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Treason Case Number 3418

1996. Fifty years have passed. Very few Norwegians other than members of the family recognise the name of 'Rolf Widerøe.' But *one* person remembers him. Tor Brustad at the Radium Hospital in Oslo cannot forget the man in the white coat with a screwdriver in his pocket, standing on his head in the radiotherapy machine. The retired professor thinks now as he did then as a new employee, that there is something odd about Widerøe's reputation. So unrecognised in Norway and so acclaimed in professional circles elsewhere. Now he wants to get to the bottom of the matter, find the truth. There must be somebody or something that can explain what wrong this man had done. He was imprisoned, but what was the crime? Setting popular rumour aside, why was he sentenced? He wasn't a member of the Norwegian Nazi *Nasjonal Samling* party.

So what had he done to help the German war effort? Was it true that he had taken part in making weapons for them? Brustad the academic did what he usually did; sought out original sources. He went to the National Archives to look at the case documents.

Before describing what he had found on the shelves in the archives, Brustad indicated the background picture of the public mood in Norway after five years of occupation. There was ill-feeling towards everything to do with Germany and Germans. This ill-feeling was also directed against Norwegians who were known to have collaborated or suspected of having collaborated with the Germans. Brustad was old enough to know about this. He was just 20 when freedom came, and two generations later he felt the need to remind people of the particular atmosphere of that time. He had

taught so many complacent students who had been born after the war. It had been difficult in those days to be unmoved by the public mood, and it was still difficult for those who had lived through it. He felt it himself.

So he took this into consideration when making his own assessments, and helped younger generations to increase their awareness. At a time when the author Knut Hamsun was still controversial, the name of the opera singer Kirsten Flagstad still had undertones and Hanna Kvanmø's 'youthful sin' of serving in the German Red Cross on the Eastern Front had still not been forgotten; at a time with more books about the Second World War than ever before; at a time when the film about resistance hero Max Manus was inspiring new, young admirers who were beginning to become interested in their parents' and grandparents' wartime experiences, finally the time was ripe to approach the delicate topic.

In 1996, the year that Rolf died and half a century after the case against him was concluded, Tor Brustad asked the authorities for access to the documents. Yes, that's fine. The National Archive would allow access to the specified documents if the family agreed. The family answered 'Yes.' Go ahead. There was nothing they wanted to hide.

The case against Rolf appeared to have been considered in thorough detail. The folders on treason Case no. 3418/45 contained several hundred pages of documents stamped as confidential. So far as he knew, nobody had looked into them or browsed through them since they had been archived. He had read Waloschek's biography of Rolf when it was published in 1993, but this had seemed only to increase the mystery and had made him even more curious to find out what had really happened. He wanted to know more and he decided to go through the documents one by one. He wanted to be clear about the whole sequence of events throughout a year and a half, the 18 months from May 1945 to November 1946.

What was in the formal case papers? What dictation had secretaries typed onto sheets of thin typewriter paper with carbon copying paper in between? What other documents were appended and what collected statements had been included? Had Rolf himself submitted any written statements? Who had been involved? Were they Norwegians? Or Germans? Or Allies? Brustad was hunting for the plain facts of the case. Interpretation, possible moral condemnation or defence, doubt or belief could follow later. The business now was to unearth whatever documented facts were buried in the papers in the National Archives case-folder. The only things he really knew were that Rolf had been in prison, as Rolf himself had said, and that somebody had reported him, which he had also said. Professor Brustad started from

the beginning, following step by step as the case had gone through the legal processes.

Reported

It all started with a sensational report alleging that Rolf had taken part in the development of the German V2 rockets that had been brought into use towards the end of the war. These had been Hitler's trump card, his retaliatory weapon, *Vergeltungswaffe 2*, as Propaganda Minister Goebbels called it. 3,000 of these ballistic missiles had been fired during the winter of 1944/45, causing many deaths and much damage in London and Antwerp. Rolf had come home from Germany to Norway in April 1945, several weeks before Norwegian liberation. On 20th April a handwritten, unsigned note was handed into Oslo Police Station. The note was rough and ready, but the allegation was clear:

Engineer Rolf Widerøe, *Norsk Elektrisk og Brown Boveri*, Skøyen, made important inventions in connection with the V-bomb. It was he who invented the gyroscope on the V2.

The complainant was alleging, in other words, that Rolf had developed the steering mechanism for the super-rockets. The allegation was very plain and could hardly be worse. The police and the prosecuting authority had to react. The case-file does not include the original hand-written note, but there is a typed copy signed by a witness. The note continued:

He was very well treated, was given everything he wanted, travelled frequently to Denmark and was for a time stationed at Peenemünde and in Hamburg where he built his things. He always travelled in German planes, and he was not allowed to travel via Sweden.¹

Arrested

On the basis of the anonymous report, an 'Order for imprisonment/charge/search/seizure' was raised soon afterwards. This was dated 23rd May 1945 and quotes the reason for the order briefly: 'Has made important inventions in connection with V-bombs.'

The very next night—the night of 23rd/24th May—the police came to his house in Røa, confiscated his passport and took him away. The note of the police decision read as follows: ‘Imprisonment for 30 days, as authorised in accordance with the decree 26/2–43 § 3–4–5–6.’ The transport order read: ‘Sent to Ila for imprisonment.’ Signed for the Chief of Police by a Junior Police Prosecutor.²

Remanded in Custody

Rolf was immediately remanded in custody at Ilebu National Treason Prison. The arrest order was signed by the detainee ‘Received 24/5 00.10 h.’

There were almost 3,000 prisoners in the camp. The Home Front and the Norwegian authorities had set up lists of people who were suspected of collaboration, and arrests had begun as early as 9th May. A total of 28,750 people were arrested. The first preparations for legal proceedings were started by the government-in-exile in London. Later denunciations were mostly made on the initiative of the leaders of the Home Front.

The day after his arrest, Rolf prepared a hand-written note replying to the questions that had been put to him. He began at the beginning. Here are the main points:

In autumn 1922 I invented the radiation transformer. (...) Graduated Ph.D. in Aachen in 1927 with an experimental investigation of this, which unfortunately gave a negative result. Kerst, an American, got the apparatus to work in 1940/41. In 1942–43 I made a number of inventions in this field that among other things significantly improved the performance and effectiveness. In this context, I should point out that the apparatus, which brings fast electrons up to a tension of many millions of volts, is exclusively of scientific interest. (...)

At the end of September 1943 I was visited by several German civilian gentlemen who asked me about these matters, claiming to be from an academic company specialising in research on X-rays. The following day, I was compelled to fly to Berlin. In Germany, it was made clear to me that from now on I was to work on these things with German factories. A contract was drawn up with a Mr. Hollnack, which I signed. Among other things, they promised to set my brother free from ten years of corrective detention. This promise was not kept. The relationship with Director Solberg was set up under a compulsory service order.

Then from October ‘43 to April ‘45 I worked intermittently on the development of the said transformer in Hamburg and later in Kellinghusen. A 15 MeV transformer was built and made to work. Immediately before the

collapse of Germany I was given permission to travel home and fortunately I was able to bring with me all the important documents relating to my work.

It is now my intention to complete a comprehensive presentation of this work and apply the results in Norwegian scientific research. I have referred to Prof. Hylleraas and Dr. Wergeland at the university. The latter described my work as enormously important for scientific research and said that this work must be saved for Norway. (...) Moreover, the Swiss firm Brown Boveri owns certain rights to these inventions. (...) I therefore request that I may have the opportunity to complete my work first. If this cannot be done at home (I can of course report daily if necessary), I ask to have my books and papers, so that I can work during the time I am held in prison.

I am willing to provide all the information that may be required for the resolution of my case.

Finally, I would like to mention that I do not recognise the reference to the V-bomb or other military matters. My work was of no significance for the war and could to some extent be described as scientific sabotage, as it diverted people away from war service and war industry.'

The document is signed: 'Yours faithfully, Rolf Widerøe.'³

On Friday 25th May he was called to a meeting at NEBB, by whom he had been formally employed right through the war. Director Solberg informed him in the presence of witnesses that he must leave the company. According to the director's own notes this was confirmed in writing there and then. The same day, Solberg sent a long letter to the criminal police.⁴ It is difficult to believe that Rolf could leave custody to take part in such a meeting, but whatever the truth of the matter we do know that NEBB immediately stopped paying his salary. However, this does not necessarily mean that he ceased having contact with the director and the company.⁵

A Defence Lawyer

Oscar de Besche, an Advocate to the Supreme Court from the legal firm Besche & Co., was appointed as defence counsel. Besche had formally requested this appointment in a rather long letter to the police, dated 16th June. In the letter, he wrote about Rolf, among other things, that 'What can be said about him must especially be that he was blindly interested in his subject and his science, without taking into consideration other factors that might have been more important.' A letter dated 20th June from the prosecuting authorities informed de Besche that his letter had been received, that an order for remand in custody had been applied for the same day and that

when the court session had been scheduled he would be notified to attend the hearing.

There is relatively little information in the National Archives about the defence lawyer's role in the case, and the firm of advocates, which is now part of the firm Arntzen de Besche, no longer has the papers from that time. Rolf has subsequently said or written almost nothing about him, neither how or why he was specifically appointed nor what he contributed to the case. From other sources, however, we know that Widerøe Airlines also used his services.

Charged

The formal charge was lodged a month after his arrest, on Wednesday 20th June 1945. It accused Rolf of contravening Paragraph 2 of the special Treason Decree that had been approved by the *Storting* (the Norwegian Parliament) on 15th December 1944. The legal document applying for judicial examination and order of imprisonment reads as follows:

Case no. 3418/45 AB—Dreyer

Widerøe, Rolf, b. 11/07/1902. Residence: Melumveien 8, Røa. P.t. Ila Prison
Treason.

Despatched with attachments according to the list of documents to Oslo Court of Examination and Summary Jurisdiction with application for a court hearing and an order of imprisonment to be imposed on Rolf Widerøe, b. 11/07/1902 in Oslo, residence Melumveien 8, Røa, *pro tempore* Ila Prison, as charged for contravention of the Treason Decree of 15th December 1944, paragraph 2 in that he:

- (a) worked in Germany as an engineer, thereby giving support to the enemy;
- (b) is suspected of having made an important invention concerning the V-bomb and made this available to the enemy.

The order of imprisonment is requested to be imposed in pursuant of str. prg. 240, Jfr. 228 pkt. 2 and 3.

For the police to be able to gather the best possible information about the punishable circumstances, application is made to request that the limit of the custodial detention be set at 120 days.

We ask to be informed if contrary to expectation the court decides that the accused must be released.

Oslo Criminal Police, Treason Department.
Oslo, 20/06/1945.

For the Chief of Police
Gustav B. Dreyer
Junior Police Prosecutor

The wording in the arrest warrant was: ‘Has made important inventions in connection with V-bombs.’ In the charge document this had been changed to:

‘Is suspected of having made an important invention concerning the V-bomb.’

This implies that involvement with the V-bomb was no longer regarded as a fact but had been moderated to a suspicion.

The arrest warrant was issued ‘in accordance with the decree 26/2–43 § 3-4-5-6,’ but the charge was based on ‘the Treason Decree of 15th December 1944, paragraph 2.’

Interviewed

Rolf voluntarily made statements to the police, even though a person who is being charged with an offence is not obliged to say anything and cannot be punished if he gives a false statement. Several of the interviews took place without a lawyer present, including one on 25th June when the note of the interview states, among other things:

The accused maintains that far from having helped the enemy, on the contrary his activity had diverted from the enemy’s war effort workers who otherwise would have served in the German military, especially two engineers who were excused from the armed forces to be his assistants. Regarding point 2, he firmly denies knowing about any invention being made available to the enemy.⁶

The note in the legal records continues with a standard pro-forma where the appropriate text is inserted in blank spaces (as underlined below):

On the basis of the above information there are reasonable grounds to suspect the accused of treason. The conditions for detention on remand under the law governing legal processes in criminal cases §240 cf. §223, 2 and 3 are considered to have been met.

Conclusion: The accused Rolf Widerøe is to be held in custody until otherwise decided by the court or the prosecuting authorities, though not beyond Monday 9th July 1945, within which time preliminary investigations must be applied for or prosecution instigated. The decision has been read out. The accused has been informed of his right of appeal. The court witness had no comment to add. The court rose.

So the request by the police for imprisonment for 120 days was not granted.

Released

Rolf now wrote several detailed requests to be released, including one that was presented to the preliminary court on 25th June. In this, he referred to a note he had provided at the police office in Kronprinsens Gate the first day after he had been arrested, and to the interviews in Ila Prison during the days following:

From these questionings it is clear that the accusations against me are totally unfounded, obviously a product of pure fantasy.

I can present completely valid written evidence of the work I did while I was in Germany. It will be apparent from the evidence that this purely scientific work had nothing to do with the war or war-related industry. This can immediately be confirmed by any expert. Therefore, in my opinion there are no grounds for a charge, nor for imprisonment. However, I am obviously keen for a thorough police investigation so that the circumstances can be clarified and so that I can be rehabilitated, but in the meantime in my opinion it is not necessary to keep me in prison.

As I pointed out to the criminal police, there are vital reasons why I must be released as soon as possible. I have worked on several inventions since 1922 and the results of my work are recorded in several patent applications that are now being submitted. If I cannot have these patent applications presented to the patent authorities as soon as possible I risk missing priority and thereby losing out on a whole life's work. I couldn't submit these patent applications in Norway while the Germans were here and I was on the point of completing them when I was arrested. This task requires collaboration with a patent authority and cannot be carried out in prison.

