behaved perfectly and Bornholm signalled that the ranges achieved were 153, 155 and 157 kilometres, respectively. However, when the fourth was launched, there was a problem with the clamps guiding the rocket on the launching rail which broke one of the stabilising fins. As the rocket rose vertically into the air, Dornberger said, 'we ducked involuntarily in our narrow trench. The different stages were bound to fall on top of us. After the first three stages had dropped among the pines without doing any damage, we waited for the fourth and last. It contained a live warhead. Splinter effect might be dangerous. In a few minutes we heard the whistle of the falling charge and shortly afterwards its impact on the left flank of the battery. The detonation did not seem very loud. Nothing serious had happened. When we reached the point of impact we looked at each other in astonishment and some embarrassment. A small, shallow crater 1,2 metres wide had been made in the loose sand. Little or no splinter effect could be traced. Such was the insignificant result of burning 580kg of powder and hurling one ton of steel!'

Kammler and Hüther overruled Dornberger's realistic assessment and the military deployment of the Rheinbote rockets was agreed. On November 29 Kammler ordered that allocation of powder to the programme be increased.

With the support of the experts of Versuchskommando Tröller, the engineers of Rheinmetall-Borsig worked hard to perfect the rocket and in December more trial firings were carried out at Leba and Waldheim (now Drogoslaw in Poland, six kilometres east of Szubin). Waldheim was actually an annex to the new rocket test range established on the Tucheler Heide (Tuchel Heath), 15 kilometres east of Tuchel (now Tuchola) in Poland, in the summer of 1944 for further development of the V2 after the Russian offensive had put an end to development work at the test site at Blizna, further to the east. From Tucheler Heide, the V2

From the experience gained at Leba and Waldheim, a comprehensive set of instructions was prepared for the crew of Artillerie-Abteilung 709. This 125-page document detailed every aspect of the employment of a Rheinbote battery — from the assembly of the various stages to the orientation of the ramp in direction and height and the firing. To service one 'gun', there were to be eight gunners in addition to the crew chief and to detail their role and duties, the instructions named them K1 to K8. As to the mounting and assembly of the various stages of the rocket, the document gave the following details: Having unpacked the second stage from its crate, K5 and K6 fastened a strap to it. Meanwhile, from behind the ramp, K4 put a wood trestle on the slide bar. K1 winched down the hoist, K5 hooked the strap and K1 winched the second stage up. He set it just behind the ramp with the sliding clamp in line with the slide bar. Under the command of K4, K2 and K3 inserted the clamp into the slide bar and pushed the stage up along the bar until it rested onto the wood trestle. K1 unhooked the hoist and K3 turned the crane arm aside. K4 inserted a shaft into the slide bar until it hit the sliding clamp. While K4 pushed the clamp with the shaft, K2 and K3 had the stage slid up the bar for about 60 centimetres. . . . Having unpacked the take-off [first] stage from its crate, K7 and K8 fastened a strap to it. K1 winched down the hoist, K8 hooked the strap, K1 winched the stage up and moved it behind the slide bar, in line with it. Under the command of K4, K1 lowered the stage and K3 and K4 inserted the sliding clamp into the slide bar. The take-off stage was then pushed up along the bar until the clamp reached the proper position. K2, K3 and K4 then slowly pushed the second stage backwards until its rear cylindrical guide inserted into the one in front of the take-off stage. 'The two lugs in the latter must fit into the two grooves in the second-stage rear cylindrical guide.' The second stage was then pushed into the take-off stage cylindrical guide until the two spring bolts caught in. . . .

