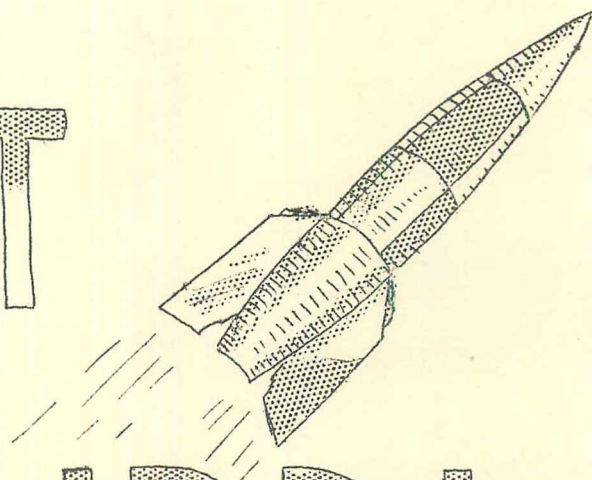


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PROJECT  
RESEARCH

THE V2



1.

Authorities unanimously accord the V2 programme ( known to the Germans at Peenemünde as the Aggregate 4) as being the first step on the ladder to space flight. This may sound like a cliché, but to quote Robert C. Duncan, author of 'Dynamics of Atmospheric Entry' :-

'The German V2 programme was the first substantial step up the ladder toward flight beyond the sensible atmosphere at hypervelocities.'

The interesting point here is that German rocket scientists, after the war, rather sportingly acknowledged that they'd learned considerably from the patents of American Dr. Robert Hutchings Goddard, who died in 1945. So before embarking on this detailed and lengthy project on the full story of the V2, perhaps I should give a few words about Dr. Goddard - this is pertinent because the V2 appeared to feature an almost identical layout to Goddard's last rocket, NELL, flown in 1935.

2.

Dr. Goddard was regarded by the American public as an eccentric - 'Moony' Goddard they called him. Born in 1883, his one burning ambition was to build a rocket to fly in outer space. He was an assistant at Clark University, Worcester, Mass, when he concluded that a rocket propelled itself better in a vacuum, and for this reason could fly in space.

Fantastic as it may seem, even before the Americans entered the Great War (WW I) he suggested the rocket as a weapon of war.

Just after the war, he published a treatise entitled A METHOD OF REACHING EXTREME ALTITUDES - suggesting the feasibility of sending a staged rocket to the Moon to discharge a magnesium flare on the Moon's surface, to be seen by telescopes on Earth.

THIS WAS IN 1919.

Unfortunately, it was this seemingly eccentric suggestion which got him tabbed 'Moony', and his future thoughts on space travel were only considered privately. His notes on space, rockets and solar engines, etc, were filed in a folder with this label...FORMULAE FOR SILVERING MIRRORS.

It was in 1926 that the first Goddard rocket flew. Make a note of the date March 16th 1926, it should be a National Day in America.

The rocket was about 10 feet long - it rose exactly 41 feet, travelled 73 yards in distance, at about 60 m.p.h. It's total flight time ....2.5 seconds.

His next success ( after many failures) was in 1929, make a note of the date again, please...July 17th 1929. The rocket rose to 102 feet. It so happened that word got around that Goddard was anticipating that his rocket would reach the Moon. Sheer exaggeration. You know how people are. The Smithsonian Institution let it be known immediately that, "No such wild project as going to the Moon is contemplated. We wish to create a method to gather meteorological and atmospheric detail."

They heard all about it all over the world ... most especially in Germany. Oh yes, in Germany a young man named Herman Oberth heard all about Goddard's rocket, and made it his business to get details. You'll read about Oberth later...

Col. Lindberg, reading these exaggerated press reports but nevertheless seeing the possibilities, interceded on Goddard's behalf, and managed to arrange a \$25,000 grant from a philanthropist Daniel Guggenheim. Guggenheim's name should be remembered, too.

Goddard and his associates moved to New Mexico, and more

enterprising work resulted in NELL.