Moreover, I emphasise that the public interest requires my immediate release. My scientific works and results are of the very greatest importance for scientific research and it is vital that I come into contact with Norwegian scientists as soon as possible so that together we can utilise this work for Norwegian science. It would be sad if a continued, prolonged imprisonment here at Ila were to squander important and valuable research.⁷

In his first case document, dated 5th July and addressed to Gustav B. Dreyer the official in charge of the case, the defence lawyer stated that the inventions were of no military significance:

According to my enquiries it is quite clear that the inventions on which Widerøe was working were to do with instruments for scientific research in physics (mainly important for the treatment of cancer) and that they were of no military significance, at any rate for the ongoing war. It should perhaps also be noted that this was not a new field of research that Widerøe was going into, but the same topic that he had been working on for years prior to the war.⁸

On Monday 9th July, 47 days after his arrest, Rolf was released from remand, but with a requirement to report on Mondays and Fridays at Piperviken Police Station. There was no longer a risk of evidence being tampered with. The decision was taken in Oslo Preliminary Court and the release order written on 7th July.⁹

There was a long queue of treason cases. A year and almost four months passed. It was uncertain when the case would come to trial.

An Expert Committee Is Set up

Not very much happened in the case during that first autumn. The prosecuting authorities needed expert assistance to clarify what Rolf had been doing in Germany during the war. On 24th September a proposal was made to set up an expert committee. The mandate for the committee was agreed on 21st November and consisted of two parts: to establish what type of work Rolf had done; and to assess the importance of that work for the German war effort.¹⁰

Four members were appointed to the committee, all of them recognised scientists. Three of them were connected with the Physics Institute at the University of Oslo: Egil A. Hylleraas and Harold Wergeland, who were both professors of theoretical physics; and Roald Tangen, professor of nuclear physics. Wergeland and Tangen had worked on atomic and nuclear physics at what was then the National Technical College in Trondheim where they had taken part in the construction of Norway's first Van de Graaff accelerator, and in 1942 they had continued that work at the University of Oslo.¹¹ The fourth and youngest member of the committee was the astrophysicist Gunnar Randers, who at that time held the rank of Captain. Hylleraas was appointed chairman. Rolf had had previous dealings with all of them.

All the members of the expert committee had worked with the resistance. Tangen had been arrested when the university was shut down in the

autumn of 1943 and had been kept prisoner in Grini until August 1944. Wergeland had been a member of the secret organisation XU.¹² Randers had served with the Norwegian Defence Forces High Command, as a member of a panel recruiting Norwegian researchers and engineers to British military research.

In his recommendations for nominations to the committee, the official in charge of the case had noted that Hylleraas and Randers had both assisted the Norwegian Defence Forces High Command by serving on an expert committee to advise on the question of the atomic bomb. Randers had particularly relevant experience, having worked in Allied Security investigating German atomic research. He wrote that 'with the occupation of Germany the Allies obtained full information about Rolf Widerøe's work in Germany.' The case manager also recommended that 'the question of the utilisation of patent rights should also be taken up, with possible securing of these by taking out patents where this has not been done.'¹³ He also specified that two of the documents he was attaching were on loan from Captain Randers on the condition that Rolf Widerøe must not get to know that they came from him.¹⁴

The Committee's Report

On 14th February 1946, after four months work, the expert committee delivered its report. This was an eight-page document with two appendages of one and six pages respectively, making fifteen pages in all. The final text was drawn up by the committee chairman, Egil Hylleraas.¹⁵ The document is entitled 'To Oslo Police Office Criminal Division (Treason) 14th February 1946.'

The report started with a list of the case documents that had been sent to the committee: a 70-page submission written by Rolf in prison, explaining his scientific work; two articles published in *Physical Review* in 1941 by Kerst, the American who had been first to get a betatron to work; and a list of 10–12 different articles written by Rolf's colleagues and other German physicists. Six of these articles were by his assistant, Bruno Touschek.¹⁶

The experts approached their task from a historical point of view, starting with Kerst's articles which they considered as 'the basis for Engineer Widerøe's alleged inventions.' Then they quoted the lecture 'On the technical problems of nuclear physics' that one of the committee members, Tangen, had delivered at Oslo University, where he had referred to the American and Rolf, who was present, had 'come to know of Kerst's work.' The committee report presented this as a starting point and continued the story:

This apparently aroused Widerøe's interest enormously. He had in fact already (developing on some work from 1928) tried to build a high tension generator in 1927-28 using essentially the same principles – his idea is moreover said to date from as early as 1922.

—*regarding his motives: At least three*

The committee then discussed Rolf's motives for his scientific activity:

Evidently, Engineer Widerøe straight away took up the task of copying and possibly improving on Kerst's "betatron." Naturally, there were various motives for taking up this work. Widerøe undoubtedly had a purely intellectual interest in the problem. Second, he may have wanted to recover some sort of recognition as the inventor of the betatron, by improving the design. Third, he may have hoped to benefit from commercial use of patented inventions in connection with the betatron. This last motive even led to him applying in 1943 for German patents for his reputed inventions.

At the bottom of page 2 the report takes up the question of why Rolf's contact with Norwegian physicists was broken off during the war:

The case documents say that Mr. Widerøe discussed his invention with one of the committee members (Wergeland) in 1943. These discussions were confined to a few simple questions about the basic principles of the movement of electrons. Neither Wergeland nor others were any longer particularly keen to have too much to do with Widerøe. Widerøe had been an interested member of the Physics Society, where he had given a talk in spring 1941 on the electricity distribution system in Eastern Norway, and he had taken a leading part in supporting a collection for the re-launch of the Society's journal. On a couple of occasions, however, he made comments which showed that in addition to having travelled in Germany he was inclined towards German sympathies – or at least admiration. This was disappointing, and together with the threat about control of associations it led to the Physics Society later suspending his membership until the war was over. Because of all this, contact with Widerøe was stopped and the committee members did not know about his patent applications in Germany in 1943 or his later work in Germany until after the German capitulation when we heard that he had been arrested and charged.

—*regarding the betatron: His own attached papers*

In the next pages, the report outlines the scientific principles on which the betatron was built and discusses 'the experimental work in Hamburg.' It points out that after the building of the 15 MeV betatron 'Engineer

Widerøe linked his claimed inventions to purely theoretical proposals, with a view to a 30 MeV accelerator and another with a maximum voltage of 200 MeV.' The committee refers here to Rolf's own submission which has been presented to them. A more 'intensive evaluation' here 'would normally not be of much relevance to the case,' but the committee nevertheless includes it as an attachment to their report, on the following basis:

Widerøe and his defence lawyer have however tried to present his inventions as especially important, even for Norway's national interest. His work and his inventive ideas have indeed aroused considerable attention here at home, not least because of the Germans' interest in his projects.

The committee has therefore felt obliged to give a more detailed critical evaluation of his theoretical proposals in a special attachment. It has also given an explanation of each of his patent claims listed in the case documents.

—*regarding the patents: Of no interest to Norway*

The committee then considers the patents in detail and concludes that they cannot see 'that there would be any benefit to Norway in securing Engineer Widerøe's possible patent rights for the nation':

Engineer Widerøe's new Norwegian patent applications may be considered of little interest. His possible patent rights in Germany are obviously confiscated by the Allies and are now property of the Allies, and it is very doubtful whether the patent authorities can grant him new patent rights on the same ideas here.

Regarding patent rights priority over Kerst, the committee says that this 'can only be decided by physicists after the relevant literature has become available.' However, the committee does make a couple of points:

The committee considers it a nonsense for outsiders to try to obtain patent rights on technical details in connection with inventions that others have achieved and that are undergoing rapid development through the work of various researchers. In Widerøe's defence it can be pointed out that he considers himself as the real inventor of the betatron and that his own interests as an engineer are towards benefitting from his inventive talent economically and commercially.

The fact is however that Kerst is the first to have made clear the necessary and sufficient theoretical foundation for the betatron and to have constructed the first working betatron on that foundation. As his work has been published in one of the major physics journals and moreover includes a very comprehensive theory for acceleration of electrons by magnetic induction, which among other

things also includes such a special feature as the premagnetisation of the steering field, his prior rights in relation to any patent applications from others are undoubtedly very strong. We must also consider that any theoretical propositions from Widerøe that may be of interest have already been studied and tested.

—*regarding Rolf: Not professionally qualified*

About Rolf generally as a person, the report reads:

Apart from the patent rights and their value, Widerøe appears to think that by making his ideas available he could contribute towards giving the country a leading position in a limited area of atomic research. The committee wishes to warn strongly against this view. For the design of bigger and more expensive apparatus for atomic research, all the preliminary stages must be well known and all the plans must be evaluated from both theoretical and practical points of view. This can only be done by trained physicists, as happens in all leading countries and not least in America. Engineer Widerøe does not have the necessary qualifications to lead a project of this type.

Engineer Widerøe has a fertile inventive fantasy, but he has not demonstrated ability to explain his ideas sufficiently clearly or support his theories robustly. His unsuccessful attempt in 1928 depended on theoretical insights that were not yet available and that did not become available until 1941 following Kerst's work. But even with knowledge of this rational basis, his theoretical explanations are very complex and unclear, even though – as it would appear – he has had considerable help from German fellow-workers in refining them.

His ideas are often alternative in that one excludes the other. The committee considers it doubtful whether he has prospects of progressing his ideas to the appropriate solutions for building a betatron himself. His most important contribution ought to be the premagnetisation of the steering field. On the other hand, in his explanations of the use of stabilising electric and magnetic lenses he comes to quite misleading conclusions.

—*on the question of guilt: We won't say anything, but*

On the next page the committee write that they don't want to have anything to do with the question of guilt:

'The committee of course wishes to have as little influence as possible on the question of guilt or innocence, which it thinks must be decided on the basis of approved judicial and human rights considerations that only the court is competent to decide. The committee does however consider itself obliged to provide such information and guidance as it can offer.'

—*regarding the V-bomb: Nothing to do with the V2 rockets*

In the next section the committee states that it has not found any connection with the V-bomb:

‘Even though one of the committee members (Randers) has taken part in the subsequent investigations in Germany, no information has come forward to indicate that Engineer Widerøe has had any connections with the work on the V-bombs. So the committee finds it reasonable to believe that what took up all of his time during his stay in Germany was the realisation of the plans for building betatrons.’

—*regarding Schiebold’s death-rays: One word against another*

The committee writes that the question of whether Rolf ‘has given support to the enemy’ is a legal-judicial matter, but it adds:

It is clear that Schiebold’s fantastic ideas about “death-rays” (to be directed against planes) must have been a contributory factor in the Germans’ decision to recruit Widerøe. Besides this, the wish to compete with the Americans in a new field that could be important for atomic physics and thereby possibly also for atomic weapons may have been part of their motivation.

Against this stands Engineer Widerøe’s claim that he only came to hear about Schiebold’s plans later and that he had always been clear that the betatron was of no military importance – plus the reality that his work in Germany (We are assuming that this was limited to the betatron.) was of no military use to the Germans. Another consideration is obviously how big a danger Widerøe faced in being appointed to this work and how adequately he assessed this risk.

—*regarding the background: Not significant*

Towards the end of their submission the committee takes up the question of how Rolf came to be in Germany during the war. The committee goes through Rolf’s explanation and indicates that this is one of the questions they consider to be outwith their mandate, but they do offer some thoughts on the matter:

Widerøe claims to have been taken to Germany by force. The committee considers the validity of this claim to be irrelevant. What is more important is Widerøe’s reaction when he arrived in Germany. He appears to have made only weak objections and at any rate not refused to work. On the contrary, he acquired very favourable contracts which according to the case documents resulted in payments amounting to 38,000 *Reichsmark* or presumably

double that sum in Norwegian kroner. According to further information from Widerøe himself, he has been paid about 150,000 kroner in total.

Widerøe's diary for 1943 shows that he corresponded actively with a German engineer called Sommerfeld and that he travelled to Germany several times in the spring and the summer of that year, presumably to prepare and arrange his patent applications. This must inevitably have brought him to the attention of the Germans. On the other hand, it also shows that, unlike others, he must have thought that German patent rights would be of significant value in the future. In other words, he must have hoped, wished or expected that Germany by one means or another would eventually win.

—*regarding his attitude: Unpatriotic*

The report ends thus:

The committee must therefore assess his attitude as unpatriotic. Apart from its view of the civil and economic value of Engineer Widerøe's activity, the committee finds the size of the payment strongly suggestive of military involvement. Whether these payments were made straightforwardly by the German state or disguised in the form of gifts of manufacturing licences, they must therefore be regarded as profits from the war.

During the course of the case, Engineer Widerøe has informed the committee about patent applications for new inventions. Having devoted so much time to advising on Widerøe's case, the committee cannot devote any more time to going through these new projects. Nor are they of any interest to the court, as they are new works that cannot have any connection with his work in Germany other than that they are to do with related problems.

For various reasons, the committee has put a lot of effort into coming towards the best possible assessment of the scientific value of Engineer Widerøe's work, and has also discussed this in meetings with Professor Trumpy and Engineer Odd Dahl from Bergen. The committee is however of the opinion that the technical and scientific value of his work should not have any influence on the judgement of his case, but that this should be done on the basis of purely judicial considerations. Therefore it also believes that further scientific discussion in this respect would be superfluous.

The document ends with the place and date: 'Blindern V. Aker, 14th February 1946'; and the signatures of all four members: 'Egil A. Hylleraas, Gunnar Randers, Roald Tangen and Harald Wergeland.' Two appendices are attached. Appendix 1 is the list of the articles referred to. Appendix 2 is a six-page document entitled About "the radiation transformer," written and signed by the committee members themselves.

