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German Engineers
- Contribution to
British Rocket Technology
after WW2

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Chapter 7

German Engineers: Their Contribution to British Rocket Technology after World War II*

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Introduction

The people of Britain, more than any among the Allied powers, had good reason to appreciate the effect of the new rocket-propelled weapons that had been brought into operational use by Germany during the Second World War. On 25 August 1943, escort vessels, accompanying a convoy in the Bay of Biscay, were attacked by several Do217 aircraft carrying the rocket powered Hs293 guided missile. HMS *Bideford* was damaged in this attack, the first in the world by a rocket powered guided missile, and, two days later, HMS *Egret* was sunk by Hs293 missiles in the same area.[1]

Early on 13 June 1944, the first salvo of V-1 missiles was fired at London by Colonel Max Watchel's 155 Flak Regiment from sites in Northern France. This first attack was less than successful, none of the nine V-1's launched reached England, let alone London. Ten more were launched a few hours later,

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and 3 reached southern England, falling at Swanscombe, Cuckfield and Platt, causing no casualties, but a fourth hit its target. This landed at Bethnal Green in London, killing 6 people and injuring 9. Before the end of the V-1 campaign in March 1945, around 10,000 V-1's had been successfully launched against targets in Britain, mainly London, and about 2,400 had impacted on that city.[2]

During the evening of 8 September 1944, a mysterious explosion occurred in Staveley Road, Chiswick, on the western fringes of London. When the dust had settled, a large hole had appeared in the road, 3 people had been killed and another 18 injured. The official explanation was a gas leak, and soon gas leaks were occurring all over London and the south eastern counties. These events heralded the arrival of the long awaited and much feared German Vengeance Weapon No. 2, the V-2. London was not the first city to be hit by the V-2, that dubious privilege fell to Paris,[3] but London and Antwerp were the main targets. During the campaign, which lasted from September 1944 to March 1945, 1,115 V-2's reached Britain, with over 500 hitting the capital.

At the end of the war, like the rest of the Allies, Britain felt that the material and technical knowledge residing in Germany's industries and research establishments should be harnessed to help us rebuild our economy. As in the U.S.A., but to a lesser extent in France or the U.S.S.R., there were conflicting views on how legitimately to acquire German knowledge and on the basic morality of it all. The situation was complicated by the clear rift that occurred in the alliance of convenience between Britain and the U.S. on the one hand, and the U.S.S.R. on the other. The U.S.S.R. had embarked on a process that can best be described as hoovering up all available material as war booty. Britain and the U.S. also resorted to subterfuge and were attempting to squeeze France out, although Villain,[4] speaking of the situation in late 1945 re French interests, has stated that ". . . relations with the Allies thereupon proceeded with a friendly and fruitful atmosphere."

The situation as regards Britain appears to be as follows. Although it was appreciated by certain scientists and industrialists, like Fedden,[5] that much of Germany's industrial technique and research were far in advance of our own, there was still a general feeling of the superiority of the British way of doing things, and that it was thanks in a large part to the ability of our boffins that we had "won the war." The story of radar is a good example of the success of British propaganda in conveying such a view. Britain also had, in 1945, its first majority socialist government in power, and a strong union tradition that was opposed to bringing in foreign labor when British ex-servicemen were joining the dole queues. Many references exist where politicians, military leaders and civil servants alike were concerned about the possible effects of bringing German engineers to work in Britain.[6] There was a strong feeling in influential

circles that, if we were to exploit what the defeated Germans had to offer, we should suck them dry and send them back home. "Squeeze like a lemon" was a phrase much in vogue in those days. Such then was the atmosphere in which those tasked with getting Britain's fair share of the spoils had to work.

In this event, Britain's share of the available German resources was small compared to that seized by the U.S.A. and U.S.S.R. This reflected the situation Britain found herself in during the summer of 1945. Britain was now a poor nation, all her resources had been spent defending the free world. Her national debt was enormous, her industry was in tatters from the combined effects of the war and a lack of investment in new technologies before the war. The Empire, on which Britain had based much of her wealth, was growing up, and the children were "leaving home to make their own way in the world." On the other hand, Britain still perceived herself to be a major international power and craved the military technologies she felt would maintain this status—the rocket and the atom bomb. She could, however, not afford a massive rocket program, and the German rocket engineers and scientists, who in the main were willing to sell their talents to the highest bidder, knew this very well. As one of them pointed out to Dr. Richard Porter of the General Electric Company, who was working on the U.S. Project Hermes, "We despise the French, we are mortally afraid of the Soviets, we do not believe the British can afford us, so that leaves the Americans."