This done, K5 and K6 unpacked the third stage and fastened a strap to it. K1 winched down the hoist, K5 secured the strap and K1 winched it up. It was moved and set so that K3 and K4 could insert its rear cylindrical guide into the one in front of the second stage. 'The markings on the two stages must fit. K3 and K4 have the two spring bolts catch in.' The fourth stage is mounted in the same way. 'The fitting of the warhead must be done with the greatest care. Beforehand, it must be checked that the safety pin is still set into the fuse. K6 and K7 take the warhead on the munitions truck and cautiously bring it to the gun.' K5, who had climbed on the ramp, then carried the warhead on his shoulder and K6 and K7 adjusted it onto the fourth stage. . . . The elevation of the ramp was trained by K3. Having first set the given elevation on the gunner's quadrant, K3 put the quadrant on the launching rail. 'With hand signals, K3 indicates to K5 whether the ramp should be raised or lowered. K5 raises or lowers the ramp by actuating the hydraulic hand pump, this until the clinometer of the quadrant is level. . . .' To aim the gun in the proper direction, the crew needed precise setting and to the command: 'Richtkreis rückwärts des Geschützes!' (Bring the direction of fire back to the gun!) K5 then went to the survey and computing team. He wrote the number given to him on a slip of paper and brought it back to K1. K1 set this number on the laying device and balanced the cross level. Turning the traversing handwheel, he then oriented the launching rail until the vertical cross-wire matched with the red mark of the aiming post. 'The matching of the cross-wire with the aiming post must be done three times at least for the laying device moves when the rail is adjusted.' When the rail was precisely trained, it was fixed in position and K1 reported to the gun chief: 'Geschütz eingerichtet!' (Gun aimed!) . . . When the gun was trained, the gun chief shouted: 'Räumt Feuerstellung!' (Evacuate the firing position!) K2, K3 and K4 moved away about 50 metres to the left, K5, K6, K7 and K8 did the same on the right. Together with K1, the gun chief checked that all parts of the laying equipment had been removed and that nobody remained near the ramp. He then ordered: 'Zündleitung anschliessen!' (Connect the firing cable!) K1 connected the firing cable to the wires reaching out of the take-off stage. This done, he shouted: 'Geschütz feuerbereit!' (Gun ready to fire!) Both went to the foxhole in which the firing apparatus had been set. Having checked the electrical continuity, K1 connected the firing cable to the exploder. 'Before that, he must check that the safety key is not inserted into the exploder. He must always carry this key on him and it is just before the fire that he inserts it into the exploder.' To the order of the gun chief, 'Geschütz Feuer!' (Fire the gun!), K1 turned the exploder key and fired the rocket.

rockets were being fired in a southerly direction, the target area being seemingly a training range in the Warthe valley. That distance was too far for the Rheinbote so to shorten the range the firing point was moved to Waldheim, nearly 100 kilometres to the south of Tucheler Heide. On December 13, after the launch of 36 test rockets, engineers from Rheinmetall-Borsig reported: 'Failures amounting to 50 per cent still have to be expected. . . The intended range of 160 kilometres will surely be achieved.'

As far as the destructive power of the warhead was concerned, one rocket launched from Waldheim which crashed into a farmyard gave a more reassuring picture after the disappointing experience of November 15 at Leba. The crater was reported as being 3.5 metres in diameter and 1.2 metres deep and the surrounding buildings showed heavy damage to the walls. The roof of the stables, 15 metres from the point of impact, had been completely blown off; the roof of a barn 50 metres away had partially been ripped off and that of the farmhouse, 350 metres away, heavily damaged. All the poultry and the farm dog had been killed and two cows injured.