The Committee's Conclusion

The expert committee concluded that no evidence had come forward to indicate that Rolf's activity had been connected with the V2 rockets. He had only worked on the betatron, which was of no military use to the Germans. They strongly doubted his professional qualifications.

The defence lawyer went through the experts' evaluation point by point. In a long document to the police office he stated that he would not enter any discussion of Rolf's professional qualifications, but just mention that 'It appears to me that the committee is taking unnecessarily strong sides for the American inventor Kerst, and even though the committee has such great admiration for this inventor, I think it is quite unfair to characterise Widerøe as an "outsider" in this field, with the rather derogatory sense commonly implied in that word.' He adds:

One can regard Engineer Widerøe's qualifications however one wants, but I consider it very significant that the world-renowned Swiss company Brown Boveri wants to work with him and that he is cited in most modern publications on atomic physics. Whatever view one takes, it is obvious that there are other opinions than the committee's on whether he can be expected to reach practicable results.¹⁷

He went on to write that Engineer Sommerfeld with whom the committee claimed Rolf had 'corresponded actively' was a 'fervent anti-Nazi,' and that 'his father, who was one of Germany's leading physicists, was dismissed from the university because of his opposition to the Nazis.' Sommerfeld jnr. was both an engineer and a patent advocate and through him Rolf 'could have his patent applications processed for use by Brown Boveri.'

Regarding the most important point, the question of whether Rolf's work in Germany had been of any importance for the war, he wrote that 'The committee's words should be clear and straightforward.' No evidence had been produced to indicate that he had been connected with the work on the V-bomb, and his work had been of no military value to the Germans. The defence lawyer maintained that:

So far as can be seen, the committee accepts the fact that Widerøe was taken to Germany by force in autumn 1943, and anybody who knows of his attachment to home and family will also be convinced that he would never have gone of his own free will.

He forthrightly rejects the charge of lack of patriotism. Rolf had not aided the enemy in any punishable way:

First, the work was entirely harmless. Second, what was done was largely carried out under compulsion. That cannot be the reason for any form of punishment. (...) Widerøe has always taken a clear standpoint regarding the Nazis, of whom he has always been an opponent. It may be that he has expressed his admiration for branches of German science. That was both unnecessary and unwise in time of war, but punishable it was not.

More Interviews

‘Not a member of the *Nasjonal Samling*’ is one of the pieces of personal information about Rolf in the heading of the report of an interview that took place in the office of the Chief of Police on 15th March. During the interview, Rolf explained the circumstances of the study tour he undertook in autumn 1941 with a group of Norwegian engineers, led by the German Director Schwartz whom he knew from his time in NEBB. He again states that his brother had been arrested that same year and condemned to ten years corrective detention.

I used the opportunity to send a plea for leniency to *Reichsminister Todt* through Schwartz, who knew Todt. Schwartz advised that to be able to recommend this application he would need to refer to some indication that I was favourably disposed towards Germany.¹⁸

Then he explains something he never spoke about during interviews later in his life:

After the study tour in Germany I had written a purely scientific article for (the Norwegian engineering journal) *Teknisk Ukeblad*, but Schwartz asked me to change it a little. I revised it then so that some of the sentences could be interpreted as showing me favourably disposed towards Germany.

I never got any response to the plea for clemency, but I did learn that it had been refused.

In this connection, I did also donate 80 kroner to NSH, but I know nothing about this payment coming to The Norwegian Legion.

In the meantime, the procedures for appointment to a post in Brown Boveri had been following their course. Rolf had travelled to meetings in Switzerland, and on 24th May the company confirmed in a letter that Rolf was appointed from 1st August. The letter was given to the police as documentation.¹⁹ Then in June the Foreign Affairs Department communicated with the police, asking to be kept informed. One of their people in Switzerland had contacted them to say that he had had news that the Norwegian Engineer Widerøe had lived in Germany during the war and had worked on 'special assignments.'²⁰

In connection with Rolf having been in Switzerland, the defence lawyer sent a note to the prosecuting authorities to remind them that Brown Boveri 'considered it of utmost importance to get started as soon as possible' on the production of his 'radiation transformer for cancer treatment.' He referred to information that Siemens, who had previously met 90% of the demand for X-ray apparatus, were now able because of the circumstances to deliver only about 5%. It was urgent, therefore, for Rolf to make a start. He also appended excerpts from the correspondence between NEBB and the Swiss parent company dated from spring 1943 onwards, 'which clearly shows and confirms what was maintained earlier, that Widerøe was in communication with the Swiss company before he moved to Germany in 1943 and therefore had no thoughts of exercising his patent rights in Germany.' A letter from NEBB to the advocate confirms that 'As early as 1942 Dr. Widerøe was seeking links with BBC for a collaboration on his invention.'²¹

On 4th July Rolf had a further interview with Police Prosecutor Dreyer. The prosecuting authority was still trying to establish whether there was any connection to German weapons research. The note of the interview states:

The radiation transformer could not have any relevance to atomic bomb research. Such knowledge about nuclear fission as one could obtain would be of no practical use. The interviewee had also discussed this with some scientists he had met in Hamburg who worked on atomic fission research, Dr. Suess and Professor Harnack, who had confirmed the interviewee's opinion, likewise Dr. Jensen.²²

The next point was salary and expenses:

The interviewee's earnings were arranged so that his NEBB salary of 17,750 kroner was paid to his family here in Norway. In Germany he got ca. 500 *Reichsmark* per month + travel expenses.

There was also discussion about the taxation of money he had been paid for patent rights, and about negotiations with BBC in Switzerland in spring and summer 1943 so that through Switzerland they could be registered in an English-speaking country. This possibility had been lost when the Germans confiscated the patents, and Rolf thought that this had significantly reduced their value.

Then he comes back again to talking about his brother and he also speaks about Theodor Hollnack, who had been the link person between Rolf and the Luftwaffe.

The interviewee stated that he was allowed to visit his brother several times in Germany. Hollnack managed to have him transferred to a better prison when he was poorly. Hollnack and Rolf W. visited him there too, and saw to it that he was well treated.

The report of the interview goes on to say that the application for clemency on Viggo's behalf 'was granted in February 1945 but came rather too late as he had already been freed by the Americans.' Finally:

The interviewee wishes to add that during the negotiations in Berlin in October 1943 the Germans also promised to release several of the NEBB officials who had been arrested. Of about 20 whose release was promised, only two were in fact released.

On 6th July the defence lawyer sent a new letter arguing that the confiscation payment by Rolf must not exceed 100,000 kroner. He was of the opinion that the case should be settled with the payment of such a fine and the prosecution should be waived.

I think this is typical of the sort of case that should be settled in this way. If Widerøe has come out of it badly, it is only because of biased scientific interests and his love for his brother. He has certainly never intended to be either a traitor or a criminal. He has surely been punished more than enough already. And I think there can be a role for him in the future.²³

A written statement from Viggo may also have contributed to the resolution of the case. This was addressed to the officer in charge of the case, Police Prosecutor Dreyer. Advocate de Besche had informed Viggo that the police wanted to interview him in connection with his brother's case. Viggo was

due to go to Stockholm the following day to start work in the airline, SAS. He wanted to send a written statement instead of meeting personally. If that was not sufficient, they could reach him at the address he gave. The statement gave factual information about his situation during the war and how Rolf had reacted to it:

I was arrested in May 1941, sentenced to ten years corrective detention in November and sent to Hamburg in January 1942. Was later moved to Rendsburg where my brother visited me autumn 1943. He told me then that he had been forced to work in a factory in Hamburg making high-voltage equipment.

I was later moved to Bützow where the conditions were very bad. I had had diphtheria and caught bronchitis and went down to 41 kg. (Normal weight 85 kg.) My brother visited me there too and asked –through the prison governor – for me to be given work out of doors, as cell life was cracking me up.

Soon after, I was sent to a work camp in Dieburg where the conditions were significantly better and where corrective detention prisoners were not usually sent.

Following a visit by my brother in summer '44, when he and a German called Hollnack spoke with the head of the camp, I was given work on a big farm and my health improved.

I also became the representative for all the Scandinavians in the camp and was thus able to help my comrades. Later, we were even allowed to receive packages.

Freed by the Americans 26th March 1945.

My brother's help, which resulted among other things in the transfer to Dieburg and the work out of doors, certainly led to my survival during these four years in prison.

My state of health from autumn '43 onwards was very poor because of confinement, illness and under-nutrition.²⁴

This statement, which was written as Viggo was on his way to a new job in Stockholm and was not available to attend in person, could have been a pro forma composition, a necessary gesture from brother to brother, something arising from the situation and without deeply felt intention. But it could also be deeply sincere. Only the two brothers themselves could know what lay behind the words. We don't know whether Rolf ever read the document or whether he even knew of its existence. Nor do we really know how it came about. One conceivable scenario could be that Rolf sat there and thought 'I need Viggo to confirm in a formal statement that I helped him; that will strengthen my case,' and then through the defence lawyer got

Viggo to write the necessary lines. Or the defence lawyer might have formulated it himself. Or another scenario: *Viggo* sat there and thought ‘Rolf needs my help now, I must confirm that his intervention was decisive for me,’ and then wrote and sent the statement.

On 31st July Viggo was back in Oslo and attended a meeting at Victoria Terrasse Politistasjon. ‘The witness was shown his letter of 8th July 1946 to Police Prosecutor Dreyer, which was read and accepted by him as his evidence to the police.’²⁵

The Main Charge Is Dropped

What next? A full year has passed. The experts have had their say. Their report was an important consideration for the prosecuting authorities in deciding whether or not to bring the case to trial in court. The defence lawyer has made his comments. Rolf has provided explanations. Witnesses have given evidence.

What happened was that the prosecution, in line with the expert committee’s conclusion, dropped the serious main charge, of having aided the enemy. On the second point, about the V-bomb, the committee had established that Rolf had devoted all of his time in Germany to the work on the betatron. The bomb was no longer mentioned. Here too, the prosecution followed the experts’ report.

There were two possible ways to deal with the remaining parts of the charge:

The authorities could decide to bring the case to court, either as a confession case (if the accused has admitted the charge) or for a full hearing with the case for the prosecution led by the police or by the state prosecutor.

Alternatively, the authorities could seek to avoid the time and cost of a court hearing by serving on the accused a document known as a *forelegg*. This document specifies the criminal charge against the accused person, the range of penalties prescribed by law and the penalty (usually a fine) proposed in this particular case. The accused then has the option either to accept the criminal charge and the proposed penalty, or to refuse. If he refuses, the case goes to a full trial. If he accepts the charge, pays the fine and signs the *forelegg* document, the case is concluded. The accused can then get on with his life, though now technically with a criminal record.

This latter method was and is commonly used in Norway for minor offences. At the time of the post-war treason trials the number of cases to be decided was so great that it was extended to deal with charges that would not in normal times be considered ‘minor.’

No Prosecution

The authorities chose the latter procedure, deciding that it should all be settled with a fine. One possible reason for this may simply be that there was a long queue of treason cases waiting to be resolved. Another may be that the official in charge of the case intervened. Also, the range of activities in the accusation had obviously diminished. The case did not come to trial in court.

In this instance, the official in charge of the case had come into play like a Joker in the pack. In a letter to the prosecuting authorities on 11th July 1946 he had laid out his proposals for the main details of the *forelegg* document. Tor Brustad tells us that the senior official thought that the case had now gone too far and that he added a personal note. He commented among other things on the size of the payment to be confiscated. During the work on the case it had appeared that Rolf would have received compensation of 140,000 kroner for the use of his patents. The official proposed that the confiscation should be reduced to 120,000 kroner, as he reckoned that 20,000 kroner should be subtracted in respect of expenses. He was also in favour of deleting both the section about loss of rights of citizenship and the fine.²⁶

Professor Brustad thinks the official’s reasons are worthy of note:

My possibly rather lenient attitude to Widerøe arises mainly from my opinion that he will be one of the more useful people to hold onto. Too severe a punishment might lead to him emigrating, or at any rate to working abroad, which would not serve the interests of our national economy. Also, the main serious charge has already been dropped.

In a note dated 22nd July to the official in charge of the case, The Chief of Criminal Police commented on Rolf’s contact with the German Sommerfeld. He pointed out that if the whole of the Sommerfeld family was as anti-Nazi as Rolf claimed, they would automatically have been put under observation, and that exchange of letters abroad would have been censored anyway. So one could assume that the content of any such correspondence would have been made known to the German intelligence service.²⁷

He recommended that Rolf's notebooks and private papers be carefully examined and that Rolf be asked to explain the various notes he had written in the course of 1943–1944.

If the result of this examination were to turn out in Rolf's favour, the confiscation should be kept at 140,000 kroner, plus a fine of 5,000 kroner. But if it were to be shown by these new enquiries that collaboration with the German authorities had been closer, the whole case should be taken up again, including questioning of Germans who were interned in Norway or imprisoned in Germany.

A little under two months later, on 14th July, the official referred the case back to the police chief again, commenting: 'I recommend a fine of 5,000 kroner and confiscation of 120,000 kroner, as it seems reasonable to me that his confiscation payment be reduced by 20,000 kroner in respect of various expenses he had incurred in Germany.'²⁸ Rolf was called into another interview on 5th October. The question at issue now was the money that had gone to the Norwegians fighting alongside the Germans on the Eastern Front. The report of this interview records that 'The interviewee (...) denies any knowledge that he had donated 100 kroner to The Norwegian Legion in summer 1941.' The connection was described thus:

The previously discussed group visit of engineers to Germany started in September 1941. The interviewee apparently first heard of the tour early in 1941. Schwartz in the *Reichskommissariat* had set up an arrangement for the delegates, whereby each of them could make a payment to him in Norwegian kroner. They would then be paid out spending money in Germany equivalent to what they had paid in, probably about 100 *Reichsmark*. The only explanation the interviewee can think of is that Schwartz may have donated 100 kroner to The Norwegian Legion in the interviewee's name.²⁹

Another month and a half passed, but then the prosecuting authority decided that it was not worthwhile to investigate the case further or call more witnesses. The *forelegg* document was drawn up.