In May 1935, this rocket was successfully fired to a height of 7,500 feet, reaching almost the speed of sound. It weighed 85 lb, and was 15 feet in length. It was powered by liquid oxygen, and by the use of a pressure supply tank this was fed into the combustion chamber - 'curtain cooling' kept the combustion chamber from a 'burn out'. It is most interesting to note that the V2 used the same basic format.

Just before WW II, Goddard again unsuccessfully tried to interest the U.S. War Department in military rockets - and possibly from letters Oberth had written to him, asking for details of his rockets, Goddard suspected that the Germans were secretly working on a similar project.

And how.....

### 3.

My extensive research into the pre-history of the V2 reveals a clever political move by the Germans to evade the regulations regarding power plants, as detailed by the Treaty of Versailles. Rocket propulsion did not come under any of the 'power plant' definitions set out by the Allies.

Besides this, however, is the fact that in the twenty year period between the end of WWI and the commencement of WW II, Germany was an exceedingly rocket-conscious nation. The byword was 'Raumschiffahrt', ( inter-planetary flying) and clubs formed all over the country, holding intimate meetings and building little model rockets which were blasted a few feet upwards, being symbolic ( and let's give them credit for this) of what they guessed was to come.

Professor of Mathematics and Physics, Hermann Oberth, was the centre of all this activity. He was technical director of a film ( supposedly made in conjunction with the German Army) designed to make the German nation rocket-minded, and he was the author of a book on inter-planetary flight, the basic suggestions of which remain pertinent to the planned progress of present-day space flight....remember of course that Oberth got considerable assistance from Goddard.

Willy Ley ( To Whom I have Spoken) describes the transition from futuristic dreams of space flight to the military aspect:-

"It can be taken for granted that it was also Oberth's book which first aroused the interest of the technically trained officers of the German Army. Of course, even though Oberth himself had space travel in mind, and the 'Society for Space Travel' expressed the same idea in its very title, the interest of the army was a military interest."

One of the military types so interested was a certain Walter Dornberger....

### 4.

Dornberger, after concluding technical studies, was posted to the Ballistic Council of the Army Weapons Department as Assistant Examiner. This was in 1930.

Things didn't go well for the energetic Dornberger for a couple of years. He couldn't get any technical data regarding rockets at all. There was lots of talk but no action. Dornberger says "We wanted to have done once and for all with theory. We were sick of fantastic schemes for space travel."

His staff moved to Kummersdorf West Experimental Station, about twenty miles to the south of Berlin, and by December 1932 had set up



a test stand for liquid-propellant rocket experiments. With him was Wernher von Braun.

von Braun, 19 years old, worked at Reinickendorf Airfield, Berlin with the Amateur German Rocket Society. It had little financial support, and von Braun left to join Dornberger in October 1931. Dornberger, writing of von Braun during this period, avers that he attached himself to Reinickendorf Airfield 'because he believed he could see a remote possibility that one day he might reach his beloved stars.'

They carried out the first test at Kummersdorf on December 21st 1932. The equipment was extremely crude...von Braun actually ignited the mixture of liquid oxygen and alcohol with a 12 feet long rod with a mug of petrol fastened to one end. The test stand blew up as von Braun brought his ostentatious match-stick into play.

Other misfortunes continued at Kummersdorf, the most serious being in 1934, when a certain Dr. Wahnke 'obsessed with the idea of finding out whether there was any danger in using propellants already mixed before combustion', discovered the hard way that hydrogen peroxide and alcohol were mighty potent when ignited without having the conduit leading to the tank safeguarded. The ignition explosion travelled speedily into the tank. As Dornberger ruefully explained 'nothing was left of the test stand except lead piping of the water supply.'

Eventually, a successful 650 lb thrust motor was designed, and work began on the first rocket, the A1. It was planned to be fired vertically with a take-off weight of 330 lb. It was eventually found to have a centre-of-gravity too far ahead of the centre of pressure. A slightly modified version, the A2 was built, and was fired successfully from the island of Borkum in December 1934. It reached a height of almost one and a half miles.