Work in Europe

At the end of the war, the British decided to establish a number of projects in Germany, where German specialists would continue their work under the supervision of the Military and the Ministry of Supply. The most visible of these was Operation Backfire, an exercise to assemble and fire V-2 rockets. Other projects of relevance to rocket development were those at Trauen, at Rheinmetall Borsig, Interluss and the CPVA, Danischenienof, near Kiel where the Walterwerke team continued their work on underwater propulsion, guided missiles and radar. It had, however, been agreed by the Allies that any German establishment capable of military R&D would be dismantled as soon as possible, and there was pressure on Britain to complete this work quickly. It was from these projects that most of the German rocket personnel to work in Britain were drawn, and the first team to be shipped to Britain was that from Walterwerke, which arrived in Barrow in January 1946. The rest followed over the next 12 or so months to work at, mainly, the Rocket Propulsion Establishment, Westcott, the Royal Aircraft Establishment, Farnborough, and the old Gunpowder Factory at Waltham Abbey. Initially all the Germans were employed on short term con-

tracts of 6 and 12 months. Many of these contracts were extended, and some Germans stayed permanently, but equally a large number soon departed for the Colonies, the U.S.A. or back to Germany.

Operation Backfire

Early in May 1945, Joan Bernard from the Army Territorial Service approached her Commanding Officer with an idea to assemble and fire V-2 rockets with the aid of German personnel. The idea received strong support in London, where it was stated "that it might save years of development work, and . . . agreed that the launching and control of rockets was a complicated operation which it was necessary for the German technicians to demonstrate in the near future, before they lost their skill."[7] Although Operation Backfire, as it became known, was officially an Allied operation, the U.S. was not particularly interested, and it ended up being run almost completely by the British. The story of this project is covered effectively elsewhere, and I will discuss here details only as they relate to the use of German personnel.[8]

The site chosen for Operation Backfire was in the British Zone, another reason why this became predominantly a British venture, at the Krupp proving ground some 8 km south of Cuxhaven on the North Sea coast. Some 600 German personnel were actively involved in Operation Backfire, about 130 of whom had had extensive military experience with launching V-2 rockets. These were assembled under the command of Wolfgang Weber. In addition to being the Commander of the experimental battery set up at Peenemünde in 1944 to work out field firing procedures for the V-2, Weber had also commanded Tactical Group South, which had fired its last V-2 in anger on 16 March 1945. A further 85 were scientists and engineers who had worked on the V-2 at Peenemünde, and most of these came from the group interned by the U.S. military at Garmisch Partenkirchen. The rest of the 600 were troops and civilians with no previous experience with the V-2. There is also evidence that a further 400 Germans were employed as laborers.

The British decided to keep the assembly and firing troop separate from the rocket specialists in order to check on the veracity of both groups. This gives some indication of the British attitude towards the defeated Germans. They soon found that most of the V-2's they had collected were missing vital components, mainly from the guidance and control systems. This necessitated extensive travel by, what can best be described as, raiding parties to various V-2 sites all over Germany. After much rescue archaeology of V-2 components and handling equipment, 8 complete rockets were produced, and 3 of these were fired with varying success into the North Sea between 2 and 5 October 1945. The other

five were brought to Great Britain, and one of them is now on display in the Science Museum.

During Backfire, most of the technical personnel had been interviewed by the British to see if any would be interested in moving to Britain at the end of the project to continue rocket work there. Ordway and Sharpe state that some twenty of them, who had not been offered contracts by the U.S.A., took up this offer.

The main aims of Operation Backfire, to gain experience in the assembly and launch of large, liquid fueled rockets, and to document the whole process, were successfully completed. But as far as the long term development of British rocketry was concerned, this was a dead end. The technical team from Backfire broke up with most going to work in the U.S.A., and the next large British rocket project—Blue Streak—did not start for another 10 years.