***Forelegg* Agreed**

Rolf received, accepted and signed the *forelegg* document, well aware that an indictment of this type when accepted by the accused is legally equivalent to a conviction by a court. This formality was completed when he signed the document at Oslo Police Office on 2nd November 1946.

The document itself—form ‘LS. no. 13. Fine and limited loss of rights, with confiscation and compensation’—starts with the calamitous words about punishment for treason:

FORELEGG

Name: Rolf Widerøe, born: 11.07.1902, residence: Melumveien 8, Røa is hereby served a *forelegg* for punishment in accordance with the provisional decree of 15th December 1944, Sect. 3, cf. section 2 no. 4.

Then follow references to the relevant paragraphs, together with a list of the three points of the charge and finally the statement of the penalty:

The regulations in Sect. 2 provide:

Can be punished in accordance with this decree:

(Points 1, 2 and 3 are scored out.)

4.

Anyone who after 8th April 1940 has done anything that although not covered by the regulations 1–3 is within the scope of any regulation in criminal law ch. 8 or 9 or in the war articles in military criminal law, cf. criminal law Sect. 86 which sets penalties for anyone who during a war in which Norway is taking part supports the enemy with advice or assistance.

The regulations in Sect. 3 provide:

Crimes under Sect. 2 are punished with a prison sentence or compulsory labour of up to 3 years, fines, loss of civil rights, cf. section 11, or restricted loss of rights, cf. Section 12, or with a combination of these penalties. A ban on visiting specified areas can also be imposed as an additional penalty, cf. section 13.

The grounds for the *forelegg* are:

1. The accused wrote a propaganda article in *Teknisk Ukeblad* 16th April 1942 about the conditions in Germany and the effects of the Allied bombing raids.
2. The accused made a contribution of 80 kroner to the Norwegian Legion on 3rd May 1942.
3. The accused worked as an engineer with a German electrical factory from October 1943 until April 1945, using his patent rights to develop radiation transformers. As compensation for the utilisation of his patent rights the accused received 140,000 kroner.

The penalty is set at:

I. A state fine of 5,000 kroner:

In setting the fine, the fact that the accused has been imprisoned and/or detained in custody for 47 days has been taken into consideration.

(Sect. 8 of the regulations provides ...)

(Sect. 9 of the regulations provides ...)

II. Loss of the following rights:

- 1 Loss of voting rights in public affairs
- 2 Loss of the right to serve in the nation’s armed forces.

In pursuance of Sects. 15 and 16 of the regulation he is further summarily sentenced to:

Confiscation of illegal earnings of 120,000 kroner:

(Sect. 15 of the regulations provides ...)

(Sect. 16 of the regulations provides ...)

The grounds for the confiscation demand are:

The confiscation payment is in respect of earnings the accused received from the Germans for making his patent rights on the radiation transformer available to German interests.

(Sect. 25, part 1 of the regulation provides ...)

The accused is required to state within 5 days of receipt of this notice whether he accepts the *forelegg*. The acceptance can be submitted to: Junior Police Prosecutor Dreyer, Treason Dept., Victoria Terrasse 5/7, room no. 254, either verbally or in writing, with one copy of the indictment being signed and returned.

If the *forelegg* is not accepted, the case will be sent for trial in court. Within the same time limit as named above, the accused is required in that circumstance to name what witnesses he wants called.

The document is stamped 'Oslo Police Office' and signed by Junior Police Prosecutor Gustav B. Dreyer. On the same day, 2nd November 1946, it was signed by Rolf Widerøe with the signature witnessed by Dreyer.

The Points that Were Scored Out

The three points under 'Sect. 2 of the regulation' that were scored out and that therefore did not apply, are as follows:

1. Anyone who after 8th April 1940 has been a member of or sought or agreed to become a member of:
 - (a) *Nasjonal Samling* or an organisation connected to it;
 - (b) Another organisation that has worked contrary to any regulations in criminal law chapter 8 or 9 or in the war regulations in the military criminal law.
2. Anyone who after 8th April 1940 has supported such organisations as are named in no. 1 or supported punishable activities initiated by them.
3. Anyone who after 8th April 1940 has carried out or taken part in commercial or professional activity for the enemy in such a way or in such circumstances that the conduct may be considered improper. The conduct should generally be considered improper if, for example, the person carrying out the activity has initiated the relationship with the enemy or worked in close understanding with him or sought enemy help to hinder or impede investigation or legal action or has acquired other improper benefit or earnings or other improper advantages.

Point 4, which is the one that applies to Rolf, is a general category for activities that are not covered under the three points that have been crossed out.

In the final citation, punishment is imposed on Rolf not under the provisional regulation of 15th December 1944, Sect. 2, parts 1, 2 and 3, but under Sect. 86 of criminal law which sets the penalty for those who support the enemy with advice and assistance during a war in which Norway is taking part.

The Penalty

The signing of the citation ended the legal proceedings. Done. Case concluded. A fine, loss of voting rights and loss of the right to be a Norwegian soldier; that was the punishment. And the crime: an article in *Teknisk Ukeblad*; money to the Norwegians at the Eastern Front; patent earnings in Germany. Rolf said ‘OK,’ signed the form. That was that; or so he thought.

Having accepted the citation, Rolf got his passport back, though initially only with permission to travel to Zurich. And the first thing he did was just that; moved to Zurich—for good. He had gone there earlier that same autumn with his wife and children, and the family was already installed in a flat there. He had then returned to Oslo on his own to sort out ‘the past.’ The past could be left behind, he reckoned.

Over-reaction

Professor Tor Brustad, however, did not content himself with just studying the handling of the case and the writ serving the *forelegg*. He read through all the documents. His conclusions were sharply critical, especially of some parts of the expert committee’s work but also with the system for dealing with the case. His main conclusion was that there had not been grounds for Rolf’s arrest. Also, the time was by now well overdue to give Rolf his place in history as a pioneer of accelerator technology. In Brustad’s opinion, Rolf should now be considered cleared of the serious treason accusations and finally given his place of honour in the history of science.

Brustad made his factual discoveries and his personal assessment of them known at an international cancer seminar in Hardanger³⁰ in May 1997 and published them the following year in an article in the scientific journal *Acta Oncologica*.³¹ The academic community had now been informed, but the general public still didn’t know who Rolf Widerøe was, let alone anything

about the accusation of treason and the subsequent restoration of his reputation. This was the point that Brustad expanded upon in several conversations during the preparation of this book:

Rolf Widerøe's work in Germany during the war and the legal proceedings against him have cast far too long a shadow over what an excellent scientist and technologist he was. His capabilities earned him an honorary title abroad as 'the founder of accelerator technology,' but among us here in Norway he has become a mere footnote in the history of physics. It is a paradox that he is almost overlooked in his homeland. The main explanation for this lies in legal procedures based on false information about what he had been working on in Germany.

He criticises the members of the expert committee, saying that 'at the periphery of, if not to say beyond, their mandate' they had sown seeds of doubt even about Rolf's abilities as an inventor and a scientist. They disliked the fact that Rolf had pointed out in an interview that one of the committee members had earlier described his work as enormously important. So in their report they had down-played this expression, implying that the comment only applied to 'a few simple questions about the basic principles of the movement of electrons.'

Brustad shows them little mercy in his article:

There was a serious defect in the basis for Rolf's prosecution, and the record needs to be corrected. Right from when he was arrested in May 1945 and until the expert committee submitted its report in February the following year, the case was based on an extremely serious allegation that Rolf had developed the steering mechanisms for the fearsome German V2 rockets. In addition to the fact that the allegation came from an *anonymous* source and was the *only stated justification* for Rolf's arrest, it was also obvious that it was false, completely baseless. If the case against Widerøe had been managed in accordance with the basic principles of Norwegian law, the anonymous accusation would obviously never have been pursued. In that case Widerøe would almost certainly not have been arrested and in any event the whole case would have followed a different and more balanced course.

Brustad remained critical of the legal process, as his further comments show:

When it then also became known that Widerøe had spent all his time in Germany developing a working betatron, and that this work was of no military use to the Germans, it was clear that the whole process against him was an over-reaction by the authorities.

A completely opposite point of view was given by Finn Lied, former industry minister and long-serving director of the Defence Research Institute, when the case was referred to him a good 60 years later. His comment was short and sharp:

If Rolf Widerøe worked for the Luftwaffe, he got off bloody lightly.³²

Lied said that he knew of Rolf as a physicist and knew that he had worked in Germany during the war, but admitted that he did not know about the details of his activities, nor about the legal sequel in Norway. He was however quite clear about the punishment and he repeated gravely that if it was indisputable that Rolf was employed by the Luftwaffe, then the penalty—a monetary fine—was very slight in relation to the crime.

Brustad pointed out that the expert committee had significantly influenced the outcome of the case, particularly in an appended document that was pure physics. Here the committee casts doubt on whether what Rolf had done really was something new and tenable, or whether it was just wrong. The text is permeated with scepticism both about Rolf's professional competence in general and about his work building a betatron in Germany. For example, it says:

Though none of the committee members has been able to check all the complicated and obscure calculations about lens effects in this presentation submitted by Engineer Widerøe, one of the members has made separate calculations. These show that neither electrical nor magnetic lenses will provide any noticeable enhancement to a betatron that is already sensibly constructed. Contrary to this, Widerøe has ...

The committee's paper then continues with their own scientific explanation. In the three concluding sections they deliver a barrage of powerfully stated deprecations:

completely meaningless
 neither here nor there
 so has misunderstood the whole theory
 whether Widerøe or his co-workers appear to have been aware of the circumstance that ...
 complications that are altogether ignored in the presentation
 nor does he mention the question of how the discharges (...) could be avoided.

As if to seal the criticism, the final sentence delivers a decisive blow:

The idea of electrostatic lenses therefore appears so little thought out that it altogether cannot be taken seriously, quite apart from the errors in the calculations.³³

An Intelligence Officer Visits

Such a salvo of rejection and disapproval from professional colleagues makes one curious. What did they mean by this? Did they not understand, or did they not want to understand, or was that just what they did?

Before the expert committee was appointed and while Rolf was still sitting imprisoned in Ilebu, the Americans had been in the picture. An intelligence officer had visited Rolf in prison, and Rolf was released the same afternoon. The visitor was identical with one of the four who later became members of the expert committee. So we have another mystery.

The visitor was Gunnar Randers, who since autumn 1944 had been working for American military intelligence as part of 'Operation Alsos,' the code-name for the section of the Manhattan Project that was investigating how far Hitler's Germany had come with the atom bomb. He was based in Paris, but travelled round Europe most of the time. So one July day in summer 1945 Randers was in Ilebu State Prison, where he had come to find out what Rolf knew. There was a total solar eclipse that day, and the astrophysicist did not miss such a phenomenon. He had brought a smoked glass through which they could look at the sun. This may have softened the mood, but anyway Rolf interpreted it as a good omen. The eclipse was due to happen about one o'clock, and the two scientists were able both to watch the eclipse and to talk physics. Little did they realise that they would have more dealings with each other, and not just once.

Rolf has said that he told Randers about his work on the betatron, but apart from that no other details of the meeting are known, neither the reason for it nor what came out of it. Nor has any question been asked officially about the meeting and the release from prison. It could be thought that the visit was just a friendly gesture, visiting a colleague who was inside, and Rolf's release the same afternoon could be seen as just a coincidence. Or on reflection, it could be thought that the visitor might have had good contacts and perhaps put in a good word with the prison authorities or the police. As simple as that.

What only the initiated knew was that the conversation in the prison was written down word for word and sent to the USA. In the archive at The American Institute of Physics in Maryland, outside Washington DC, there is a thick folder labelled 'Rolf Widerøe Papers, 1942–1945.' Contained within this is a file on the outside of which Gunnar Randers has written by hand: 'Visit to Widerøe in Oslo, July 1945.' and 'Capt. G. Randers.'

Professor Brustad had hit the mark when he went through the material in the Norwegian National Archive and wrote in the article:

The Allies had for a long time been carrying out extensive investigations of all the German military research activity. Norway had been taking part in this and had been represented by Gunnar Randers, who at that time had the rank of Captain.³⁴

Brustad asserted that through this work Norway had 'had full surveillance of Widerøe's work in Germany.' The information about intelligence activity in research milieus was probably not so remarkable for a professor with long experience, and he didn't expand on it. Nor did anybody appear to be interested in the connection between Randers' visit and Rolf's release. Neither at the time, nor since. Nor did Rolf say much about it, other than that he thought he had been released thanks to Randers and his friend and colleague Odd Dahl, and assumed that the pair of them had managed to convince the authorities that there was no reason for him to be in prison while he was waiting for his case to come up. The only thing Rolf says about Gunnar Randers in the biography is that 'He had been given the job of speaking with me, probably because of the V2-rockets.'

The strange thing here is that nobody has followed up on what Rolf is on the point of saying, namely that the Allies knew of Rolf's dealings with the German weapons industry and that it was understandable that he was being investigated. And if it was the case that the Allies were aware, what would be the consequences of that? In what direction would that influence the question of guilt or innocence? Did it strengthen the case for finding him guilty or was it a mitigating circumstance? Nobody has looked into that. But even more, one must wonder why he himself didn't make more of it.