## 5.

1936 was an important year, because Dornberger's staff at Kummersdorf had now developed a rocket motor with a 3,500 lb thrust. Visiting high-ranking army brass, thrilled with the possibilities, promised finance. Dornberger was worried because the unusual and characteristic roar of his rocket motors was attracting unwanted attention - and obviously if rockets were going to be fired, Kummersdorf and district was no use for observation. What was required was a remote coastline with a couple of hundred miles of little-used sea to observe the behaviour of the experimental rockets.

von Braun discovered Peenemünde...it was ideal, far from any sizeable place, with a range of over 250 miles on the Pomeranian coast.

Within several hours of a suggestion made to the Air Ministry, Peenemünde was purchased for 750,000 marks, and so was born the Army Experimental Station.

## 6.

The next design was the A3 rocket. It began to resemble what we now come to expect as the conventional rocket shape. It was almost 21 feet long with a diameter of three feet. Even before the testing of A3, talk had swung round to a much larger rocket, the A4, with a take-off weight of twelve tons. But it was temporarily pigeon-holed until the A3 had been tested.

This was a terrible anti-climax. Four models were fired, and each behaved in an identical fashion - soon after firing, a 90 degree turn on its longitudinal axis, a turn into the wind at about 3,000 feet, and a tumble into the sea.

After weeks of earnest discussion, A4 was still temporarily shelved, and work progressed on A5. It was given the A3 motor, but had a diameter increase of four inches.

Summer 1938 saw the launching of four A5's, these models almost reaching Mach 1, and achieving a height of some 5 miles.

Many more A5 tests were made in 1939, the most successful reaching a height of seven and a half miles and a distance of eleven miles.

#### 7.

As stated previously, an important factor in making the move to Peenemünde was the necessity for extreme secrecy.

Apropos to this, a little-known fact is that on September 9th, 1939, before actual work on the A4 had begun, and a few days after the outbreak of WW II, a remarkable incident took place in Oslo, Norway.

The British Naval Attache in Oslo was the surprised recipient of an anonymous letter. It stated that the writer was prepared to submit a document detailing ultra-secret German technical developments. If the British Government was interested, a news broadcast in German was to have a particular preamble, 'Hullo, hier ist London.'

There was of course a distinct possibility that it was a cunning 'plant' by the German Secret Service, but the British authorities realised that they had absolutely nothing to lose, and the code was given as directed.

Soon afterwards, the report duly arrived - known in British Intelligence circles as the OSLO REPORT. Its contents revealed all German advanced projects...radar, radio-beam navigation systems, rocket-driven glider bombs, etc, but it also gave details of the rocket experiments at the Army Experimental Station at Peenemünde.

British Intelligence thought the OSLO REPORT too good to be true. Even though, as the war progressed, items the report had detailed were found to be accurate, no one bothered about the reference to 'long-range rockets.'

#### 8.

One other little thing.....

On May 15th, 1942, a certain R.A.F. pilot, Flight Lieutenant D.W. Steventon was undertaking photographic reconnaissance from a high altitude on the western shores of the Baltic Sea.

Whilst passing over the mouth of the River Peene, he spotted an airfield and instinctively gave it a few shots with his camera.

The photographs were duly examined by experts at Medmenham, a British Photographic Intelligence Unit. The site was plotted as being Peenemünde and 'strange massive ring-like things in the woods' were categorized as being 'heavy constructional work.' Section passed it to section, no one thought there was anything peculiar about the structures.

The photographs were duly filed away.....

#### 9.

Two models of the A4 had been fired at Peenemünde on June 13th and August 16th 1942 - two unsuccessful attempts. This did not help the extremely difficult negotiations being carried out in the background. Hitler, who had paid a brief visit to Peenemünde in March 1939, dithered about whether to give the A4 priority or not - and intrigue was also being carried out by the higher echelons of Nazidom - vast fortunes could be made if orders for thousands of A4's were achieved...Dornberger was worried about all this, when, on October 3rd 1942, another A4 launching was imminent.

Thrust was developed to the then fantastic amount of 25 tons...and over this power the A4 gently rose. Dornberger writes how he watched the launching through binoculars :-

'It was an unforgettable sight. In the full glare of the sunlight the rocket rose higher and higher. The flame darting from the stern was almost as long as the rocket itself. The fiery jet of gas was clear-cut and self-contained. The rocket kept to its course as though running on rails...the first critical moment had passed. Missile A4 had shown itself to be stable about its longitudinal axis. The projectile was not turning; the black and white surface markings facing us did not change.'