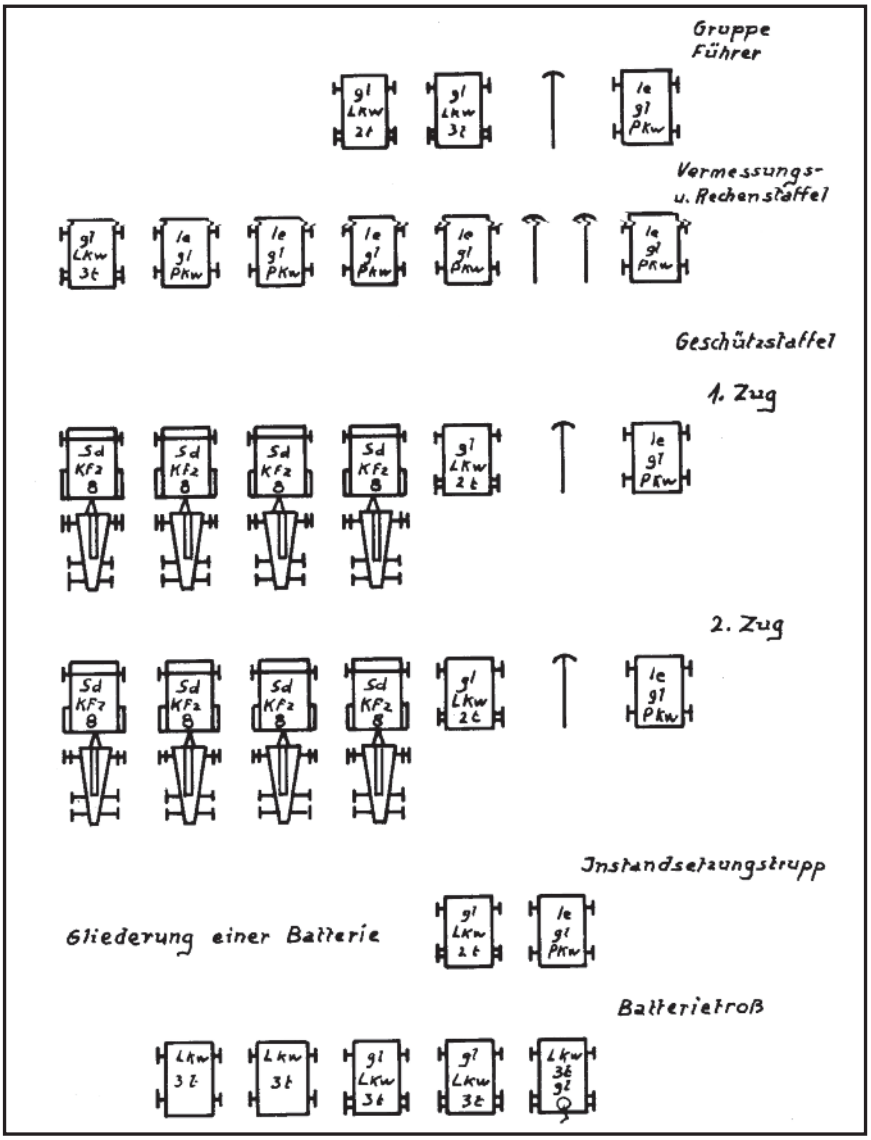
However, the Rheinbote was still not 100 per cent reliable, and the time fuses which had to ignite the various stages at the proper time were particularly troublesome. In a series of tests at Waldheim between December 1-17, 12 rockets were launched of which only four ignited properly; five failed and the whereabouts of three had not been traced when the report was written. The greatest range achieved was 194.2 kilometres, with a lateral deviation of 20.9 kilometres; the shortest 45 kilometres, with a deviation of 7.5 kilometres.

Following Kammler's order of late November for the first batch of 300 rockets, 115 units had been produced by December 12. In addition, another 222 rockets were scheduled to be delivered by the end of January.

In the meantime, Tröller had shaped his Versuchskommando into an operational unit, the officers being trained with the rockets at Leba and Waldheim and the men being instructed at the Rheinmetall-Borsig production plant at Marienfelde. For operations in the field, the Kommando was formed into Artillerie-Abteilung 709, actually with only one battery, and on December 12, it was moved by rail to its operational area in the West.

Assigned to Kammler's Division zV, Artillerie-Abteilung 709 received the order to bombard Antwerp and it set up its launching site in a wooded area at Nunspeet, some 25 kilometres west of Zwolle, in the Netherlands, some 165 kilometres from the target. According to a report dated December 13, there were then only four Startbahngeschütze (launching ramp vehicles) to hand although none were serviceable as some vital components were still missing.

These were finally delivered and Artillerie-Abteilung 709 opened fire on December 24. Oberstleutnant Tröller reported: 'The firing sites, carefully camouflaged against view from the air and spread out widely, were located in the approaches to the V2 division. Nearby, 24 rockets were stored in the open, also spread out, in readiness. Each launching site was assigned to an officer. They could hardly believe their ears when they were informed that action was becoming serious. Excitement with the officers and crews was only small. They knew that nothing could go wrong, as they were very familiar with the rocket. The distance between Nunspeet and Antwerp amounted to 165 kilometres. According to provisional firing procedures — no firing table had yet been developed — the raising for this range was 64 degrees. . . . The Startbahnen headed towards the port of Antwerp. At 12 a.m. precisely, the first salvo



The detailed instructions also outlined the composition of a Rheinbote battery which would consist of a battery staff with a communication section, a survey platoon, two weapon platoons, each with four FR-Wagen, a maintenance section and a combat train. The battery comprised 28 vehicles and five motorcycles (the arrow-like symbols). The vehicles included 11 lorries (Lkw), nine personnel carriers (Pkw) and eight SdKfz 8 half-tracks to tow the FR-Wagen. In the event, when Artillerie-Abteilung 709 went in operation in December, it had one battery with only one weapons platoon.

Powerful half-track prime-movers were needed to manoeuvre the heavy Meiller trailers (nearly 12 tonnes when a rocket was transported). Here, an FR-Wagen is being towed into position by an SdKfz 7 half-track at Waldheim during the operational training of Artillerie-Abteilung 709.