Did he not know better? Again we are faced with one of those questions of which there are so many about Rolf. I read through the text in the biography again and check what he has said elsewhere on the subject, including in an interview that Pedro Waloschek carried out when he was preparing the biography. Then I listen again to the recording of the interview and conversation that some young physicists arranged in Oslo when Rolf was 81 years

old.³⁵ I think about what Rolf says in the interview and what he allowed the author of the biography to write. I read the corrections and deletions in the drafts he was given to look through. What remains is content he vouches for, almost identical word for word in the book, on video and in the tape-recording. Like a lesson learned by rote. When I repeat the sentences to myself, an imaginary and slightly reproving dialogue plays out in my head as Rolf tells me about the time when Gunnar Randers visited him in the prison:

He came straight from America, tasked with finding out what was going on. I explained everything to him exactly, and he immediately understood that I had had nothing to do with Peenemünde. And obviously he then set about having me released.

So it was as simple as that, you were just released after he had been there? How was that possible?

I was given the opportunity to explain the circumstances around my work in Germany and – at least for me – it seemed to me as if we had got on well together.

You were set free the same day, but you didn't mention that. Why are you not clear about this? It would surely be an important thing to include in an autobiography. Was physics more important?

He had been in America for a while and had come back to Norway to go into astrophysics and nuclear physics.

That is what you are talking about! But don't you see that you are concealing his connection with American intelligence services by drawing attention towards physics and a new career in the homeland? Was there something you had promised to keep quiet about? Was there something the Soviets mustn't get to know about? And then the big question that I always come back to: Why did you not use this in your defence? Why did you not say "Listen, there are mitigating circumstances." Weren't there any? Or did you try such a plea? An intelligent man like you must understand that things like this give rise to conspiracy theories.

I never did get to say that to him, and there is now no possibility of having my comments repudiated. However, he had a good spokesman in Tor Brustad.

Biased

The professor at the Radium Hospital did not conceal his criticism of much of the expert committee's work. One could almost say that he bore a grudge against the whole committee, whom he considered were complicit in having

Rolf relegated to a 'footnote' in the history of physics in Norway.³⁶ He was particularly critical of the attitude that appeared to him to permeate the committee's report:

Unfortunately the committee was influenced by the feelings and attitude that were so prevalent in 1945-46 and were very negative about anything concerning working with the Germans.

He did however give the committee credit for one important point, namely that they did contribute to the clarification that Rolf had had nothing to do with the development of the German V-bombs. This point is worth looking into further. In his article Brustad summed up and commented upon it thus:

Despite the fact that the main conclusions in the report are scattered in different parts of the report and sometimes wreathed in long and difficult formulations, they can be summed up in three sentences:

1. Widerøe had had nothing to do with the V2 rockets.
2. Widerøe had used all his time during his stay in Germany on the work of developing a functioning 15 MeV betatron.
3. Widerøe's work in Germany had not been of any military use to the Germans.³⁷

Brustad commented further that even though these conclusions were inevitable the experts should be given credit for them, when one takes into consideration the resentful anti-German feeling that prevailed in Norway at that time. Nowadays, we know that point no. 2 is not entirely accurate. On this point the committee was too lenient, whether knowingly or unknowingly, and so was Brustad. For Rolf did in fact do other things. In a sense the committee was right, though, because the only machine that physically came to be built was the 15 MeV betatron, even though at the same time he was working theoretically on ideas for different and bigger machines. It is difficult to know how well the committee was informed on this matter.

Serious Omissions

Brustad also raised the question of why the experts had not mentioned some of Rolf's achievements, but seemed to be obsessed by what he had not achieved. Why did they say nothing about his success in constructing the world's first linear accelerator? His patent for the principle of colliding

beams? His patent for the basic principles of the synchrotron, which he worked out while he was imprisoned in Ilebu? Nor had the committee attached any importance to the fact that Rolf had taken out patents and offered to work with Norwegian authorities in giving access to the knowledge and information he had brought back from Germany.

Tor Brustad was of the opinion that even though the expert committee had detailed knowledge of Rolf's work in Germany, they gave only a vague explanation of why the Germans wanted to engage Widerøe in the betatron project.³⁸ He pointed out that only two reasons were given in the report. The first of these was that high-energy radiation produced in a betatron could be used to disable the enemy's aircraft. Brustad comments on this as follows:

The committee did not make it clear to the prosecuting authorities (who obviously were not knowledgeable about this technology) that these plans were totally unrealistic. How could a slender beam of radiation from a colossus of a 1944 betatron be aimed at an enemy aircraft flying high and fast? How could radiation of ludicrously low intensity for such a mission deliver a dose sufficient to kill the pilot and/or disable the radar system?³⁹

The second of the two reasons suggested by the committee, Brustad tells us, was that the Germans 'may have wanted to compete with the Americans in this new technology that might have been important for atomic physics, and indirectly for the atomic bomb.'⁴⁰ The committee left it to the prosecuting authorities to assess the significance of these two arguments. The report just said that:

It is clear that Schiebold's fantastic ideas about "death-rays" to be directed against aircraft must have been a contributory factor in the Germans wanting to secure Widerøe's talents for themselves. Besides this, the wish to compete with the Americans in a new field that might be important for atomic physics and thereby perhaps indirectly for atomic weapons, may have played some part.⁴¹

So in Brustad's opinion not only was the content of the committee's report biased; the omissions were equally serious.

Illogical

Brustad goes even further, pointing out flaws in the committee's logic. He thinks that the committee had implied, without presenting any evidence, that the German delegation had been involved in a possible military use of the project, and that they had insinuated that Rolf might have agreed to take part in something of this sort. Brustad maintains that such a suggestion

would have been firmly rejected by Rolf. It would in fact have been quite illogical for the delegation to ruin their plans by mentioning possible military applications. Rolf would have exposed the whole weapons project as nonsense and his confidence in the betatron project and in the negotiators would have been weakened. Mention of military aspects would quite unnecessarily have aroused Rolf's national feelings, which the Germans wanted to avoid.

Brustad considers that both the prosecuting authorities and the expert committee saw Rolf's participation in the Hamburg project as evidence of a lack of national loyalty. It seems as if the only excuse they could have accepted for agreeing to such collaboration would have been evidence that he had been exposed to threats or violence. Brustad expands on this view:

Rolf was so important for the German security services that they would never have allowed him to fall into the hands of the Allies. They knew all along that they would succeed in keeping him under control and working on his betatron project because they held the trump card, a partly concealed threat that would guarantee them success without having to turn to violence. If he had refused to collaborate on the project – let alone work with the Allies – or if he had omitted to return after visiting his family in Oslo, the security services would almost certainly have persuaded him to reconsider without delay. They would just have tightened the thumbscrews on his brother. So the security services would never agree to releasing Viggo from prison. By holding Viggo as a hostage they held control over his much more important brother. So the two brothers were hostages for each other.

Professor Brustad is in no doubt that the expert committee knew that the Germans' death-ray project was technically a hopeless wild goose chase. So all that remains of the reasons for the Germans wanting Rolf to work for them is the airy argument about competition with the Allies.

But the committee itself concluded that Rolf had used all his time in Germany on the development of the 15 MeV betatron, and that this work had been of no military benefit to the Germans. If the Germans' motive really was to engage Widerøe on a project of no military value, it is difficult to understand why he was appointed to lead the project and given authority to carry it forward as he wished.

Brustad asserts that Rolf had confirmed that he was in charge of the project, as shown by notes Rolf wrote to Oslo Police Office in answer to specific questions from the expert committee. In point 6 of document 15 the

committee asks: ‘What requirements did the Germans place on the results of the work?’ Widerøe replies: ‘No special requirements, except that the development should happen as quickly as possible.’ I was in charge of the science and technology.⁴²

In general, Brustad thinks that the committee report failed to answer many questions: Why was Rolf sent to Germany without apparent use of force?⁴³ Why was he so generously provided with economic, personnel and industrial resources? Why was he given so much freedom during his stay in Germany and such good opportunities to travel to and fro between Oslo and Hamburg? Indeed, why did he start working with the Germans at all?

What Happened?

With the benefit of hindsight, we can see that the experts’ report had a dramatic effect on the whole process. However, there must have been several other factors influencing the outcome.

Something happened between Rolf’s arrest in May and the *forelegg* in November of the following year. A man is arrested on suspicion of having helped to construct one of the world’s most dangerous bombs and ends up with a fine, as if it were a minor traffic offence. Even with a reduction the fine was considerably bigger than it otherwise would have been for a breach so slight that one just paid a fine. If the accused accepts the grounds and pays up, the case is now off the prosecuting authorities’ books.

Even though it was considerably moderated in relation to the initial denunciation, the charge against Rolf was still very serious. Yet it did not finally come to court. No official prosecutor arguing the case for imprisonment. No jury, no judge, no main hearing, no sentencing in court. After one year and six months it is all settled in the simplest possible way, with agreement to a *forelegg*. The Central Statistical Office’s official count of treason cases in the years 1940–1945 explains why this was a common way of resolving cases soon after the war.

A *forelegg* can generally be used for minor cases where the offence is punishable by a fine, possibly combined with confiscation. (See Criminal Procedure Law of 1st July 1887, ch. 287.) An agreed *forelegg* has the same effect as a sentence. The facility to conclude a case with a *forelegg* has been widely used in treason cases. In his letter of 25th November 1947 to the Ministry of Justice about the restriction of the treason settlement, the Director General of Public Prosecution says, *inter alia*: An important means of speeding up the legal

process by simplifying the procedure was the regulation introduced by law no. 2 of 22nd February 1946 about authority for the prosecuting authority to apply an agreed fine in preference to a prison sentence of up to 1 year.⁴⁴

Rolf was in the category eligible for a *forelegg* and a fine. He had been in prison for a month and a half, not under sentence but detained in custody awaiting prosecution. The final outcome of the case showed that there were no grounds for a prison sentence but that a fine was considered appropriate. That should have been enough to settle the matter, but why did the whole process start so viciously? Do we really know the whole story? Did the authorities know something that has been withheld from us? Rolf had undoubtedly been working on a project sponsored by the Luftwaffe. And he had earned money from it.

A long time passed between the submission of the expert committee's report and the prosecuting authority's decision on how to conclude Rolf's case. There is no known documentation to indicate whether this was just because of the long queue of cases waiting to be resolved, or whether his case was particularly difficult. There certainly was a large number of cases to be dealt with. Over 90,000 people were charged with treasonous offences. About 30,000 were arrested. It would inevitably take time to work through all these. At least half of the people who were charged under the treason paragraph, Constitution Paragraph 86, were given penalties, of which half were fines. In other words, a quarter of the cases concluded with a fine.⁴⁵

The Passport Question

While the legal case was proceeding in relative peace and quiet, the question of whether or not to return Rolf's passport was a big issue. He had been offered a position at Brown Boveri's head office in Switzerland, to lead the technical development of betatrons on an industrial basis. The firm wanted him to start the construction of a machine for the hospital in Zurich as soon as possible, and naturally enough they wanted to arrange a meeting. However, the Norwegian they were head-hunting had not only been imprisoned, but had had his passport confiscated and was unable to travel abroad even after he had been released.

On 1st March 1946 Rolf wrote to the official in charge of his case, Gustav B. Dreyer, asking to be allowed as soon as possible to travel to Switzerland to meet the Brown Boveri management. He cited two reasons in support

of his request. First, he couldn't start work on the betatron the Norwegian Radium Hospital had ordered until he had conferred with the laboratory in Switzerland about important details of the construction. Second, he needed to discuss matters concerning one of the patents in which there was great interest, especially from the USA.⁴⁶

The question of whether or not to return Rolf's passport would turn out to arouse much wider attention than the fact that he had been arrested for treason. He couldn't travel to any meeting at Brown Boveri in Switzerland without a passport, but it was difficult to get his passport back so long as the case against him had not been resolved. Tor Brustad points out the irony that while the Swiss were offering him an attractive research and development position on the basis of the competence he had built up through his work, the Norwegians were holding him under arrest for the same work and the same competence.

The Radium Hospital Intervenes

Around this time, The Norwegian Radium Hospital had started working on plans to acquire new radiotherapy equipment. High energy, accelerator generated radiation was the very latest thing in cancer treatment, and the director was determined that the equipment to be bought should be so advanced as to place the Radium Hospital in the forefront of the revolution that was about to happen in radiotherapy. The question was where to obtain the best equipment.

Together with the manager of NEBB he sent a letter to the prosecuting authorities, asking that Rolf be given the opportunity to travel to Switzerland to take part in a preliminary meeting about the development of new radiotherapy technology. They said that this work would be of great public importance, as it would lead to more effective treatment of many cancer patients.⁴⁷

The Official in Charge Intervenes

When Rolf heard about the intervention from these two, he sent further requests in the autumn and in the winter to have his passport restored. Brustad tells us about this and expresses amazement about what happened next.

The official in charge of the case then made a surprising move. He brought in the expert committee. The four scientists who had been appointed to assist the prosecuting authority with technical questions about physics were now also expected to express an opinion on the passport question. This created further dramatic complications. The committee advised firmly against all the applications and therefore opposed any release of the passport.