Ministry of Supply Establishment, (MOS) Trauen

The German rocket specialists from Operation Backfire who had decided to move to Britain, were transferred, early in 1946, to the former Sänger Raketentechnisches Forschungsinstitut (Rocket Research Institute) on Lüneberg Heath. There they joined another group of German scientists and engineers who, for a further 6 months, worked on combustion problems under the control of the Ministry of Supply, officially until the end of June, although work continued until late in the year.

The principal German personnel at MOS Trauen, as listed in Reference 9 were:

From Peenemünde
- Botho Demant, Chemist
- Norbert Luft, Chemist
- Walter Reidel, Engineer
- Dr. Zimmerman, Electronic Engineer

From Walterwerke, Kiel
- Jürgen Diederichsen, Chemist
- Willi Kretschmer, Engineer
- Johannes Schmidt, Engineer
- Hermann Treutler, Engineer

and from Trauen itself
- Mr. Zohrer, Chemist
- Hans Ziebland, Engineer.

These specialists were first required to produce detailed reports on the work they had carried out during the war. They then conducted small scale experiments under the supervision of Ministry of Supply staff. The program covered propulsion chemistry research utilizing the three main oxidizers—oxygen, hydrogen peroxide and nitric acid—and heat transfer experiments. Many reports were issued at Trauen and, according to Murray, all the leading German personnel from Trauen and a selected number of assistants were offered contracts in Britain. Most appear to have accepted, and the only specialist listed as one of the principal Germans at Trauen who did not arrive in Britain was Herr Zohrer. It also appears that the French made contact with, and hired, many German personnel who had worked for the British at Cuxhaven and Trauen.

The Barrow Group

This was the first group of German rocket specialists to arrive in Britain, although it must be stressed that they did not come here to do rocket work. The firm of Walterwerke, Kiel, in addition to rocketry also made important contributions to submarine technology, particularly in the use of hydrogen peroxide in the propulsion system. In a manner similar to that employed on a rocket, a supply of hydrogen peroxide was carried onboard the submarine to provide oxygen to burn the fuel whilst submerged. This was seen by the Germans, British and the U.S.S.R. as a wonder fuel, which could provide a submarine with a high velocity but short duration sprint capacity while submerged. Before the end of the war, British exploitation teams, including the infamous 30 Commando Assault Unit headed by Ian Fleming of James Bond fame, entered Kiel with the aim of acquiring German personnel and material to assist with British submarine development work.[10]

The result was seen late in 1945, when the German cargo ship, *Elizabeth*, arrived at Barrow in Furness, bound for the firm of Vickers, carrying equipment from Kiel and accompanied by a German experimental hydrogen peroxide submarine that had been scuttled at the end of the war. This was later commissioned into the Royal Navy as HMS *Meteorite*. Then, in January 1946, 6 German engineers, led by Hellmuth Walter, Director of the firm of Walterwerke, also arrived at Barrow. The team comprised, in addition to Walter:

Hermann von Dohren, Chemist
Erich Kalckschmidt, Chief Test Engineer
Helmut Lensch, Aircraft Rocket Side of Walterwerke
Gunter Oestreich, Design Engineer
Heinz Ullrich, Submarine Engineer.

According to Mrs. Marietta Oestreich,[11] the group had no alternative but to work in Britain, although the feeling was that they were just grateful that they had not been taken by the Russians. They were housed in a rather grand old house, Rocklea, and their arrival aroused mixed feelings among the local inhabitants. On the one hand an article in the *Barrow News* of 12 January 1946 reads:

> Horror at the installation of the German technicians in Barrow was unanimously expressed at a meeting of the Barrow Townswomens' Guild on Monday. Members agreed on an opinion that the Government were very ill-advised to think for one moment that such recent enemies could be trusted to reveal anything worthwhile. In any case, it was demanded, why house them in more comfort than the majority of Barrow citizens.[12]

Then, a week later, another article reporting on the visit to Rocklea by the local Member of Parliament states that:

