The Moonlandings

An Eyewitness Account

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Foreword by **Dr Buzz Aldrin**

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1 The Context: A Twentieth-century Faust

Five days after the fall of the Berlin Wall, I was talking to young East German space scientists who had never heard of Peenemunde. There was vague recognition of the name 'Dr Wernher von Braun', but they knew nothing about him.

Forty-five years of silence and censorship east of the Berlin Wall meant that by October 1990 knowledge of one of the twentieth-century's most remarkable men had been almost obliterated. For von Braun not only designed and built the rockets that landed the first men on the Moon; the drive and determination with which he led the missions changed man's perception of himself and added to his language in a way not experienced since Shakespeare wrote his plays and sonnets. [Women had tried but failed to penetrate either the ranks of the astronauts or the top echelons of NASA in the moonlanding years of the 1960s and 1970s.]

My own encounters with von Braun started in the late 1950s. The impact in 1944 in Sydenham, south-east London, of one of his first V2 rockets had hastened the arrival of my younger son, and for two years I could not bring myself to shake his hand. After that I was surprised to find quite a warm professional friendship developing between us.

'He was like Faust!' My own impression, formed years earlier, that this German rocket engineer had mentally sold his soul to the Devil in exchange for the facilities and the money to fulfil his ambition to build a rocket capable of sending men to the Moon, was finally confirmed in a Dresden cafe during the 1990 International Astronautical Congress.

I had tracked down Hans Endert, by then aged 71, who had been one of von Braun's engineers at Peenemunde during the final developments of the V2s in 1943–45, and asked him to describe the man for

whom he worked. I had not expected that my own view of von Braun would be confirmed with the use of the same simile – especially as Endert had had no opportunity to observe the man's extraordinary development after arriving in the United States.

At first von Braun's execrable English made it impossible for the BBC to broadcast interviews with him; and his mouth full of metal teeth was quite revolting for the viewer. One suspected the Faustian pact as much as US technology for his transformation, within a few years, into a gleamingly fit and handsome middle-aged man with near-perfect English flowing from between a set of pearl-white teeth.

Endert, both a victim and beneficiary of von Braun's quest for the Moon, had just been retired from his job as Director of East Germany's space agency. West Germany had taken it over. And for the first time in 45 years he was free to sit and talk about his experiences. He filled in the gaps in my earlier knowledge of the development of the V2 rockets.

The 'V' did not stand for 'Victory' as was generally believed by the recipients of the one-ton warheads which the rockets delivered in England. The V stood for 'Vergeltungswaffen' or reprisal weapons. Most major countries, including Britain, France, Germany, Japan and the US, were already studying rockets – amid much secrecy – as potential weapons, before the 1939–46 war.

The story of Germany's rocket development and test range at Peenemunde, an island on the Baltic Coast, and of the way that Western intelligence, helped by Sweden's recovery of a V2 that veered off course and fell in their territory, gradually learned what was happening, is a matter of history.

For Hans Endert the story started with a raid by the RAF on Peenemunde on 17 August 1943. Of 571 Lancaster and Halifax bombers, 40 were shot down as they returned to England in bright moonlight, at a cost of more than 300 RAF lives. Most bombs seem to have missed the main target – the adjacent installations at which both the V1 flying bombs and the V2 rocket bombs were being built and tested. But the bombs did hit the Germans' living quarters, killing 735, including Dr Walter Thiel, responsible for developing the V2 rocket

engine. Nearby Zinnowitz however, with a comfortable hotel at which von Braun and his top associates spent much time – and which still survives – escaped serious damage.

Following that raid, the ranks of the German Army were hurriedly combed for engineers capable of replacing the dead men; and Endert, busily employed maintaining radio communications on the Russian front, was pulled back and rushed to Peenemunde. 'A great stroke of luck', he said many times. 'It saved my life.'

Although production of the V-weapons was moved to the Harz Mountains following the raid, development flights continued at Peenemunde until the Soviet and Allied forces converged upon it in 1945. Von Braun, whose loyalty and motives were doubted – perhaps with some reason – by the Gestapo and SS, was at one time arrested and imprisoned, but released within a few days when his friends, who included General Dornberger, protested to Hitler that without von Braun there would be no V-weapons.

Von Braun's daring and determination were equal to the final test when it seemed that Soviet forces would reach Peenemunde first. Taking advantage of conflicting orders, from Berlin to evacuate, and from local commanders to stand firm and fight to the last, he bluffed his way 250 miles south-west to Bleicherode past military roadblocks and Gestapo checkpoints. It was an epic journey with a trainload of documents, drawings and papers to enable him, somewhere at some time, to continue his exploration of rocket technology. With him went about 5000 engineers and their families. His own *History of Rocketry* records how the huge convoy of railroad cars, trucks and other vehicles was emblazoned with red and white signs reading 'Vorhaben zur besonderen Verwendung', or 'Project for Special Disposition' – an entirely mythical project.