In the article Brustad quoted one of the replies from the committee, to 'illustrate the committee's attitude, both to the release of the passport and to Widerøe himself':

As will be evident from the committee's report, Eng. Widerøe's planned journey to Baden (Switzerland) should not be seen as of any public benefit, but merely as serving his own personal interest. The question of the passport is a police matter for which the expert committee will take no responsibility. The committee will however comment that such a visit would give Widerøe unrestricted opportunity to promote his view of the case – also regarding hypothetical Norwegian interests – among his foreign contacts. The request from Brown Boveri should undoubtedly be considered to have come about on Widerøe's own initiative.⁴⁸

The committee said that it wanted to have nothing to do with the question as it was a matter for the police, but then they offer their opinion and suggest that Rolf has orchestrated it all. Brustad then goes on to tell us of a new twist in the passport question:

Then the official in charge of the case at Oslo Police Office intervened. Again. For when it became known that the accusation of dealings with the German V-bombers were a fabrication, he decided that the whole case against Rolf Widerøe had been of such a minor character that he could on his own authority give permission for the passport to be released to allow Rolf to take part in his meeting with Brown Boveri.'

It is easy to imagine the ignominy and loss of prestige and public reputation that Rolf would have suffered if he had not been allowed to travel. His own prosperity, future job and respect and honour were at stake. So there can be no doubt that he set great store on being able to make the journey. It was just a matter of formalities – or maybe a little more than that. The point is that he didn't give up, and he finally succeeded. After repeated applications, several rejections and pressure from various quarters he succeeded in obtaining a temporary passport in spring 1946. Then after Easter he went on a two week visit to Brown Boveri's head office.

He was now concentrating more and more on making a start on the betatron he was to build for the Swiss, and he was beginning to become impatient with the slow progress of the legal case. On 7th June 1946 he wrote to the police in Oslo and Aker, asking that his case 'be resolved as soon as possible.' He said that he had had meetings with the senior doctor at the hospital in Zurich and that what the doctors had said was 'very alarming.' They anticipated that 'within the course of the next year there would be a catastrophic shortage of X-ray tubes for cancer treatment in European hospitals.' Siemens was unable to meet the demand for X-ray tubes. Before and during the war the company had supplied more or less the whole market, but because of the situation in Germany they could now deliver only about five per cent of their normal production. His radiation transformer could solve this problem, because the apparatus could 'replace at least 5–10 normal X-ray tubes,' and so it was 'of very greatest importance to be able to provide apparatus ready for hospital use as soon as possible.'

In his letter, Rolf also referred to the director of the Norwegian Radium Hospital, who thought that a modern radiotherapy machine should be installed there as soon as possible. He went on to emphasise that this was 'a case whose significance was not limited to Norway.' It affected many other European countries. He then ended his letter with a peroration:

Therefore I appeal to you to take into consideration the major humanitarian interests that are involved here and to make the best possible efforts to ensure that your work is not delayed. I ask for my case to be dealt with as soon as possible so that I can start the work in Baden in August this year' Signed 'Yours faithfully, Rolf Widerøe.⁴⁹

Not a word about the details of the case or its possible outcome.

Four weeks later he wrote another letter, addressed directly this time to the Chief of Criminal Police in the Treason Department, Lars L'Abée Lund. He attached a cutting from the newspaper *Neue Züricher Zeitung* about Brown Boveri's investment in his radiation transformer and wrote that it was very urgent for him to start on the work:

The construction of the apparatus has now reached the point where my personal presence is required and the company is therefore asking me to come to Switzerland as soon as possible. In this context, I urgently request you to speed up the consideration of my case as much as possible so that I can travel on 17th August with arrival in Baden on 21st August to take up my post as planned. Yours faithfully, Rolf Widerøe.⁵⁰

Nor is there here any attempt to argue or clear his name; just an appeal about the progress of the case so that he can move on.

He did go to Zurich in August. From there, he wrote to his defence lawyer to ask if it really was necessary for him to travel back to Oslo to be present at the conclusion of the case later in the autumn. If it was just a matter of formalities, could it be settled by the advocate and by letter? Then he took up the question of a permanent passport. The rest of the letter is about the apparatus he is working on and thinking about, planned to be of 1100 MeV and possibly to be built at the expense of the Swiss Government.⁵¹ His mind was fully on his work and he didn't seem to worry about being accused of treason. However, other people took a different view of his situation.

The Media Intervene

Now the only ingredient missing for the passport question to explode was the intervention of the media. Inevitably this happened, and not unexpectedly what lit the fuse was the visit to Switzerland. When it became known that a person who had been charged under the treason regulations had been allowed to travel abroad, there was an outcry. The members of the expert committee were pilloried, even though it was not they who had authorised the passport request. The problem was that people could believe the committee was responsible for the decision, and the committee members felt they had to clear their names as quickly as possible. No good Norwegians could tolerate lenient treatment of traitors. When it became known during the summer that Rolf had been issued with a passport vicious outburst erupted, not least in *Dagbladet*, against those the newspaper thought responsible, even though the Police Chief had made a statement to the press that the passport was only valid for travel to Switzerland, was only valid for one month and could not be extended.

It started with an article on 6th September, when *Dagbladet* demanded to be informed who had been responsible for Rolf being given his passport so that he could leave the country. Front page headlines declared 'Norwegian Nazi Atomic Expert Goes to Switzerland' and 'Fine and Confiscation Await Rolf on his Return Home.' The text continued very emphatically:

One of the things that we were *sure* during the war would *not* happen, that just after the war we *hoped* would not happen and that we now *fear* will happen *regularly in future, happened* recently. The authorities issued a passport to

a prominent pro-German, one of the many who have narrowly succeeded in avoiding prison. (...) Dr. Engineer Rolf Widerøe has travelled to Switzerland taking his whole family with him, and the whole of the Røa district, where he lives, is understandably in an uproar. From what *Dagbladet* understands, he has said that he hopes to emigrate to Switzerland and he has taken his car and equipment with him. But the police tell us that he cannot have his passport extended abroad and that he therefore has to come back.

Then *Dagbladet* refers to the pro-German article Rolf had written for *Teknisk Ukeblad* during the war. They point out that an active member of the Nazi Party had taken over as editor, and that submitting articles was considered by good Norwegians to be disloyal. The paper is sticking the knife in, but it does admit:

From the information available we cannot raise an action against him for spying, but he must answer to the law for his article in *Teknisk Ukeblad* and other sins, for which a significant fine and forfeitures can be considered.

The Experts Intervene

Now the expert committee joined in the action, engaging actively in the press debate. The chairman was worried that people would think that the committee had had something to do with Rolf getting his passport back. He wrote in *Dagbladet* on 11th September, making it clear that the committee was not responsible for this. This was front-page news again, under the headline ‘The Widerøe Case.’

Another committee member, Gunnar Randers, turned to the paper again on 17th September:

We have not recommended any travel. Nor is there any scientific justification for his visit to Switzerland. We recommended that he should be treated as a traitor and face the consequences of that. That was all we said.

That was how it was presented. Double-underlined. Nobody should be in any doubt. The committee had not recommended any travel. There was no important scientific matter that absolutely had to be attended to. Moreover, traitors must take the consequences of their actions. Highly respected men could not leave any grounds for doubt about where they stood on the case. Traitors were traitors. That was how it was.

Professor Brustad is very critical of the committee's intervention in the press debate:

It is worrying when members of an expert committee go to the press and engage in rather strong pre-judgement of the accused just before the case is due to come to court for final decision. This was particularly bad in light of the prevailing public mood during the treason trials, when the will to advance the accused's points of view was not given high priority.

No Mitigating Circumstances

Tor Brustad was also concerned about the human aspects of this time of stress and conflict. Nine months passed between Rolf's arrest and the submission of the committee's report, and a further nine months until the case was concluded. This was a time of continuous humiliation for Rolf and his family, and eventually all they wanted was to have the case ended as soon as possible, so that they could start their new life abroad. Brustad thinks that Rolf hoped his stay in Germany during the war would be understood as Rolf himself saw it: a humanitarian project of public benefit; a technological development to improve the radiation treatment of patients with cancer. Instead, his work in Germany was interpreted as a flaw in his patriotism. In support of this view, Brustad refers to the confiscation of income from patent licenses:

The normal procedure would have been for the tax authorities to assess both the initial and the subsequent taxation of extraordinary income and assets. This procedure was not followed. Instead, the prosecuting authority simply confiscated the income from about thirty of Rolf's patents.

Brustad also refers to the situation of Rolf's brother:

I think the fact that Rolf's desire to save his brother was not recognised as a *force majeure* is illustrative of the public mood at the time. None of the steps that Rolf had taken to bring about ameliorations in Viggo's prison conditions were recognised as mitigating circumstances. On the contrary, two of them were explicitly included in the list of charges in the *forelegg* document.

According to Brustad, Rolf's obligation to help his brother—which might have been the trump card in the case for his defence—appears to have

carried little weight with the prosecuting authorities. It does seem strange that Rolf does not appear to have used this argument. We may wonder whether he might have had an even better card up his sleeve.

Blackened and Scarred

Professor Brustad's clear opinion is that the expert committee contributed to blackening Rolf's reputation. He points out that the committee itself wanted to restrict its mandate and to have the least possible influence both on the outcome of the case and on the question of whether Rolf had assisted the enemy. However, the committee had not maintained its neutrality in these matters, as he asserted quite bluntly in his paper:

In the light of its mandate and of its self-imposed additional restrictions, I am deeply disappointed to have to state that the expert committee did not use only pure scientific arguments in their report, but unfortunately also inserted a number of subjective, very offensive opinions about Widerøe as a person: for example, it instructed the prosecuting authorities that Widerøe's work *till now* had not included anything *original* that was worth mentioning, and that *nor were there grounds* to believe that his future work with the betatron would be crowned with success, for as a *physicist* Widerøe was an *outsider*, with minimal understanding of *theoretical physics* and moreover with *limited ability* as a *manager*.

Fifteen to twenty years later, Brustad stood by his assessment and thought that the committee's severe criticism was much of the reason for Rolf's loss of reputation in Norway. He attributed heavy responsibility to the expert committee for the outcome and consequences of the treason case. He did that when he published his findings, and he still did it at the time this book was being written, even though he admitted that in the 1990s he may have gone slightly too far in his defence of Rolf and in his criticism of the committee. He admitted that he could have expressed his opinions more moderately, and that in his eagerness to find good arguments in Rolf's favour he might have been biased and blind to the counter-arguments. But that does not contradict the main conclusion from his findings in the National Archives. He stood by that, and it is noteworthy enough: The documents showed that Rolf had done nothing of military value to the Germans.

Brustad says that the experts also lacked relevant specialist competence:

We can take into consideration that the committee lacked competence in radiological physics and therefore didn't understand that by his work Rolf had made important contributions to revolutionising radiotherapy, an area of science that was directly related to the committee members' own special areas of nuclear physics.

He adds that the elements he criticises in the expert committee's report not only harmed Rolf but also reflect badly on the experts' own reputations and—what is worse—on the legal system itself:

Having studied the documents in the National Archives, it is with sorrow I maintain that both the parties involved in this case, both the legal system and Rolf Widerøe, emerged scarred from the process.

But What If ... ?

However, we can also consider whether the committee wrote as they did in order to *help* Rolf. Not everything should be taken literally when there is a war on. The report could also have deliberately been written ambiguously for a particular purpose. Professor Brustad in his stern criticism has either not identified or has chosen to ignore such an interpretation. What if the intention was to underplay Rolf's significance in order to make him appear harmless, in order to help him? Then, for example, reducing him to 'Engineer Widerøe' would be a clever move rather than a sophisticated insult. It is worth noting, at least as a matter of curiosity, that the committee consistently refers to Rolf as 'Engineer Widerøe.' He had a doctorate, but for the committee members he was nevertheless 'Engineer.' His degree was 'Doctor of Engineering' from a technical college, whereas the committee members' doctorates were from the university.

We cannot be sure that there was any deliberate downgrading in the choice of title, but to call him just 'Engineer' sounds a little condescending when we read it today. If we want to interpret the committee's report in the worst sense we can admittedly describe the choice of wording as a domineering technique, a deliberate attempt to belittle him. On the other hand, at that time it was almost impolite to refer to somebody using just a surname. Something or other had to come before the name, such as 'Mrs. Jensen' or 'Teacher Johansen' or in this instance 'Engineer Widerøe' from sheer good manners, as there had to be some sort of title. A kind interpretation could therefore be that 'Engineer' is just a practical abbreviation for 'Dr. Eng.'

I prefer the first version, that in the committee's eyes he was a technician, whereas they were intellectual academics.

Insulting and Demeaning

Danish Professor Søren Bentzen at the University of Maryland School of Medicine in the USA, knows of Brustad's work to restore Rolf's reputation. He shares Brustad's professional opinion that it was because of bad feeling that such a significant Norwegian scientist as Rolf Widerøe had not been recognised in Norway.

I think in fact that many people never want to mention his contribution. It's like the attempt to have the Nobel Prize-winning author Knut Hamsun declared insane, an attempt to diminish somebody in order to be rid of him. It's a stain on his reputation, and I think that's what Brustad found offensive about the expert committee's report.

What is your own assessment of the expert committee's evaluation?

I think it was purely political. We can say that if anyone mixed science with politics it was the committee, not Rolf. There was a political motive for diminishing Rolf's significance. I share Brustad's sense of offence, because it is obviously nonsense to say that Rolf did no important scientific work in the past and would not do any in the future. It's a professional misjudgement that shows a lack of insight into Widerøe's real importance. I'm quite sure that they were politically motivated, in the same way as the Nazis tried to downplay the significance of Albert Einstein's work.

Did the investigating commission know enough about his research to have informed opinions about it?

I don't know. I don't know enough about the circumstances and I don't know if they really had the necessary expertise. Widerøe was working in a very specialised field. But I do think that by that time Widerøe should have been recognised for purely scientific reasons. I think people were mixing up science and politics.'

The question is whether they were mixing them up deliberately?