> . . . . I found it (Rocklea) was an ordinary standard Admiralty hostel, furnished as such. . . . I enquired of the Germans as what were the reactions of the Barrow people to them. They said they found tradesmen courteous and cooperative and their general treatment in the town most hospitable. In the circumstances I think we ought to recognise that to establish true international relationships which is (sic) so essential for the modern world, we must foster a spirit of goodwill and not a spirit of prejudice and malice.[13]

The team was put to work on a site separate to the main Vickers works at ADEB (Admiralty Development Establishment Barrow). They brought with them considerable experience with handling hydrogen peroxide which was to prove their main benefit. They were effectively kept separate from the British development team working on our hydrogen peroxide submarines and were used principally as advisors and consultants. They were certainly not integrated into the ADEB team, and there is a suspicion voiced by Harold Verity, Chief Draughtsman at ADEB, that the German engineers were not always as cooperative as they appeared. There was also a measure of tension and distrust between Forsythe, the British Head of ADEB, and Walter, according to Standen who worked at the Establishment.[14]

After 6 months, the team collected their families and, if there had been any widespread bad feeling against the Germans when they originally arrived, it had vanished by the time their families turned up at Barrow. This might have been influenced by the unofficial entrepreneur activities of von Dohren, who made perfume and sold it to ladies of Barrow. Mrs. Oestreich also remembers fondly the kindness of Mrs. Flannery, housekeeper at Rocklea, who helped her so much when her first child was born three weeks after arrival at Barrow.

But, by the middle of 1948, it was felt that there was nothing further to be learnt from the Walterwerke team, and moves were afoot to find them other employment. At the time, the policy of denying the services of German engineers to Russia was in force and, although it appears that Britain was prepared to find other employment for von Dohren, Oestreich and Lensch, neither the British nor the U.S. Military was particularly interested in the other three. It was, however, stated in a letter by a Group Captain Newell at the British Joint Services Mission in Washington that "it is considered most undesirable that any of this team, particularly Walter, should return to Germany where they might fall into Russian hands and become a possible threat to the security of the U.K. and U.S."[15] In any event, Walter did move to the U.S.A., four others of the team returned to Germany, and only Oestreich remained in Britain.

The Westcott Group

Rocket development in wartime Britain was coordinated by Dr. Alwyn Crow, Controller Projectile Development (CPD) from London, and most of the work was carried out at the Projectile Development Establishment (PDE) at Aberporth in South Wales. Some work on liquid fuel rockets had been undertaken by Lubbock and his team under a CPD contract and by the Royal Aircraft Establishment (RAE) at Farnborough.[16] In April 1946, a new center, with responsibility for all aspects of British Army and Navy missile development, was opened as the Guided Projectile Establishment (GPE) at an airfield near Westcott, but following an intense power struggle, Westcott became a department of the RAE and, from early 1947, was concerned only with the development of rocket motors. This power struggle was not without its implications for British rocket development, as many of the major driving forces behind the establishment of Westcott, e.g. W. Cook and B. Elstub, soon left; but that is another story.

In November 1946, 10 German rocket engineers arrived at Westcott from the MOS Trauen. They were led by Dr. Johannes Schmidt, the engineer who had been in charge of the development of the Walter 109-509 hot thrust hydrogen peroxide rocket motor used in the Me163 fighter. The other 9 were:

Hermann Treutler, Physicist, Walterwerke
Jürgen Diederichsen, Chemist, Walterwerke
Gustav Fiedler, Design Draughtsman, Walterwerke
Johannes Frauenberger, Design Draughtsman
Heinz Walder, Experimental Engineer
Karl Meier, Experimental Engineer

Killed Nov 47

Walter Kolterman, Foreman/fitter
Walter Mueller, Design Draughtsman
Friedrich Jessen, Experimental Engineer

To these later were added:
Walter Reidel, Engineer from Peenemünde
Willi Kretschmer, Engineer from Walterwerke
V. Barske
Werner Schoenheit
Hermann Zumpe, Peenemünde - Wasserfall drawings - Westcott
Hugo Reichert.

