

# FELIX's Transmitter

## THE STORY OF THE NAZI SPY IN SOUTH AFRICA

Lothar Sittig (Fig.1) was trained as a diplomat, but he never served as one. Instead, in 1942, he became notorious as the Nazi spy, codenamed FELIX, in South Africa.

Sittig left Germany in 1922, soon after he completed his academic studies intended to equip him for life in the world of international affairs but, as a result of the Treaty of Versailles in 1919, Germany had lost all her colonies, and so he turned to farming soon after arriving in Portuguese West Africa, the Angola of today.

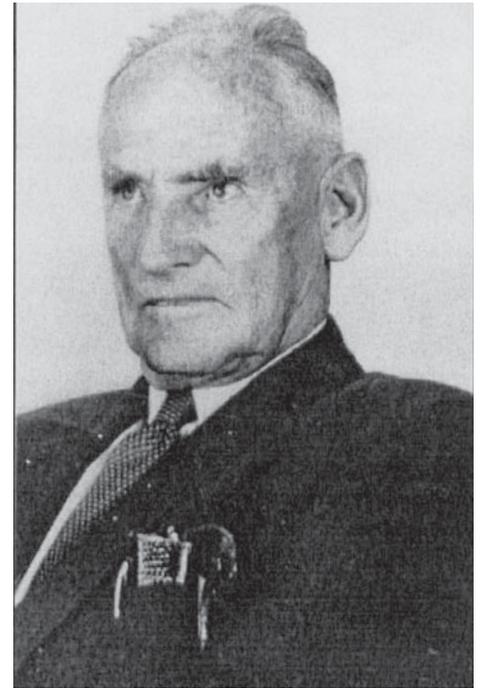
In 1925 he went to South Africa where he spent most of his time managing a farm near the Vaal River.

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Soon after South Africa declared war on Germany in September 1939 Sittig, who was still a German national, was interned along with many of his fellow countrymen. He was sent to the internment camp in Leeukop prison near Johannesburg. There he encountered the Ossewabrandwag (OB), the ultra-nationalist movement formed earlier that year, initially as a cultural organisation to represent those Afrikaners whose intentions were to sever all ties with Britain and turn South Africa into a republic. At that time South Africa was a self-governing British Dominion with a similar status to Australia, Canada and New Zealand. However, the OB rapidly evolved from a social body into a hard-line pro-German organisation intent on bringing about a change of government, even by force, if needs be. Their version of the SS, the 'Stormjaers' were itching for a fight.

The OB's new leader was the charismatic Dr Hans van Rensburg, (Fig 2) a former Secretary of Justice under Jan Smuts and the former Administrator of the Orange Free State. He had also been a senior officer in one of Pretoria's oldest regiments.

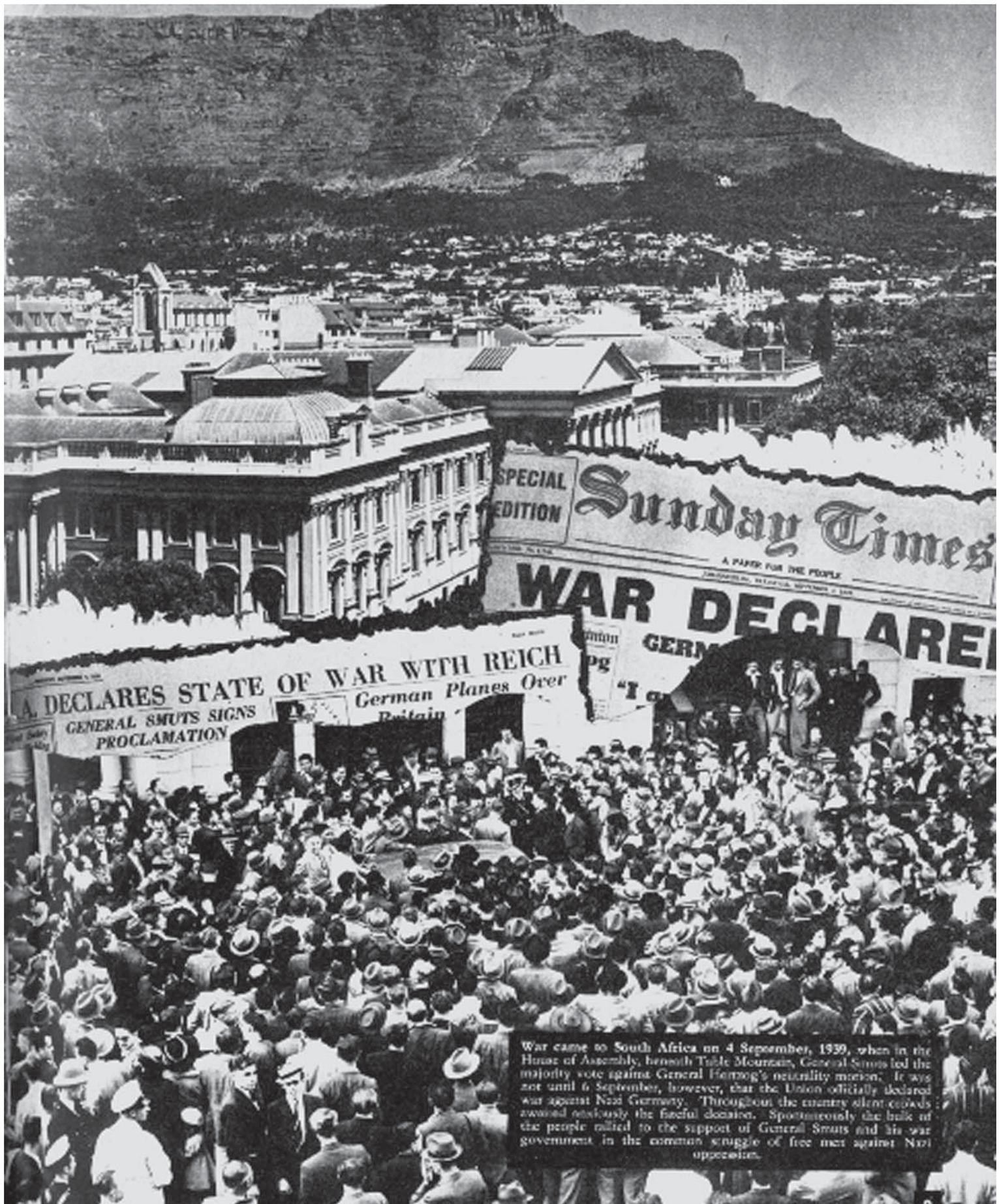
With the active connivance of some of the guards at Leeukop whose sympathies lay squarely with the OB, Sittig and a fellow German by the name of Nils Paasch managed to escape and, after some months being sheltered by various OB sympathisers around the country, they made their way to Lourenco Marques and specifically to the German consulate there. Portuguese East Africa was neutral territory but the German consul, Paul Trompke and particularly his