Just over 20 seconds after blast-off, the A4 became the first liquid-propelled rocket to achieve supersonic speed - soon it was visibly increasing speed - Mach 2 in about 35 seconds - 2,000 m.p.h. in under 50 seconds - 3,000 m.p.h. in under a minute....this is commonplace now...OK, but remember this was almost 23 years ago.

Another problem which only actual flight-testing could prove was what would happen as the rocket re-entered the Earth's atmosphere - Dornberger suspected that the A4 would break up - but it didn't - it struck the Earth almost 5 minutes after launching.

The flight had been utter perfection from blast-off to impact. Dornberger, understandably thrilled at this tremendous success after ten years of work, and many frustrations, called his small party to-gether and gave a stirring speech, a considerable part of which I feel I must quote:-

"...the history of technology will record that for the first time a machine of human construction, a 5.5ton missile, covered a distance of 120 miles with a lateral deflection of only  $2\frac{1}{2}$  miles from the target. Your names, my friends and colleagues, are associated with this achievement. We did it with automatic guidance. From the artilleryman's point of view the creation of the rocket as a weapon solves the problem of the weight of heavy guns. We are the first to have given a rocket built on the principles of aircraft construction a speed of 3,300 m.p.h. by means of the jet drive peculiar to rockets. Acceleration throughout the period of propulsion was no more than five times that of gravity, perfectly normal for acceleration of aircraft. We have thus proved that it is quite possible to build piloted missiles or aircraft to fly at supersonic speed, given the right form and suitable propulsion. Our self-steering rocket has reached heights never touched by any man-made machine. Since the tilt was not carried to completion our rocket today reached a height of nearly 60 miles. We have thus broken the world record height of 25 miles previously held by the shell fired from the now almost legendary Paris Gun. The following points may be deemed of decisive significance in the history of technology : we have invaded space with our rocket and for the first time - mark this well - have used space as a bridge between two points on Earth; we have proved rocket propulsion practicable for space travel. To land, sea and air may now be added infinite space as a medium of future inter-continental traffic. This 3rd day of October 1942, is the first of a new era in transportation, that of space travel....

...so long as war lasts, our most urgent task can only be the rapid perfection of the rocket as a weapon. The development of possibilities we cannot yet envisage will be a peacetime task. Then the first thing will be to find a safe means of landing after the journey through space....."

One thing the British should be thankful for was the confused



situation which resulted from the success of the A4, or the V2, as it became known (Vengeance Weapon No.2.). High ranking members of the German War Machine, who for a decade had considered the Peenemünde outfit to be a waste of money, now leapt on to the band-wagon of success.

One influential group even called in Dornberger and tried to coerce him into joining an enterprise to form Peenemünde into a limited company.

An efficiency expert, Degenkolb, made fantastic plans to produce 300 V2's monthly starting in December 1943.

Then Hitler had a dream. "The Führer has dreamed that no A4 will ever reach England", was the message sent to Dornberger from headquarters. Even worse than this, Hitler announced that as there was a very heavy consumption of raw materials and considerable financial cost in building the V1 (Fiesler Fi 103, commonly called the Flying Bomb) and the V2, a choice would have to be made - V1 or V2 ?

A Long Range Bombardment Commission was set up to decide the merits of both futuristic weapons - and after considerable discussion the Commission concluded that both types should be put in mass production. A demonstration of both was put into effect at Peenemünde on May 26th 1943 - two models of the V1 crashed immediately after take-off, the two V2's performed superbly, each travelling almost 160 miles.

All these meditations took time, people at ministerial level in the German Government, hypnotized by Hitler's designation of the A4 as Vengeance Weapon No.2, decided that the Degenkolb programme of 300 V2's a month by December 1943 was too conservative - they drew up plans to produce 2,000 a month.

Much argument took place about this 2,000 a month programme. Dornberger knew it was impossible, yet frenzied arguments with industrialists continued.