These were initially housed in less than ideal conditions at Westcott but were soon allowed to bring their families across, and conditions improved. There appears to have been little of the superficial animosity which faced the arrival of the Walterwerke team at Barrow, and the Westcott group quickly integrated into British society and the work of the establishment. Reidel and Zumpe, for example, joined the British Interplanetary Society in 1948, and the first Westcott technical reports with German authors had appeared by October 1947. Events did not, however, progress smoothly for the German team. On 14 November 1947, their leader, Schmidt, was killed in an accident, when a German 109/510 RATO unit, that was being run in a test stand, exploded, causing the death not only of Schmidt but also two British technicians. This led to a redesign of British rocket test stands, but it was also a distinct setback to lose probably the most talented German in the team.

There is little doubt that it was this group of Germans, based at Westcott, who were to have the most influence on British rocket technology between 1945 and 1955. This influence can most clearly be seen in the development of the early British Alpha, Beta and Gamma motors, all of which used hydrogen peroxide as an oxidizer. Later versions of the basic Gamma motor were used in the large British Black Knight and Black Arrow rockets. It is no coincidence that at least five of the Westcott Germans—Schmidt, Diederichsen, Fielder, Kretschmer and Treutler—had arrived from Walterwerke bringing extensive hydrogen peroxide experience with them. Although some of the Germans, e.g. Barske (turbopump development) and Reichert (combustion stability) had left by the mid 1950's, most remained to make their career in Britain, and their input can be seen via their published work, which continued well into the 1960's. Diederichsen, Treutler and Walder all made contributions to injection technology, and Reidel, Schoenheit and Kretschmer published extensively on combustion chamber technology. It is also important to note the input of Kolterman, who was not a scientist or engineer but was an expert welder, and his experience proved

invaluable, especially in the early days. But in general, the work of the Germans tended to be routine rather than spectacular. They were employed individually or in small teams working on specific technical developments, such as injection systems and turbo-pumps, rather than being kept together to work as a team. Their visible influence was not as marked, therefore, as in France, where some of her early guided missiles bear a strong resemblance to German designs.

The Royal Aircraft Establishment, (RAE) Farnborough

This was the largest aerospace R&D establishment in Britain, and it had taken an active but secondary role in British rocket development during the war. Staff at the RAE had worked on various rocket applications, such as rocket catapults for launching fighters from merchant men on Atlantic convoys and, by the end of the war, had commenced development of primitive guided missiles and test vehicles.17

The main thrust of the RAE's exploitation of German technology was on the aviation front. In July 1945, the Air Ministry had initiated Operation Surgeon, primarily aimed at extracting as much information as possible from the specialists and equipment at the prestigious Hermann Goering Institute, the German aviation research establishment at Braunschweig. This was in the British Zone and, although the establishment had been vandalized by liberated POW's and had also received the attention of U.S. troops, we collected some 80 Germans, who were put to work there writing up reports of their wartime work, etc. Much engineering hardware, particularly wind tunnels, was also returned to the U.K.

Late in 1946, 26 German aviation experts were offered contracts in Britain and transferred to the RAE. Others followed later. Many of these were engineers of the highest caliber, including Adolf Buseman, who came on a short term contract and quickly left for the U.S.A., and Hans Multhopp, of Stuka fame, who made important calculations on swept wing designs before he, too, moved across the Atlantic. Others stayed at the RAE to make notable contributions to British Aerospace technology. Predominant among these was Dietrich Kuchemann, from the AVA Gottingen, who, with his German colleagues Johanna Weber and Karl Doetsch, played a leading role in the design and development of the Anglo-French Concorde supersonic transport—an aircraft of such aesthetic quality that even today heads turn as it passes overhead. Kuchemann has been described as becoming more British than the British. He became a naturalized British citizen, was made a Commander of the Order of the British Empire (CBE) in 1964, and rose to become Head of the Aeronautics Department of RAE in 1966. There is no doubt that German aerospace engineers made a highly

significant contribution to British aircraft development after the war, and also, incidentally, to the cultural activities of the area. Both Kuchemann and Mangler were leading lights in the Farnborough and RAE Orchestra, Kuchemann on cello and Mangler on violin.