While he hid his documents in mountain caves, from which American intelligence later recovered this treasure trove, von Braun sent his brother Magnus, who spoke better English, to make contact with the Americans. Magnus told a somewhat astonished Private (First Class) Fred P. Schneiker of the 44th Infantry Division that 150 top

Dr Wernher von Braun, then aged 33, suffering from an arm broken in a car accident, centre, 'surrenders' with his rocket team to the Americans at Reutte in May 1945. It was more a negotiation than a surrender. The most confident man I ever met, von Braun was well aware of the value of what he had to offer the US. His brother Magnus von Braun, who had made the first contacts, is on the right. From left: Charles L. Stewart, US counter intelligence agent; Lt-Col. Herbert Axter, on Gen. Dornberger's staff; and extreme right: Hans Lindenberg. (NASA)

German rocket personnel wished to join the Americans to continue their rocketry work. It was a tricky situation, for by then they were hiding in an inn behind the German lines from an SS general who wanted to use them as bargaining hostages.

Again, the story of how it all worked out, as von Braun and General Dornberger planned it, is a matter of history. The only casualty of his epic 'long march' seems to have been von Braun himself: a photograph of his group finally surrendering to the Americans at Reutte in May 1945 shows him wearing a rather smug smile and a huge plaster caste on his left arm. For years I thought this was just camouflage and yet another detail of his great escape plan; but later I was told that it was

the result of a motor accident, and that the injury was so bad that amputation was discussed. When I knew him, however, he did not appear to be handicapped in any way.

Less important members of his entourage, such as Hans Endert, fell into the hands of the Russians, and it was three months before they learned that von Braun had gone over to the US. 'Then, knowing that the Americans knew everything,' Endert told me, 'I had no scruples about helping the Russians, because they offered me a decent salary and food rations which I could get nowhere else.' He was well treated and sent off to an establishment near Leningrad.

'Did you like that?' I asked – provoking him to throw his hands in the air and reply: 'Only an Englishman could ask such a question!'

But, as I suspected, there were compensations for him. Just before that he had fallen in love with a German girl who was bilingual in Russian, so that she went with him and acted as interpreter between the German and Soviet scientists. Three years later they were given one week's notice that with 175 others they were being sent back to East Berlin. There they were given priority housing, and for the rest of his career Endert was employed by the East German Space Agency on their numerous co-operative Soviet space projects.

When I met him he had just been back to Peenemunde, and was astonished to find little but bog and trees growing where Test Stand No.7 had stood – a large hall 50 × 40 metres, and 40 metres high. Having first removed all the equipment they could, the Soviets had blown it up with great thoroughness. Endert and his colleagues were planning to use a bulldozer to regain access to the site, uncover what remained, and establish a museum telling the story of Peenemunde and its contribution to space history. It did not seem to be the appropriate time to express my hopes that such a museum would include the names of the 300 RAF personnel who had lost their lives in a raid that foiled Germany's last desperate bid to reverse the course of the war in their favour.

Von Braun himself entered my personal life during that unhappy period for America in 1961 when the Soviets had launched Gagarin and

Titov into orbit, and NASA was struggling to match those achievements against national indignation about being second in the space race. The US had in fact been concentrating on production of intermediate and long-range military missiles rather than on bigger and more powerful rockets capable of lifting men into low Earth orbit.

And so far as Earth-orbiting satellites and men-in-space were concerned, the effort had also been handicapped by the bitter rivalry between the three Services to claim these glamorous activities. The US Navy, with the most powerful political lobby, won Government and Congress support for their Vanguard rocket – which, however, kept blowing up during tests. The Air Force, which thought and still thinks that space belongs to them, maintained that their early Atlas rockets would be best; while the US Army, politically the poor relation of the three Services, and despite its corps of German rocket engineers, had its claims repeatedly turned down that it could do the job with the rockets developed from the V2.

Watching from Cape Canaveral the string of failures which accompanied these political struggles, the growing corps of international space correspondents, led by the British media, learned how von Braun's team, still conducting their meetings in German, refused to give up. He finally won the inter-Service battle for the US Army on 31 January 1958 with the successful launch of Explorer 1. At last the US had a satellite in orbit – and only four months after Russia's historic Sputnik 1. It was done with a rocket called Juno 1, a four-stage development of Jupiter C, which itself had been developed from Redstone, which in turn was directly evolved by von Braun from his wartime V2.