It was now August 1943....

11.

On March 22nd 1943, a high-ranking German soldier, General von Thoma was captured in North Africa. He was led, like a lamb to the slaughter, into a room equipped with cunningly concealed microphones. He was then introduced to a friend of his, captured previously, and whom von Thoma hadn't seen for some months.

Naturally, in the supposed seclusion of their little room, they had an animated conversation, von Thoma, in discussing the general war situation, expressed bewilderment that London hadn't been obliterated by German rocket attacks. He explained in some detail how he had actually seen huge rockets being launched, and had been assured that they would soon be operational.

British Intelligence had also received other reports. A Danish chemical engineer mentioned overhearing in a cafe in Berlin some talk about ' trials of a large rocket on a site on the Baltic coast.'

In February 1943 another secret agents report had even mentioned Peenemünde by name.

I consider one of the most fascinating aspects of this belated V2 collection of evidence by British Intelligence was the data supplied by a captured German officer, a tank expert. He was also captured in North Africa, was sent as a prisoner-of-war to Canada and was found to be extremely co-operative. Very speedily he was re-shipped to England, given an alias 'Mr. Peter Herbert', and set to work as an adviser to the Ministry of



Supply (Fighting Vehicles Division.) He was working diligently enough, and at the height of the V2 rocket scare happened to mention casually that he knew all about German rocket development. The horrible information he so casually tossed out was that these rockets weighed 100 tons, had a 10 ton warhead, and were ready for use.

It was obvious to the Germans that British Intelligence was bound to discover the existence of the V2 - the unusually active photographic reconnaissance flights by Spitfires and Mosquito's over Peenemünde must have been a most pointed reminder that sooner or later the V2 would be photographed. Consider also that the information supplied by Mr. Peter Herbert was a gross exaggeration, but his tank information was utterly accurate and competent - therefore would his rocket information not also be accepted as being authentic? In such circumstances, would it not be within the bounds of possibility that the captured German tank expert had been 'set-up', allowed to be captured, so gain confidence with his captors and then, at the psychological moment, drop his information like a bomb-shell? Certainly he was believed by one faction of British Intelligence.

I mention 'one factor' deliberately, because a strange situation became apparent in the British Cabinet. R.A.F. Intelligence (amongst other intelligence units) thought that the V2 scare was a sheer exaggeration. No V2's existed. Others believed Mr. Peter Herbert, and expected a massive V2 attack on London was imminent.

Mr. Winston Churchill delegated his own son-in-law, Mr. Duncan Sandys, to direct an investigation into the whole V2 affair - he did this against the advice of Lord Cherwell, Churchill's own personal scientific adviser. Churchill said "I should be inclined to bet against rockets being used."

Lord Cherwell's assistant, Dr. Jones, managed to obtain some photographs of Peenemünde, taken on 12:6:43. The important fact is this - these photographs were restricted, being only for the use of Mr. Sandys staff, which, as explained, was in direct opposition to Lord Cherwell. How did Dr. Jones obtain the photographs?

No matter how, the important thing is that Dr. Jones was the first person to identify rockets on photographs, and it says much for Lord Cherwell's strength of character that he immediately caused Jones to inform Mr. Sandys of his discovery.

The guesses, the conjectures, the panics, the indecisions ceased - there most definitely was a rocket being tested at Peenemünde. Mr. Sandys came to a sudden conclusion - Peenemünde had to be bombed out of existence by the R.A.F.

This idea was opposed by Lord Cherwell, R.A.F. Intelligence and R.A.F. Bomber Command. Nevertheless, Mr. Sandys pressed onwards, a meeting of the Cabinet was called, and the Defence Committee eventually agreed that Peenemünde should be bombed. Some authorities aver that if Mr. Sandys hadn't been so forceful, so sure of himself (and being the son-in-law of the Prime Minister), maybe Peenemünde wouldn't have been attacked at all...

But it was....

## 12.

Over 600 four-engined bombers, mostly Lancasters, assembled over Rügen just before midnight on August 17th 1943. A small diversionary force flew southwards over Peenemünde towards Berlin, without dropping any bombs. This was an attempt to baffle the fighter defence. At 12.15am on the 18th of August, wave after wave of bombers commenced to saturate Peenemünde

with high explosive bombs and incendiaries.