The situation is not so clear, however, regarding the contribution of the German rocket and missile engineers who came to RAE in 1946/47. It has even proved difficult to establish the exact number of Germans with rocket and related technology experience who came to the RAE after the war. A list of all German specialists employed (124 in all) in British Defence Establishments as of 14 January 1948 indicates 38 personnel as having guided missile or rocket propulsion/fuel expertise, not including the Barrow group.[18] Of these, 15 were located at RPE Westcott and 5 at Waltham Abbey. Of the remaining 18, only 12 can definitely be linked to the RAE through their publications, etc. These are: Karl Buchs, Martin Eichler, Wilhelm Elfers, Siegfried Entres, Oswald Lange, Joseph Linke, G. Pieper, Fritz Rockstuhl, H. W. Roehr, Karl Schirrmacher, Theodore Schmidt and Rudolf Ulrich.

Most of these were employed in the Controlled/Guided Weapons Department at the RAE and, as with the group at Westcott, the Farnborough Germans were not kept together as a team to work on one particular project, but that they were spread over the various activities of the Department. There is also an impression that, initially, the German specialists were kept in the background and were not fully integrated into the work of the projects. This view is supported by the fact that it was not until the 1950's that RAE technical reports, written by the Germans, appeared in any numbers. There are, however, exceptions to this—for example, in 1948 and 1949, Wilhelm Elfers and G. Pieper were publishing on simulation studies of air to air and anti-tank missiles.

Many of the Farnborough Germans stayed and made their careers at the RAE, later in 1962, joining the newly created Space Department. Three in particular—Entres, Schirrmacher, originally from Telefunken, where he worked on the radio control of Wasserfall and Enzian, and Ulrich—made long term contributions to British rocket and guided missile technology. In the Guided Weapons Department at RAE, Schirrmacher worked on control and guidance systems for missiles and test vehicles, including the RTV1, before becoming part of the launcher division of RAE working on Black Knight and, later, the ELDO vehicle. Entres, after working with Ulrich on reliability and simulator problems, eventually left RAE to work at the headquarters of the Department of Trade and Industry. Whilst there, he was largely responsible for enabling the Space Department at RAE to enter the Earth Resources field. However, without wishing to belittle the important work that these, and the other German rocket specialists carried out individually, their input and influence was not exceptional. Accord-

ing to at least one source who worked with the German rocket specialists at RAE, "it did not matter materially whether the Germans were there or not, none of them were anything special."

Waltham Abbey

Another British establishment to employ German rocket expertise was the old Royal Gunpowder Factory at Waltham Abbey, a few miles NE of London. Waltham Abbey has a long history including several legends linking its gunpowder to the Battle of Crecy in 1349, the defeat of the Spanish Armada and the Guy Fawkes plot of 1605.[19] The Royal Gunpowder Factory had ceased to be an explosive production site by the end of 1943, and it was formally closed on July 1945. In October 1946, the site was occupied by the Chemical Research and Development Department, an outstation of the Armament Research Department at Woolwich. In 1947, the name changed to the Explosives Research and Development Establishment, whose program of work included rocket propellants, particularly liquids.

Several rocket test stands were erected on this site, and to the Establishment came five German rocket men, all of whom had been employed at MOS Trauen early in 1946. In the Establishment's complement list of 22 December 1947, these five Germans comprise some 20% of the technical staff.[20] They were:

Botho Demant, Chemist from Peenemünde West
Norbert Loft, Chemist from Peenemünde West
Franz Neunzig - HTP
Hans Ziebland, Heat Transfer expert - stayed
Gerhard Muller, Described as "only a very competent scientific assistant."[20]

It appears from existing records that the work of this German group was highly respected at a very early stage. For example, when Hans Ziebland asked for a pay raise at the end of 1948, his supervisor reported:

> Ziebland is making a first class contribution, both theoretical and practical, to fundamental studies of the physical and physico-chemical behaviour of gases at high temperatures (and of liquids at low temperatures) bearing particularly on the problems associated with cooling the rocket motor. On the subject of heat transfer no other scientist at this establishment possesses his wide knowledge; his familiarity with engineering design and past experience of Proofstand work in Germany are also exceedingly valuable.[20]

Earlier, in November 1948, his supervisor had stated that "[Ziebland] is of outstanding ability and is satisfactory in every other respect. We regard him as an essential member of our research team."[20]

Neunzig worked on hydrogen peroxide applications for torpedoes for the Admiralty Experimental Station at Welwyn, linked no doubt to the submarine work at Barrow, and on the thrust unit for the Vickers transonic aircraft of 1946/48.