By mid-December, Artillerie-Abteilung 709 had set up its rockets in a wood near Nunspeet in the Netherlands. The target was Antwerp, 165 kilometres away. Although these pictures were taken at Waldheim during trials earlier that month, they still give a good idea of how the German rocket detachment would have emplaced its launchers in Holland following the directions as to how to deploy in a wooded area to hide against aerial observation.

of four rockets started off without trouble. Within one hour, all 24 available rockets had been launched towards Antwerp. . . I have ordered the officer in charge of each site to test the rockets which were launched from his site as to the perfect function of the units. In other words, to note the typical three sounds which should be heard after 2, 10 and 22 seconds. The reports from each firing site indicated no failures.'

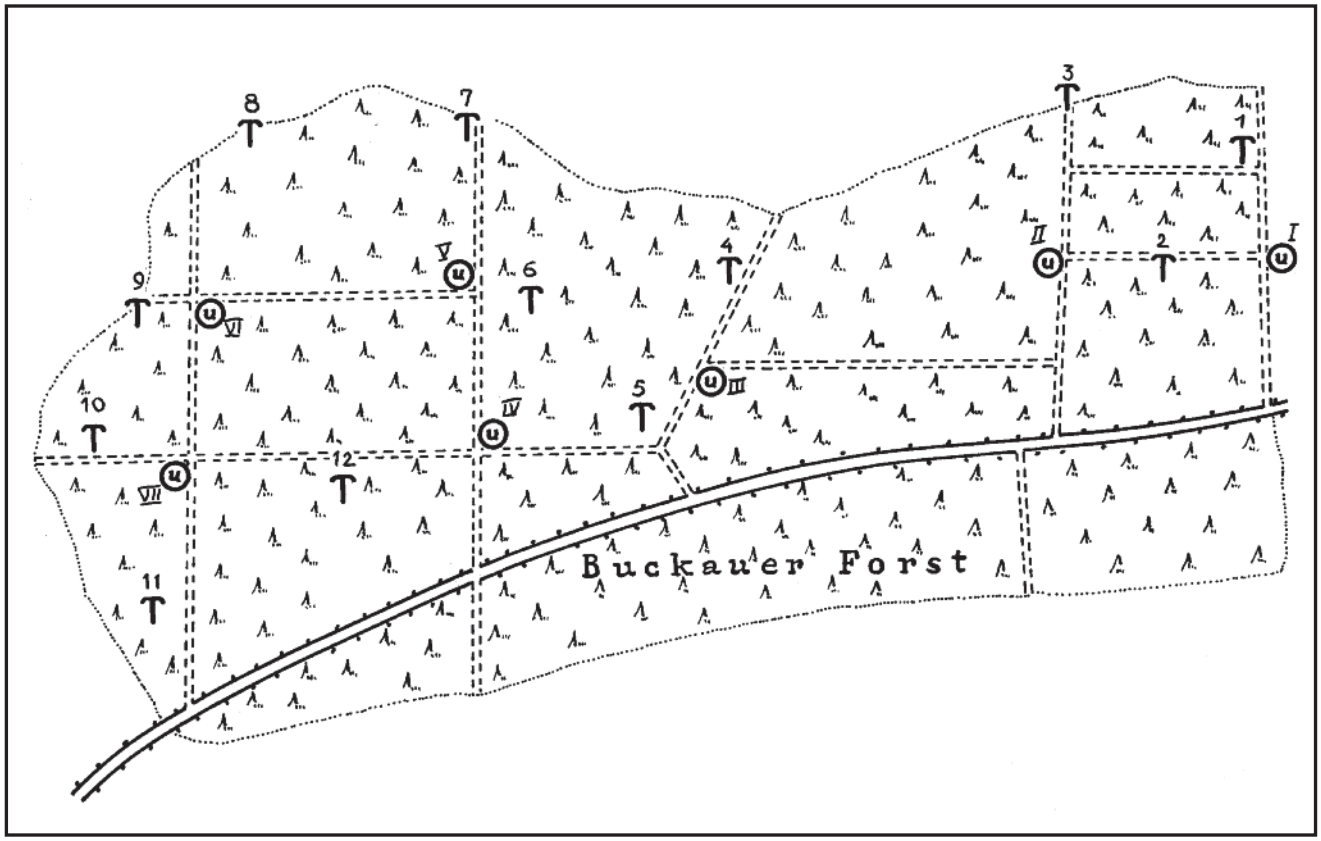
Tröller and his men had launched an additional 20 Rheinbote rockets by the middle of January. (Some sources give higher numbers, up to a total of 200 rockets, but these figures seem implausible). When all the available rockets had been fired, Artillerie-Abteilung 709 was withdrawn back to Tucheler Heide.