Soon after dawn, Dornberger and von Braun flew over the target area, to try and assess the damage. Dornberger writes that after landing all he could mutter was, "My poor, poor Peenemünde."

Official German figures state that there were 735 deaths in the raid - this figure including not only foreign workers, but also many irreplaceable scientists. It is difficult to total the damage. Certainly the R.A.F. claim that Peenemünde was well nigh devastated - Dornberger states that production was only held up for six weeks, and by skilful camouflage, not appearing to repair some of the buildings, etc, he says it was many months before Peenemünde was attacked again. Also, with diversification of construction centres, high priority, and with Himmler taking over the labour force at Peenemünde, V2 production progressed.

13.

Dornberger was woken up by telephone early in the morning of March 1st, 1944. He couldn't believe the fantastic news he was given. Professor von Braun had been arrested for sabotage.

Dornberger knew that Himmler had placed spies at Peenemünde, ostensibly to work on the slave labour, it never occurred to him that the spying had been on his own staff. He made an urgent appointment with Field Marshall Keitel, and asked for von Braun's immediate release. Keitel said, "Do you know that your closest colleagues have stated in company at Zinnowitz that it had never been their intention to make a weapon of war out of the rocket? That they had worked, under pressure from yourself, at the whole business of development only in order to obtain money for their experiments and the confirmation of their theories? That their object all along has been space travel?" Keitel explained further, "The sabotage lies in the fact that these men have given up their innermost thoughts to space travel and consequently have not applied their whole energy and ability to the production of the A4 as a weapon."

Dornberger finally made a declaration on oath that von Braun (and two others arrested at the same time) were 'indispensable to the V2 programme', and they were provisionally released for three months, this period being extended after a further declaration was made.

The arrest of von Braun was only one of many thorns pricking at Dornberger. So many important men were trying to take over the A4 project that Dornberger himself, through a certain Colonel-General Fromm, tried to obtain complete control for himself. The notorious Himmler also wanted mastery, and produced a Dr. Kammler at Peenemünde as his representative. Intrigue piled up, Dornberger was sent for and threatened with a charge of 'unsoldierly conduct and cowardly dereliction of duty' if he persisted in his demands for complete control.

Kammler, in a report to Himmler, announced that the A4 programme was 'a chimera without prospect of realization and it's continued development a crime against the German people.'

This same man, rapidly made a Lieutenant-General, was, within a month of making that pessimistic report, placed in complete charge of A4, answerable only to Himmler.

14.

Meanwhile, British Intelligence were still working hard on the V2, sifting hundreds of fragmentary reports, most of them stating the rockets weighed up to and over 100 tons, with warheads of 10 tons.

Only five statements amongst the hundreds taken agreed that the warhead weighed one ton. Two of these statements were made by prisoners-



of-war who had worked at Peenemünde , the other three were reports by secret agents. These five statements also had one other thing in common - they each stated independently that the V2's fuel was liquid oxygen and alcohol....

15.

Dornberger was still having his troubles, but possibly the worst one happened at 4.3 pm on June 13th 1944.

A V2, serial number 4089 was launched from Peenemünde at this time, one of many test vehicles, this one specifically to try out new radio-controlled equipment. The rocket refused to obey its radio controller, and at 4.8 pm blew up a few thousand feet above south eastern Sweden, the remains of it crashing into a cornfield.

The remains, weighing about two tons, were taken by armed guard to Stockholm.

British Intelligence soon heard about this totally unexpected but extremely fortunate stroke of luck, and immediately undertook negotiations with the Swedish authorities for the acquisition of the fragments. A deal was made ( some reports stating the exchange involved a presentation to Sweden of two squadrons of tanks) and the remains were flown to Britain by air, arriving in July.