But, as with other Civil Service Establishments, by 1950 a decision had to be made about the long term future of these Germans. Luft and Muller returned to Germany, Demant obtained other non-rocket work in Britain, and Neunzig, it is believed, emigrated to Australia. Only Ziebland remained to continue his work in England at Waltham Abbey. He published extensively in Government reports and in the open literature on his specialist subject of heat transfer, collaborating with the Rocket Propulsion Department at Westcott, and he received special merit promotions within the British Civil Service to enable him to continue with his technical work unhindered by administration duties.

Conclusion

So, what was the influence of the 35-40 German rocket specialists who came to Britain after the war? Three points need to be made:

1. Britain acquired no charismatic German rocket experts who were able to stride the stage as von Braun was to do in the U.S.A. and, to a lesser extent, as did Kuchemann in the aerospace field in England.

2. It is a gross generalization to imply, as does Tom Bower, that all the rocket specialists who came to Britain were second raters.[21] Most of them, it is true, were just good, general engineers, but at least four were more than this. As mentioned earlier, Johannes Schmidt had been placed in charge of the development of the Me163B powerplant at Walterwerke when problems developed, Hans Ziebland was one of Germany's leading experts on heat transfer as related to rocket motors, and Botho Demant was the chief chemist at the Luftwaffe Peenemünde West Establishment. Finally, there was Walter Reidel III, of whom Wernher von Braun himself is reported to have written ". . . is now working with the British at the Rocket Propulsion Establishment, where I hope his great talents are being fully utilized!"

3. Most of the British Germans did not come from Peenemünde, especially when that establishment is thought of with reference to V-2 development.

These German rocket specialists did have some influence on British post war rocket technology. They brought with them previous experience, which was

useful in itself, and many of them had wide expertise on the use of hydrogen peroxide as an oxidizer. As related earlier, this was a factor in the decision by the British to use this oxidizer in their early Alpha, Beta and Gamma rocket motors.[22] Also, in the immediate post war period, the design of the rocket test stands erected at, for example, Westcott and Waltham Abbey, owed much to German knowledge. However, in the longer term, German influence on British rocket and missile work was minimal. The Germans that remained, less than half of them, found niches in the British Scientific Civil Service and produced competent but unexceptional work.

The Germans at the various establishments were treated in different ways. Vickers at Barrow got rid of them all before 1950, Waltham Abbey retained only 1 of the 5 they received, about half of RAE's and a majority of the Westcott Germans remained. It is difficult not to conclude that the British did not make as much use of the German rocket expertise as they might have done.

Sharpe has written that "of the 20 Germans from Peenemünde who went to work for the British, including Dr. Walter Reidel, the highest ranking amongst them, little of real value was gained. They were simply too few in number and not employed on a team with specifically set goals. Additionally they lacked the resources for the facilities to pursue advanced work in the field of rocket technology."[8]

Apart from the fact that we did not receive 20 Germans from Peenemünde, Sharpe's analysis has much truth in it. Our German team was fragmented, our resources were limited, but over and above this is the feeling that we were going to do all our rocket work from scratch. The British industrial effort on rocketry, that began at Armstrong Siddeley, Ansty and at de Havilland, Hatfield in 1946 and 1947 made very little direct contact with the German specialists, and any information they received came second hand. There was also little or no cross feed between the German teams at Barrow, Westcott, Waltham Abbey and Farnborough in the early critical stages, when such interaction would obviously have been fruitful.

This lack of foresight in using available resources was also true in other missile related technologies. A good example is the development of an inertial guidance system, so crucial to modern day missiles and rockets. In the late 1940's, Britain had the services of two of the main German specialists in the field. Johannes Gievers, Director of Development of the firm of Krieselgeräte, was installed in an Admiralty laboratory at Teddington, with 10 former colleagues, to work on inertial sensors. However, according to Mackenzie, his employers, the Admiralty Compass Observatory, were not enthusiastic, and, in 1950, the team were allowed to return to Germany.[23] The other specialist was

Dr. Siegfried Reisch from Siemens, who went to work at the Royal Aircraft Establishment at Farnborough, but nothing came of his work either.

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