There, Tröller met the team from Rheinmetall-Borsig, which had in the meantime carried out additional trial launches from Waldheim for the setting up of a firing table, who told him of a surprising increase in range. According to the new data, when fired at an elevation of 64 degrees the Rheinbote rockets averaged a range of 230 kilometres. However, no one at Rheinmetall-Borsig had known where Artillerie-Abteilung 709 was operating so this vital information could not be passed on to Tröller. When the Rheinbote rockets at Nunspeet were fired at Antwerp at an elevation of 64 degrees they may have overshot their target by over 50 kilometres, possibly impacting somewhere between Ghent and Aalst.

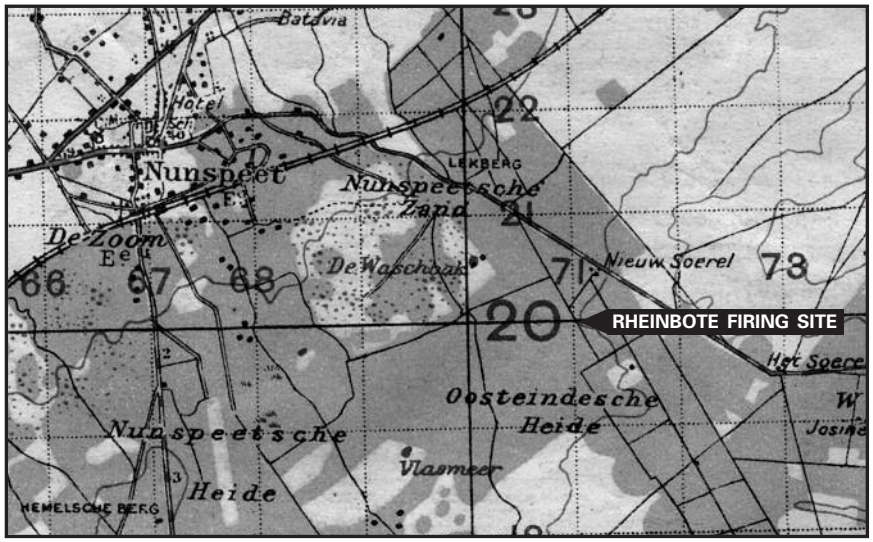
The first production of 1,000 rockets was planned to begin in December, in two monthly production runs of 500 each. This would permit 450 rockets to be available per month to be launched in operations while the remaining 50 were to be set aside for further development and testing but because of a lack of materials and powder, these plans proved illusory. On January 15 the scheduled monthly production for February had to be reduced to 150, of which 60 were to be reserved for development, leaving only 90 rockets for deployment. The production for March was set at 150, 30 rockets being earmarked for development.

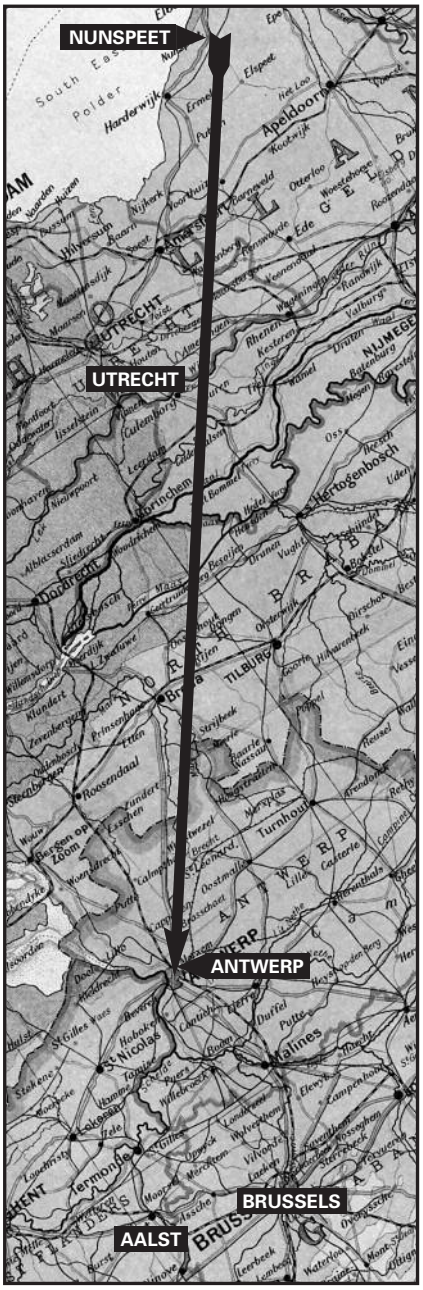
However, the Rheinbote was still far from being reliable enough for operational deployment as reported by Major Axster of BzbV Heer on January 14: 'Further investigations have revealed that failures at the last trial firings were caused by problems with the time fuses. BzbV Heer and WaPrüf 11 have already taken the necessary measures to ensure that, starting with the next test-firings, only new faultless fuses will be used.'