Naturally, scientists descended upon the fragments in shoals, and Dr. Jones ( the same person who identified the V2 on photographs of Peenemünde ) observed that there was a fuel pump ' with no provision for external lubrication.' One of Dr. Jones's assistants remembered that ' liquid oxygen was handled by mechanical pumps designed to be lubricated by the fluid it was pumping', and so a frenzied search amongst reports and statements on the V2 was once again instigated, resulting in the five aforementioned specific references to liquid oxygen.

The fragments were assembled at the Royal Aircraft Establishment at Farnborough, and Lord Cherwell ( Mr. Duncan Sandys adversary) upon visiting Farnborough and seeing the results, recapitulated. He finally admitted to Churchill the obvious existence of a military rocket capable of hitting London.

Soon, over half a million people were evacuated from London....

16.

Meanwhile, back in Peenemünde , Dornberger was still having no respite from his continual series of trials and tribulations. To put it briefly, his rockets ceased to function...only 15% of his test rockets made a perfect landing in the target area - most of the remainder succumbed to a mysterious breakdown ( such as happened to Model No. 4089). For some unaccountable reason, after travelling in perfect order for 160 miles, they disintegrated a few thousand feet above the ground, just after re-entry.

In November 1943, Dornberger and his unit moved to the centre of Poland to continue testing the V2, and was almost in a frenzy of frustration with the new crisis - he couldn't get his models to cease this bewildering untimely disintegration, and he was being hounded by his superiors for a speedy remedy - they wanted V2's to drop on London.

Dornberger and von Braun checked and re-checked every conceivable cause of the trouble - 24 possible danger points on the rocket were fitted with measuring transmitters. The two men even went out to the target area, and watched the sky with binoculars...they were 5 minutes



13 seconds from the launching site at Blizna. When that time had expired they spanned the sky, and Dornberger actually saw the rocket, or rather the track of it, travelling at some 2,000 m.p.h. - he saw it break up, as most of the others had done. Eventually, after exhaustive testing, the efficiency of impact increased to 70%. The trouble was finally cured by reinforcing the forepart of the hull with rivited sheet-steel casing.

In his ADVANCES IN SPACE TECHNOLOGY, J.L.Nayer avers that NASA tests suggest that 'panel flutter was the cause of structural failures of some of the early V2's'.

Of course, until the cause was detected, mass production of the V2 could not be undertaken, and Dornberger quite frankly admits that the circumstances and speed under which he and his staff had to work resulted in 'a missile far short of the possible standard - a missile inadequate in accuracy and effect which was exactly what for years we had anxiously striven to avoid : a weapon, despite its technical merits, unequal to its task.'

#### 17.

Dr.Jones was still working hard on his assessment of the V2. He composed a treatise on the weapon which, as was later proved, was surprisingly accurate. He also told the Chiefs of Staff that the Germans probably had 2,000 V2's stockpiled.

But in their profound wisdom, the Air Staff decided that they knew the score, and that Jones was being too pessimistic. The Allied armies were swiftly traversing Northern Europe, the V2 launching sites had been overrun, hadn't they ? On September 5th 1944, attacks on V2 storage dumps were stopped. Two days later, evacuation from London was cancelled.

The British Government breathed a sigh of relief. The V2 scare was over. It had been rough, but now the situation was under control.

Mr.Duncan Sandys, thrilled no doubt that his foresight and drive in the V2 investigation had stopped the dreaded rocket attack in the nick of time stated at a press conference on September 7th 1944, "The Battle of Britain is over."

But in Holland, at 6.38 pm on September 8th 1944, German troops blasted off the first of many V2's Londonwards....

#### 18.

From this date ( 8:Sept:1944) until the last V2 was launched on March 27th 1945, almost 1,100 V2's landed in England. There was absolutely no defence against it.

In this year of grace 1965, ICBM technique, both for and against, has become extremely sophisticated. We have the missile itself, or at least the warhead, entering the target area, accompanied by a veritable bevy of 'penetration aids', designed to divert the enemies anti-missile-missiles from the warhead. In other words, accompanying the warhead are various forms of anti-missile-missile-missiles. The penetrations aids, some of which are specially constructed to give the same radar readings as the warhead, being therefore unidentifiable from the warhead, are attacked the the enemies anti-missile-missile-missile-missiles.