From that day the US Army's von Braun team was unassailable. Redstone was used to launch Alan Shepard and Gus Grissom on the first two US 'spaceflights', which were actually suborbital up-and-down space lobs, in the tiny Mercury capsules. The US Air Force's Atlas rockets had to be used – with misgivings in view of their early history of unreliability – for the subsequent four Mercury orbital flights, and the Titan, also based on an Air Force missile, for the 10 two-man Gemini flights. But it was von Braun who was building the Moon rockets.

With unlimited money and manpower – just as in his Peenemunde days – he had the time to go on developing Juno and Jupiter into a rocket big enough to fulfil President Kennedy's 1961 programme aimed at landing men on the Moon and returning them safely to Earth before the end of that decade.

'Saturn' was selected as the name for the family of rockets needed for the moonlandings because that huge planet came next after Jupiter. Space correspondents like myself were inevitably sceptical about the proposals for the 3000 ton Saturn 5 when we were still watching and reporting Atlas and Centaur failures, with robot Ranger spacecraft regularly crashing on the Moon without sending back the close-up pictures that were essential before men could be sent.

But von Braun, having moved rapidly from prisoner-of-war to US citizen and Director of the Marshall Space Flight Center – as the US Army Ballistic Missile Agency at Huntsville, Alabama, was soon more respectably named – quickly proved himself to be a superb politician as well as leader and inspirer of the rocket design team. His private demeanour and enthusiasm convinced both President Kennedy and Vice President Lyndon Johnson, while publicly he was unerringly effective, briefing the media at news conferences and doing radio and TV interviews.

Once I got past the Public Affairs 'minders', von Braun always performed for me, well aware that it gave him access to the BBC's world-wide audience; and when his compatriot, Dr Kurt Debus, became Director of the Kennedy Space Center at Cape Canaveral, NASA's manned spaceflight programme was effectively being run by Germany's rocket refugees.

Two days before the lift-off of Apollo 7, the first manned flight on a Saturn rocket in October 1967, von Braun was shaking his head dubiously, and capturing headlines around the world by pointing to the recent unmanned Soviet flight around the Moon, and telling us that 'at best' the actual moonlanding would be a 'photo finish' between the two Super Powers racing to be first. In an interview with me he stressed the immense prestige value of winning the race. 'After all', he said, 'who remembers the second man to fly the Atlantic Ocean?'

He was wrong there of course, since Colonel Lindbergh's flight came seconds after that of Britain's Alcock and Brown, and it is Lindbergh's solo flight that is remembered. But such esoteric details did not worry the American public; what did worry them was the threat that they might lose the moonrace. And, thus aroused, those worries ensured that the prospect of wounding financial cuts to the Apollo programme died away.

The Soviets on their side provided von Braun with a steady flow of ammunition for his repeated warnings that the slightest US hesitation could cost them the race. Cosmonaut Shatalov's boastful assertion at one critical point that when the first American stepped on the Moon Soviet cosmonauts would be there to greet him added hundreds of millions of dollars to NASA's budget!

Inevitably, as this story tells, once the Apollo 11 crew had achieved their landing in July 1969, the remainder of von Braun's life was all anti-climax. President Nixon started cutting back the programme as soon as he and his Administration had extracted the maximum benefit from it.

'We've built a railway line to the Moon, and we're only going to run one train along it,' mourned von Braun in another interview with me that day. In fact, seven were run, six of them successfully. The one Apollo failure had nothing to do with the Saturn launcher, which ended its career uniquely with a faultless performance. The Skylab space station missions in 1973, and the Apollo–Soyuz manned link-up of 1975, provided some use for left-over Saturn hardware, and then its life was over.

von Braun's master plan for landing men on Mars by 1982, of which he gave me a copy the day Apollo 11 landed, remained unread in Washington. The White House was worried about ending the Vietnam War and the media was obsessed with Senator Edward Kennedy's car crash off Chappaquiddick Bridge in which his woman passenger drowned.

Apart from that, von Braun never knew failure, nor the bitterness of the recriminations evoked by re-awakened consciences during the last two decades of the twentieth century. Fifteen of his Saturns placed

45 Americans in space without the loss of a single life. Three giant Saturn 5s, originally intended to carry Apollos 18, 19 and 20 to more remote parts of the Moon (and which would have solved the problem of whether it contains any frozen water!), remained unused to inspire awe in thousands every day as they are displayed like dinosaurs at the Kennedy, Johnson and Marshall Space Centers.

von Braun's last five years were spent as technical and development vice-president of Fairchild Industries, and he finally met his destiny in that role in 1977, aged only 65. He had achieved what he set out to do, but I was saddened to see him wasting away as cancer consumed him. In what was probably his last interview he told me, shortly before he died: 'I just envy the youngsters who have a chance of going on where we leave off.'