I don't know if they were doing it deliberately. There could be two possible theories. One theory is that they really did want to have Widerøe released. We could speculate that the committee was trying to do Widerøe a service by diminishing his importance, but that is rather a devious logic. I think that from a professional point of view they did a poor job. The professional kick in the teeth that they gave to Widerøe was totally unnecessary and totally unacceptable. But whether there was someone directly pulling the strings, whether somebody somewhere or other said "Listen now, we need to say that Widerøe

isn't really so important;" that I don't know; somebody guiding the committee's hand as it wrote. It may be more that they were trying to knock Widerøe off the scientific pedestal by belittling his importance. Now, with the benefit of hindsight, we know that Widerøe had got the science right and that his principles were the starting point for a whole industry. Nevertheless, I do think that the expert committee should have acknowledged his work from a purely scientific point of view.

Five Physicists

The four committee members all had doctorates in physics. They were members of the same physics society, they subscribed to the same physics journal, they wrote articles for it, they were developing their careers. Like Rolf. Then they wrote their report about Rolf to the prosecuting authority. Signed by all four.

The fifth man—Rolf—was also a member of the Physics Society. He too read the members' journal, wrote for it, had a doctorate and was focussing on his career. He was and was not one of them. He found himself in the wrong place at the wrong time. How much insight did the four committee members have into this situation? How much were they swayed by the national mood at the time? To what extent are they responsible for the outcome of the case? Is it because of them that Rolf was not acquitted on all charges and his reputation restored? Or, on an alternative interpretation: Is it because of them that Rolf did not get a more severe penalty, such as Finn Lied would have preferred.

They would meet again later. Their interests and talents were not really so very different. Rolf met Tangen and Randers and Wergeland again. He exchanged very courteous letters with Hylleraas, who had chaired the committee. Randers would invite Rolf to take part in creating a research institute in Norway after the war, and both he and Hylleraas were extremely active in promoting the case for Norway to take part in CERN, when Rolf served as a consultant while it was being established.

A Guilty Conscience

Brustad and Waloschek have both told me that it seemed as if one of the committee members, Roald Tangen, subsequently had a guilty conscience about what he had been involved in.⁵² Tor Brustad had at one time been a

student at Oslo University, with Tangen, as his academic supervisor. He said that Tangen had always wondered about having been able to put his name to the content of the expert committee report. The two of them had spoken about this again when Brustad was a scientific assistant at the university in the 1950s, and Brustad understood that Tangen felt uneasy about having signed the report.

Pedro Waloschek had got the same impression from his correspondence with Tangen. In the course of writing Widerøe's biography he was in contact with Roald Tangen, who was then the only living survivor of the expert committee. Tangen helped by obtaining original case documents from the National Archives, including the *forelegg* document. Waloschek had also written to the archivist, and either as a direct response to this request or via Tangen, the National Archives sent him a roll of microfilm with copies of the settlement document and the committee's report. In the biography, discussion of the legal case is limited to just a few excerpts. Waloschek was not particularly interested in the details of the *forelegg*. The Norwegian legal term *forelegg* is difficult to translate into other languages. Tangen helped him with this, and Waloschek's main focus in what he wrote about the case was to try to explain this concept of an agreed summary sentence.

Waloschek thinks that the reason Tangen sought out information in the National Archives was that he was genuinely concerned about the committee's work and its influence on the case, and that he wanted to make his contribution to the book as accurate as possible. Tangen's comment about the committee's conclusion was as follows:

The documents in the archive showed that the committee's work had led to the first point in the charge, the one about Rolf's involvement in the construction of V-bombs, being recognised as baseless. This meant that the charge was reduced to a general allegation of having worked for the occupying power.

Interestingly enough, he adds:

The expert committee had no role at all in the legal process that took place much later (in November 1946).⁵³

If it is the case that Tangen regretted having signed the committee report, this weakens the possible argument that the committee was trying to defend Rolf in what they wrote. Another interpretation, less flattering to Tangen, would be that he was retrospectively trying to put a gloss on what he had taken part in, by saying that he regretted it. He had experienced that in

other contexts, but both Brustad and Waloschek were of the opinion that Tangen's regret was genuine. However, that is not the end of the story. The committee's report had been unanimous. In a book Waloschek wrote later about German arms development during World War II, he refers to his correspondence with Roald Tangen and writes, among other things:

Tangen assured me several times that the expert committee's report was mainly about freeing Widerøe from the charge of having collaborated on the V2, and that in this they had been successful. On the other hand, the committee's very negative assessment of Widerøe's purely scientific work in Germany was both unjust and sometimes incorrect. But the powers of the time and the supervising courts did not take that into consideration.⁵⁴

Waloschek has discussed this with me in more detail. He said it could appear that Tangen had a guilty conscience about what he had been involved in. This is confirmed by nuclear physicist Olav Aspelund, one of the participants in the interview with the physicists in the 1980s, who referred to something Tangen had said on that occasion:

I have always regretted signing that, but I was junior at that time and had great respect for these senior professors at the University of Oslo.

Tangen had also approached another member of the expert committee, Gunnar Randers, at a social gathering. Randers had replied 'So have I,' confirming that Tangen was not alone in how he felt about the affair.⁵⁵ Following Tangen's comment during the interview, Rolf had referred to the overheated mood after the war and expressed a desire to move on. Nevertheless, later in the interview Aspelund returned to the topic of Tangen's embarrassment about the committee report. The report was not scientifically valid, and the chairman had quite improperly mixed in politically motivated content.

Let Bygones Be Bygones

Not over-surprisingly, Rolf himself has a relaxed view of the committee's work:

For my part, I didn't take these investigations very seriously, but I am not very sensitive about such things. Someone may have made negative comments about me, but either I didn't understand that or it didn't bother me.

I assumed that the prosecuting authorities just wanted to have experts to answer the questions they couldn't answer themselves. I consider that quite natural under the circumstances, but the mood in Norway was a little heated at that time and things were not always thought through or considered coolly and calmly. I don't bear any grudge, but at the time I was glad that I would soon be able to go to Switzerland to continue my work.⁵⁶

He gives no good explanation of how he came to be in such stormy waters, other than that as an employee of NEBB he was 'called up' to work in Germany. Nor does the committee give any simple answer. Tor Brustad's conclusion after going through the case documents was that 'Neither the expert committee nor Allied Intelligence ever found the real reasons for Rolf joining the betatron project in Hamburg in late autumn 1943.'⁵⁷

Others have also tried. In the interview with the physicists in Oslo when Rolf was 81 years old, one of the things he was asked about was his experience with the legal system and his view of the expert committee's work. The tape-recording from the conversation was typed out by a secretary, but the copy was never released and is no longer available at the research institute where the meeting took place. There is, however, a copy in the USA.⁵⁸ Apart from the organisers, the only person who really took an interest in the conversation was Rolf himself. He carefully proof-read the 116 typewritten pages and completed the text with an attachment. Then he single-handedly translated it all into German for Waloschek, writing with a blue ballpoint pen on his usual square-lined jotting paper. Waloschek later passed on to me his whole Widerøe archive, including the translation of the interview meeting.

Well into the interview the physicists come to the topic of the legal case. Parts of this are quoted below. It is useful to remember that it is an old man who is speaking; some things may have been forgotten, some suppressed and some embellished in the course of the years. But the fact that he committed himself so much first to the print-out and then to the translation and then approved it as the basis for his biography, indicates that he also acknowledged the statements in the light of hindsight and wanted that to be what remained when he was no longer.⁵⁹ It is worthwhile to look at how he chooses his words and which questions he passes over quickly. The theme of the meeting was his contribution to physics, but other topics also arose. Rolf firmly took control of the interview when he was asked how long he had been in prison:

Rolf Widerøe: Yes, I don't remember, it was a couple of months, I think, or something like that. And I got a passport, and I travelled to Switzerland. (...) And I was clear that it was quite out of the question to build the betatron in Norway, there was no sort of basis for vacuum technology or glass technology or anything such as that. Anyway, I didn't know of any. (...)

Jan Vaagen: Were you employed by Norwegian Brown Boveri all throughout the war?

Rolf Widerøe: Yes.

Jan Vaagen: Did that help to shorten your stay in Ilebu when you came back here?

Rolf Widerøe: I don't think it was possible to do anything about that. But there was something odd. Randers, he got the job—he was away in America then—to travel to Norway to question me. So I met him at Grini, and we were good friends and we talked about all sorts of things. For remember, the reason that I was in Grini was that the neighbours in Røa, they knew that I knew about relays and so they thought that I was the inventor of the V2 bomb. And that would have been a dreadful business, naturally. And that was why I was in Grini. And that was why Randers came to Norway to ask me about that. And I was able to explain to him quite quickly—naturally I told him everything just as it was, and he understood immediately that all this about the V2 bomb was just nonsense. So after that there weren't any major difficulties for me.

Then Vaagen wanted to know if he had had contact with Norwegian colleagues when he was in Norway after the war.

Rolf Widerøe: I was, and I spoke with Hylleraas [the committee chairman] and he was very sceptical about me. He said 'You can't pretend that this was a scientific work.' He said something like that to me. But otherwise I had very little contact with Wergeland during the war, and he was very reserved towards me. To begin with, first time, he was very friendly and we talked freely about all sorts of things, but later he was very reserved. And I think that was because people had been talking about this and that. So I was probably marked as a rather bad person. (...) By the way, is Hylleraas still alive?

Olav Aspelund: No, he's dead. He must have been dead for you to be proposed for membership of The Academy of Science and Letters here in Oslo, I can say that quite bluntly.

Rolf Widerøe: Oh well, that's how it is.

Jan Vaagen asked if the committee report had been produced to order and what might have lain behind that. Rolf doesn't go into speculating about this, but hurries on to what *he* thinks is important.

Rolf Widerøe: I assume it was simply that the prosecuting authorities needed expertise in a matter they couldn't judge for themselves. And I don't think

there was anything odd about that, and I haven't felt any grudge towards any of these people since, for the one thing that was good and fortunate, was that I got permission to go to Switzerland and get started on my work there as soon as possible. (...) And of course I realise that for purely political reasons the mood in Norway was very difficult at that time. It was overheated, and you couldn't expect things always to go properly and smoothly and nicely for yourself. I can understand all that, and I have put it all behind me and forgotten it all. So for me to talk about it here now is superfluous.

Olav Aspelund said his impression was that the academic reputation of Oslo University didn't come out of it very well.

I can say that, for I know the mood in the Physics Society. I too had to break down a barrier when I invited you there. But it went very well. Among others, Tangen performed like a man.

Jan Vaagen was concerned about the principle of somebody whose talents are mainly in technical activity being evaluated by an academic committee whose area of competence was quite outwith his field. Both Rolf himself and several others agreed that the committee members were theoreticians without experience of experimental physics. Aaserud wanted to bring the discussion back on track and summed up: 'There are many unknowns here.' Rolf agreed:

Rolf Widerøe: I think we should let bygones be bygones. That's the best we can do.

Jan Vaagen: Yes, I think we should come back again to the interesting scientific points. That episode has after all had repercussions in certain quarters that I gather were unpleasant.

Rolf Widerøe: I haven't noticed anything, though. But I am really so insensitive in these matters that it may well be that people have said insulting things where I either haven't noticed the insult or simply haven't bothered about it.

Jan Vaagen: I think we can go so far as to say that there is something in the book about Lawrence and Oppenheimer to the effect that your right to Norwegian citizenship was in danger at that time. Something like that.

Rolf Widerøe: Not a trace, not a trace. (...) And I had no difficulty getting a passport for example.

Are Facts the Same as Truth?

What Rolf said about getting a passport can safely be described as a retrospectively embellished version of reality. He was adjusting the truth when he said that he couldn't remember how long he had been in prison. The *forelegg* document that he signed stated the exact number of days that he had been detained, namely 47. Does one forget such things? Does somebody who works with numbers forget such things? He was able to explain to Randers how things stood, and 'after that there weren't any major difficulties for me.' That must be the world's biggest understatement. It is difficult to judge whether this is caused by repression or by a conscious desire to give a well-styled presentation. Maybe a little bit of both. As an elderly man, he had developed a consistent way of reciting these events—or a rather selective memory if you prefer to see it that way.

That was also apparent ten years later, when Pedro Waloschek worked with him on the biography. Rolf said that he had been *freigesprochen*, found not guilty. Waloschek has told me about this in more detail:

It is on record that he said that. But he didn't always tell the truth.

You must explain what you mean by that.

Well, this bit of the story doesn't reflect well on him.

Go on.

The fact is that he insisted that he had been acquitted – '*freigesprochen*' – in Norway. And when he told me that during a video-interview I was doing with him, his wife called me into the kitchen and said, "He's not telling the truth. He accepted the summary sentence. He signed it. He got a fine. He was banned for life from serving in the Norwegian army, and he has never been reaccepted. He knows all that very well. The summary sentence was accepted. And he, inside his head, has changed that to *Freispruch*, acquittal."

Then Waloschek went on to say that he thought Rolf's wife was telling the truth when she immediately said 'Stop! That's not true.' This was why he began to investigate further, he said, and obtained copies from the Norwegian National Archives, especially the *forelegg* document with Rolf's signature.

But perhaps Waloschek is being a little severe here. Acquitted of what? Of all charges? No. Not of writing the article for *Teknisk Ukeblad*; not of giving money to the Norwegian Legion; not of having worked in the enemy's country. Well, maybe not. But acquitted of the appalling main charge, of having worked on the V2 bomb.

‘Acquitted’ in his own head, but not fully in the eyes of the law or in popular judgement or in Ragnhild’s opinion.