Yet it was now too late to perfect a weapon of doubtful effectiveness and on February 6 Kammler ordered all work on the Rheinbote cancelled.



In this sketch reproduced from the 1944 document, the battery was shown completely equipped with three weapon platoons — hence a total of 12 FR-Wagen (numbered from 1 to 12) — hidden in position in a forested area. At Nunspeet, Artillerie-Abteilung 709 had only four FR-Wagen. This drawing also indicates seven widely separated unloading spots (U for Umladestellen, numbered from I through VII) where the parts of the rockets were delivered in crates.





In 1986, the late Bart Vanderveen, Editor of *Wheels & Tracks*, managed to trace Gerrit Karsten who had watched the men of Artillerie-Abteilung 709 as they operated the Rheinbote rocket against Antwerp in the winter 1944-45. By then, Mr Karsten was living with his family at the Nieuw Soerel farm, a few kilometres east of Nunspeet *(above)*. **'Early in November 1944, the Germans ordered us to evacuate our home and property within two days. The whole area became out of bounds and German troops started preparations at four sites, two pairs about 70 to 80 metres apart. Many trees were felled to create openings for the mobile launchers to move into and out of position and more were cut down to facilitate negotiating several sharp bends. The missiles were delivered on long trailers and went along gravel roads and dirt tracks past the farmhouse into the woodlands behind it. Although nobody was allowed anywhere near the place, in January 1945 I managed to get permission to go into the vicinity with horse and cart to collect a load of firewood. Accompanied by an armed guard, I succeeded in getting quite near the launching site and through the trees I saw one of the rockets on its ramp. When the guard noticed my interest I was told not to look in that direction again and to hurry loading the timber and leave'.** *Right:* **The 165-kilometre trajectory of the Rheinbote launched from Nunspeet. Fired at an elevation of 64 degrees above the horizontal, the rocket achieved an altitude of 65,000 feet after 31 seconds of flight, climbing at a speed of 3,800 feet per second. Two minutes after the launch, it had reached the top of its ballistic trajectory at an altitude of 186,000 feet and its speed was 2,500 feet per second. Some 230 seconds after its launch, the warhead crashed on its target. Unfortunately there is no record of the impact points of the rockets fired from Nunspeet and it is not even known if they landed in Antwerp or overshot their target, crashing near Aalst. Coming at a time when V1s and V2s were regularly hitting Antwerp and its suburbs and errant V1s were crashing all over the countryside, it appears that the impacts of the small Rheinbote warheads went unnoticed. Peter Taghon searched the Belgian Gendarmerie files of the V-weapons incidents in Flanders for us and traced 18 for December 24, the day of the Rheinbote first salvoes. However he said that these reports do not differentiate between V1s and V2s, let alone the Rheinbote and, of the 13 incidents reported for that afternoon (the Rheinbote were fired from midday), all were in the Antwerp area. The one exception, a major incident in Kalken at about 4.30 p.m., must be a V1 because the size of the crater — 15 metres in diameter and five metres deep — excludes the Rheinbote.**

The Germans stayed at the Nieuw Soerel farm until shortly before the Canadians arrived in April 1945. Mr Karsten: 'As soon as the area was considered safe, the farm was ransacked by Dutch civilians who took anything they could put to use. When I returned to my house, the place was in a shambles and there was a lot of abandoned equipment, including numerous rifles which had been smashed to pieces against a tree. I visited the launch site and noticed damage to the surrounding trees, the bark being badly scorched to a height of over two metres. There were also craters in the ground.' Unfortunately the Nieuw Soerel farm was demolished in the mid-1960s and a dirt road has since been built across the area. New trees have been planted so the exact launch site could only be pinpointed with Mr Karsten's help. *Left:* **This is the road to the launch sites beyond the spot where the farm once stood.** *Right*: **Mr Karsten points out the position of one of the launch pads to Bart Vanderveen.**