I used that quote to dedicate a book I wrote for young people called *Space Age* to the man whose hand I had for so long refused to shake. Since then I have had many second and third thoughts, and wondered whether, after all, I should have shaken it.

The doubts were re-awakened when in October 1993 my wife and I drove to Nordhausen, just inside what used to be East Germany, and visited Dora-Mittelbau, the mass production factory in tunnels beneath the mountains in which Dr Arthur Rudolph was directing the mass production of V2s when the war ended. Had the war gone on for another six months London would have been rendered uninhabitable.

Out of 60000 European slaveworkers brought there from the Buchenwald concentration camp and elsewhere, 20000 were worked and starved to death in the catacombs. The production and reliability of the V2s was hindered by the determined sabotage of those workers, and there were frequent hangings, sometimes outside Rudolph's office, when the culprits were caught.

We saw where the corpses of hundreds were incinerated each week. We shivered in the rain where the workers had been paraded for hours, often naked, before and after their 12-hour shifts in the tunnels.

The relevance here of all this is that von Braun, while working at Peenemunde, was a frequent visitor to Dora after production was transferred there, and could not have been ignorant of the sufferings

Arthur Rudolph, when manager of the Saturn 5 programme office at Huntsville under Wernher von Braun. Not until after his retirement did questions begin to be asked about his past at Dora. (NASA)

imposed upon those whose work did not in the end win Hitler's war, but which did make space travel possible soon after it. And when Germany fell, Arthur Rudolph was included in the team von Braun took to America.

Having worked with von Braun in Germany and America for 38 years, Rudolph was awarded NASA's Distinguished Service Medal in 1969 – but was forced to abandon his American citizenship and flee back to Germany when at last the media began to investigate what happened at Dora. By then von Braun himself was dead. The twentieth-century Faust himself had escaped such final retribution. Having died before the collapse of the Soviet Union, he was buried with his reputation, and even bigger and better American honours, untarnished.

Was this a monstrous injustice? Or should we console ourselves that, had von Braun not been allowed to continue his work, there might

German engineer Dr Hans Endert, who said Wernher von Braun, under whom he worked at Peenemunde, was 'like Faust'. He is pictured standing on the overgrown site of the test facility, which was blown up by the Russians in 1945. (Hans Endert)

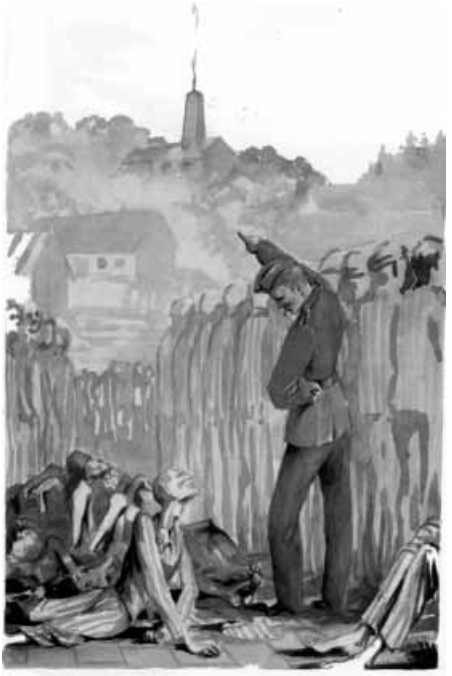
still be no human footprints on the Moon? And how far, if at all, should we blame von Braun for the awful happenings in the Harz Mountains?

Albert Speer, Hitler's Minister of Armaments and War Production, whose idea it had been to transfer V2 production from Peenemunde to the bomb-proof tunnels, explained how it all came about after his arrest as a war criminal. He was one of the few Nazis to admit publicly to a guilty conscience:

> Basically, I exploited the phenomenon of the technician's often blind devotion to his task. Because of what seems to be the moral neutrality of technology, these people were without any scruples about their activities.

Part of the price for landing men on the Moon: Life and death at Dora, the mass production factory for V2 rockets in the Harz Mountains, 1943–45. Of 60 000 slave workers, 20 000 were worked or starved to death. Shortly after his release, an artist survivor, Maurice de la Pintiere, depicted its horror in 35 sketches, ending with the camp's busy crematorium. (Maurice de la Pintiere)

13. ...Où chaque tronc d'arbre leur semblait une trop lourde croix



24. ...Tandis que résonnaient les plaisanteries macabres des gardes-chiourmes