Most people took little interest in the legal proceedings. The media had taken an interest in the question of the passport but not in the case as such. This is partly because when a *forelegg* is accepted and signed, all the case documents are automatically stamped ‘secret.’ In a normal court case, on the other hand, the public can more easily follow the proceedings in court and become informed both about the nature of the charge and about the arguments advanced by the prosecuting and defending counsels. In Rolf’s situation, the papers were merely archived.

Years passed. More facts became available. He was *there*. He did *that*. Together with *them*. So now do we know what happened? We know something about what he has said and written, yes. And about what others have said and written. But we only know about what has been found. There may be more; more documents in various countries; more people involved; more people who have promised or who for one reason or another have chosen not to say anything.

The National Archives have been visited, the documents from treason case no. 3418/45 have been read and interviews have taken place. What has been written about the case in the past, is known. Comments have been made public. Important and illuminating facts that nobody had managed to discover have come into the light of day, thanks to two physicists, one in Oslo and one in Hamburg. Brustad, the professor at the Norwegian Radium Hospital, wrote his article in a journal about the treatment of cancer, *Acta Oncologica*. He arranged a conference, initiated the Widerøe Prize and placed a bust of Rolf in a glass case in the vestibule of the hospital. Waloschek, the professor in Hamburg, published his book and had it translated into English and Russian.

The international community of physicists had been given the message: Rolf should never have been arrested. He had not aided the enemy, had never had anything to do with the V2 bombs. The facts were on the table. Good, so do we know everything then? Why he went to Germany in 1943 and why he suddenly returned home in April 1945? Do we understand more of his reaction when he ‘fled’ to Switzerland after the legal case? Have we gained insights into what it felt like to live with the consequences, in exile for fifty years? Do we understand more about Rolf Widerøe as a person? So do we know him now? Yes and no.

Are facts the same as truth? Well, maybe. And even if they *are*, can we really be sure that we have found all the facts? We can choose to wonder about such things in retrospect, but life has to be lived in the here and

now—with wife and children and job and elderly parents back at home. Can everything be converted into factual data that can be worked out in an equation? The law may see things in black and white, but life is often lived in shades of grey. Other people's wild assumptions and loose rumours muddy the waters more than necessary, stirring up further questions and confusion. Looking back from a detached historical perspective, we wonder how he managed to find his way through this.

The people closest to him probably thought that what he did was not so strange. That was how he was, wholly absorbed in his research. Unusual. For his part, he just shrugged his shoulders and left again, in 1946...

... with back straight, head high and eyes fixed far ahead on a point somewhere out there in the wide world. *Komme was wolle. Quoi qu'il arrive. Komme det som komme vil.* Come what may.

Notes

1. Dokument x. O. Pk. VJ 3418, 46–47. Rapport A, nr. 1029. Riksarkivet, Landssviksak nr. 3418/45 (Clause).
2. Dokument 2, 1003, 24.5.45, Riksarkivet, Landssviksak nr. 3418/45 (Clause).
3. Dokument 8, handwritten 'Redegjørelse for mitt arbeid i Tyskland ("Account of my work in Germany") etc.', 24/5—45, Riksarkivet, Landssviksak nr. 3418/45 (Clause).
4. Tor Brustad: 'Why is the Originator of the Science of Particle Accelerators so Neglected, Particularly in his Home Country?' Extended version. Scandinavian University Press 1998. ISSN 0284-186X. (An abridged version of this paper, without inter alia, is printed in *Acta Oncologica* 1998, 37.) Offprint of complete article, p. 10.
Letter from Engineer S.A. Solberg, A/S Norsk Elektrisk & Brown Boveri, 25th May 1945 to the Criminal Police in Oslo, Møllergt. 19, Oslo.
5. Letter from Rolf Widerøe to Director Solberg 22nd January 1946, ETH-Library Zurich HS 903:80.
6. *Dokument 11 Rettsbok for Oslo Forhørsrett*, dated 25th June 1945, held at Ila Prison. National Archive, Treason Case no. 3418/45 (Clause).
7. *Dokument 18. O. Pk. V, sak 3418* Explanation presented to the preliminary court 25/06/1945, National Archives, Treason Case no. 3418/45 (Clause).
8. Oscar de Besche case document, dated 5th July, addressed to Junior Police Prosecutor Gustav B. Dreyer, National Archive, Treason Case no. 3418/45 (Clause).

9. *Dokument 17. O. Pk. V*, Oslo 7/7 1945, *Løslatelsesordre* ('Order for Release'), National Archive, Treason Case no. 3418/45 (Clause).
10. *Dokument 19. Rettsbok for Oslo Forhørsrett*, 21/11 45, National Archive, Treason Case no. 3418/45 (Clause).
11. In 1942 this work continued at the University of Oslo. The professor who had led the development, Johan P. Holtsmark, had been appointed professor there and the two of them followed him to Oslo. It is stated in several places that Holtsmark was also a member of the expert committee. But the four appointed members who also signed the final document were Hylleraas, Wergeland, Tangen and Randers.
12. Per Chr. Hemmer and Ivar Svare '*Linjen for Teknisk fysikk ved NTNU og dens videreføring 75 år 1932–2007*'.
13. He was a member of the scientific intelligence organisation 'Operation Alsos,' also referred to as 'The Alsos Mission,' in the USA.
14. Communication dated 24/09/1945 from Junior Police Prosecutor Gustav B. Dreyer to Senior Prosecutor L'Abée-Lund, National Archives, Treason Case no. 3418/45 (Clause). The two attached documents were number 14 and 15. Ref. extract in the next chapter of this book, 'But there was more,' in relation to Randers' work for American Intelligence Services.
15. Among other sources, this is from one of the members, Roald Tangen, in conversation with Pedro Waloschek during the preparation of Widerøe's biography.
16. The others are by Herman Dänzer, Walter Müller and the later Nobel prize-winner Walther Bothe.
17. Document 25, dated 11th March 1946. Addressed to Oslo and Aker Police Office, Treason Department, Viktoria Terrasse 5/7, from High Court Advocate Oscar de Besche, National Archives, Treason Case no. 3418/45 (Clause).
18. Document 27, dated 15th March 1946. Report to Oslo Police Office submitted by Crime Assistant John Strand, National Archives, Treason Case no. 3418/45 (Clause).
19. Document 33, dated 24th May 1946 from Brown Boveri to Rolf Widerøe, National Archives, Treason Case no. 3418/45 (Clause).
20. Document 45 with attachment, letter from The Royal Foreign Department to the Chief of Police, Oslo, dated 12th June 1946, 'Dr. Eng. Rolf Widerøe's activities during the war,' National Archives, Treason Case no. 3418/45 (Clause).
21. Document 28, dated 29th June 1946, O. pk. V.J.5154, written from Advocate O. de Besche to Oslo and Aker Police Office, National Archives, Treason Case no. 3418/45 (Clause).
22. Interview of Rolf Widerøe conducted by Police Prosecutor Dreyer 4th July 1946, National Archives, Treason Case no. 3418/45 (Clause).

23. Written from Advocate O. de Besche to Oslo and Aker Police Office, National Archives, Treason Case no. 3418/45 (Clause).
24. Letter from Viggo Widerøe to Police Prosecutor Gustav B. Dreyer 4th July 1946, National Archives, Treason Case no. 3418/45 (Clause).
25. Document 32, Report to Oslo Police Office, 1st August 1946 submitted by Police Prosecutor Gustav B. Dreyer on 31st July 1946, National Archives, Treason Case no. 3418/45 (Clause).
26. Tor Brustad: 'Why is the Originator of The Science of Particle Accelerators so Neglected, Particularly in his Home Country?' Extended version. Scandinavian University Press 1998. ISSN 0284-186X. (An abridged version of this paper, without inter alia, is printed in *Acta Oncologica* 1998, 37.) Special printing of complete article, p. 8, footnote 17. Note dated 11th July 1946 from Police Prosecutor Gustav Meyer to the Chief of Criminal Police, Oslo Police Office, Treason Department. Area: AB 3418, National Archives (Clause).
27. Note (separate folder) Eng. Rolf Widerøe, case 3418/45—AB, dated 22.07.1946 probably from L. L'Abée-Lund to Gustav B. Dreyer, National Archives, Treason Case no. 3418/45 (Clause).
28. Letter from Gustav B. Dreyer to Chief of Criminal Police L. L'Abée-Lund 14/9-46, case Rolf Widerøe, National Archives, Treason Case no. 3418/45 (Clause).
29. Document 52, Report to Oslo Police Office, dated 11/10/46 by Junior Police Prosecutor Gustav. B. Dreyer, National Archives, Treason Case no. 3418/45 (Clause).
30. The First Scandinavian Symposium on Radiation Oncology. Seminar in memory of Professor Dr. Eng. Rolf Widerøe. Rosendal Manor, 24–28th May 1997.
31. Tor Brustad: 'Why is the Originator of The Science of Particle Accelerators so Neglected, Particularly in his Home Country?' *Acta Oncologica* 1998, p 37, Scandinavian University Press 1998. (Shortened version without footnotes) Two other contributions about Widerøe that were delivered at the seminar are published in the same issue. These were written by Anders Brahme and B.H. Wiik.
32. In conversation on 16th September 2009. Lied died on 10th October 2014.
33. Appendix: 'Regarding the radiation transformer'
34. Brustad: 'Why is the Originator ...'
35. Waloschek's video interview was recorded over two days, 22nd and 23rd October 1992 and shown as part of an exhibition in the Museum for Design in Zurich from 3rd March to 2nd May 1993. The interview was conducted in German and was used as the basis for the biography.
36. Brustad: 'Rolf Widerøe: Eminent scientist—a Footnote in Physics in Norway?' *Forskningspolitikk*, no. 3.1997.
37. Brustad: 'Why is the Originator ...'

38. Brustad: 'Why is the Originator ...'
39. Brustad: 'Why is the Originator ...', complete article, footnote 20: 'Schiebold was a German physicist who had proposed that if, by technological development, one could generate X-rays with high energy and intensity, it might be possible to aim a pencil-beam of X-rays at enemy aircraft. The enemy pilots might in this way be given fatal radiation doses, and the beam might even interfere with the radar system of the enemy so that aircraft would lose track of their targets and have problems "finding their way home".'
40. Brustad: 'Why is the Originator ...', footnote 21.
41. The expert committee's report, p. 7.
42. Documents 14 and 15 presented to the expert committee, Treason Case no. 3418/45, National Archives.
43. Tor Brustad is referring here to footnote 21 in the article 'Why is the Originator ...': In the book compiled and edited by Pedro Waloschek, 'The Infancy of Particle Accelerators, Life and Work of Rolf Widerøe,' Vieweg 1994, (ISBN 3-528-06586-9), Widerøe states "So I agreed to go to Hamburg or, to be more precise, I was 'subjected to compulsory work' via more or less voluntary agreement (and obviously that of my employers, NEBB)."
44. Norway's official statistical reports, XI 179. Statistics relating to treason 1940–1945. Norwegian Central Statistical Office, Oslo 1954 (footnote 1).
45. Regarding the outcome of the treason cases. Report from the Justice Department to Parliament, 11th January 1962. The official figures are as follows: A total of 92,805 people were accused of offences in connection with treason, 342 with war crimes. 28,750 people were arrested, and the highest number of prisoners was in July 1945, with about 14,000 distributed in 200 camps. 30 people were condemned to death for treason and 15 for war crimes. About 17,000 were sentenced to prison, about 25,000 were fined, about 7,500 received other forms of punishment, about 14,000 were acquitted at final trial, about 5,500 prosecutions failed and about 37,000 cases were dropped for lack of evidence.
46. Tor Brustad: 'Why is the Originator ...', complete article, footnote 13. (This is the first time Rolf makes any mention of the Radium Hospital ordering a betatron. It must refer to the 15 MeV betatron, an order that never come to anything. It was not until the 1950s that they ordered and received their 31 MeV betatron.) Document 24. Letter from Rolf Widerøe to Junior Police Prosecutor Dreyer, dated 01/03/1946, O. Pk. J. 3418, 46–47 'concerning Dr. Widerøe's application for permission to travel', National Archives, Treason Case no. 3418/45 (Clause).
47. From an interview with Tor Brustad. He is probably referring to the Chief Engineer, Torleif Kaulun Torstensen.
48. Reply from the expert committee to Junior Police Prosecutor Gustav B. Dreyer. Headed 'National Archive Document.' Tor Brustad: *Acta Oncologica* 1998, 37.

49. ETH Zurich Library, Archive, HS 903:239 Rolf Widerøe, letter to Oslo and Aker Police, Røa, 07.06.1946.
50. ETH Zurich Library, Archive, HS 903:239 Rolf Widerøe, letter to the Head of Criminal Police, Røa, 02.08.1946.
51. ETH Zurich Library, Archive, HS 903:239 Rolf Widerøe, letter to Oscar de Besch, Zürich, 03.09.1946.
52. Conversations during the preparation of the book.
53. The biography, box 11, p. 99.
54. Waloschek: *Todesstrahlen*.
55. The interview with the physicists in Oslo 12th July 1983, NAVF Oslo, now The Norwegian Academy of Science and Letters. Rolf writes in his German translation that it took place on 11th July, which was his birthday. It was probably in fact the 12th. The print-out prepared by the research institute is dated 14th March 1984.
56. The biography.
57. Brustad: 'Why is the Originator ...'
58. Niels Bohr Archives, American Institute of Physics.
59. The Norwegian Academy of Science and Letters set up the interview. The participants (with their titles at that time) were: research fellow Finn Aaserud, assistant professor Jan Vaagen (University of Bergen), Olav Nettelund (The Norwegian Radium Hospital), research associate Olav Aspelund and senior conservator Gunnar Thorsen (Technical Museum). The head of the academy, Hans Skoie, was in the wings.

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