I was carried away there, but you get the general scheme of things. But in 1944/45, the V2 was a fantastic weapon. If its production had been carried out without Peenemünde being attacked, without the terrible behind-the-scene intrigues by top Nazi's, if it could even have become operational before D-day, and been concentrated at Southampton, it would

# V2 DATA

Length 46.1 ft.

Diameter 65 ins.

Weight overall 27,376 lb

Payload 2,150 lb.

Range 200 miles

Altitude 50 miles

Velocity 3,500 m.p.h.

Engine - thrust 51,000 lb

Burning time 60/70 sec.

Warhead...2,000 lb high explosive

Radio and gyroscopic control apartment

alcohol tank

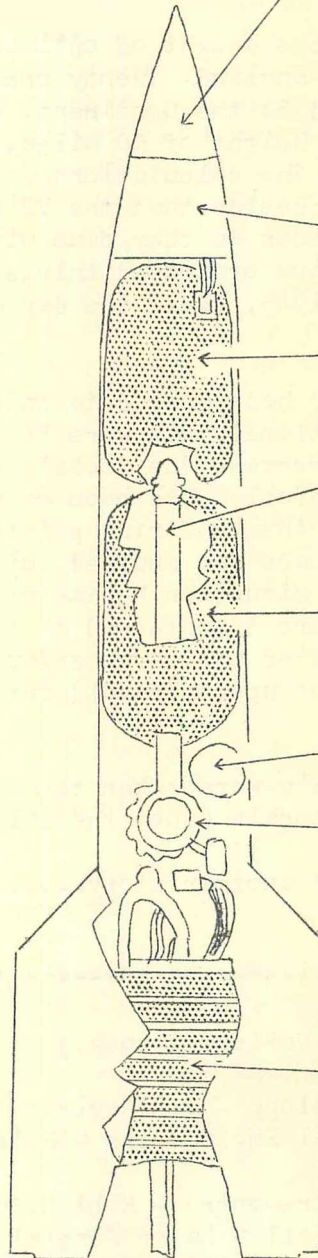
double-walled alcohol delivery pipe to pump

liquid oxygen tank

hydrogen peroxide tank

turbine and pump

combustion chamber and venturi



Details from HANDBOOK  
OF ASTRONAUTICAL ENGINEERING  
by Heinz Herman Koelle.

The oxygen and fuel pumps were powered by a steam turbine, and steam was generated by mixing hydrogen peroxide and calcium permanganate.

almost certainly have stopped the Allied invasion of France. In other words ( fortunately for the Allies) the V2 was three months too late to effect the course of the war. But nevertheless, the casualties and damage inflicted in En-land were severe. The total casualty figures in England were Killed...2,855. Injured...6,268. Besides this, many hundreds of Allied airmen were killed attacking V2 sites. It must also be remembered that German records show over 1,600 V2's were launched against Antwerp.

I think the height of optimism in the last war was shown by Anti-Aircraft Command in England. Twenty one radar units were moved to the east coast of England and to the Continent. Continual plotting showed that the V2 reached a maximum height of 50 miles, travelled at 3,000 m.p.h. and impacted at 1,800 m.p.h. The calculations and statistics thus discovered led an unnamed genius to decide that the V2's should be bombarded with anti-aircraft shells as soon as they came within range. By a gem of astutue dead-reckoning, this genius organised things so that the order to fire was given on March 26th 1945, i.e., the day after the last rocket landed on England.

19.

Dornberger had managed to increase the V2's range to 220 miles, some of the operational V2's were beam-guided, and final arrangements had been made to increase the rockets explosive effect. Also, the re-entry disintegration problem had been completely solved. All too late.... And then, in March 1945, the V2 firing points in Holland were captured, and just like that the V2 menace was snuffed out.

As the war situation became utterly hopeless, the specially trained V-weapon corps were transferred to the infantry, and Dornberger and his staff were evacuated to Oberammergau, where they frittered away the time ( perhaps dreaming of space travel) until the Allies caught up with them.

20.

Captured V2's were taken to America and there experimentally fired, some with WAC Corporals ( not the gals, silly) fitted as an extra stage.

But this is another story.....

John Berry  
1965

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