*Fig 1: Lothar Sittig as a much older man.*

vice-consul, Luitpold Werz, were actively supporting the Nazi cause by encouraging and assisting the flow of German agents across the border with South Africa. The intention was that they would make contact with the OB and so lend support to those Afrikaners who were seeking to overthrow the Smuts government and, ultimately, to remove South Africa from what they saw as the stranglehold of British domination in 'their' country.

The OB, using the services of well-placed individuals, would observe shipping moving in and out of South Africa's ports and then report these to the Kriegsmarine, Hitler's navy, so that the German submarines – the U-boats – could attack them. To do this, there had to be some effective means of communication between the OB and



War came to South Africa on 4 September, 1939, when in the House of Assembly, beneath Table Mountain, General Smuts led the majority vote against General Hertzog's neutrality motion. It was not until 6 September, however, that the Union officially declared war against Nazi Germany. Throughout the country all-out efforts followed ardently the fateful decision. Spontaneously the bulk of the people rallied to the support of General Smuts and his war government in the common struggle of free men against Nazi oppression.

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Fig 2: Dr Hans van Rensburg saluting his OB guard of honour.

the German consulate in LM. That meant wireless, and Sittig soon became FELIX, his codename for the rest of the war.

The intention was that he would return to South Africa, obtain a radio transmitter and then communicate, initially, with Werz in Lourenco Marques but ultimately, so they hoped, directly with Berlin. The critical link in the OB – Nazi chain was another individual who had escaped from detention and had been smuggled across the border by willing members of the ‘Stormjaers’. His name was Olaf Andresen, a musician and composer who would subsequently be remembered as the composer of Afrikaans ‘liedjies’, most notably *My hart verlang na die Boland* but he also wrote what would become the anthem of the

Ossewabrandwag, called ‘Opsaal Boere’. It would subsequently play an essential part in the process of communicating with Berlin, as we will see.

Moreover, there were others too. The very first Nazi agent to become active in South Africa was Hans Rooseboom, an irascible character who soon fell out with everyone he was supposed to collaborate with. Eventually, van Rensburg cast him out, and it was even suggested that his name was placed on an OB assassination list. However, after lying low for some time, he reappeared and made contact with a German radio engineer named Herbert Wild, whose electronics business in Johannesburg still exists today. Wild had a transmitter which Rooseboom was to use

to contact Berlin. There is no evidence he ever did.

Since all communications would be in code, Sittig received training in this black art, and though the Enigma machine had become the Nazi’s tool of choice throughout the war, FELIX used a far simpler method based on a commercially available numerical code. He was to transmit using Morse code, another skill he did not yet possess. However, he was a resourceful man and, besides, he was driven by a great urge to serve the Fuhrer despite being a very long way from the war that was raging in Europe. Early in 1942, his attempt to re-enter South Africa was foiled, and he was arrested and interned once again. However, three months later he’d escaped again and headed for Pretoria



and the headquarters of the OB on van Rensburg's farm to the east of the city. There he came under the wing of van Rensburg's adjutant, a former officer in the Union Defence Force (UDF) by the name of Heimer Anderson. It was Anderson who had been instructed by van Rensburg to take charge of the OB's radio communications. His first task was to gather in the various transmitters that had been constructed in a veritable cottage industry around Pretoria and Johannesburg with the intention of providing wireless communications between the OB's many commandos wherever they happened to be.

All in all, Anderson accumulated between five and fifteen transmitters (depending on which source you believe), some built by radio amateurs and at least one by a senior engineer at the SABC by the name of CL Olén. The Johannesburg suburb of Sydenham housed one of these transmitter factories. It was owned by OB stalwart 'Kowie' Marais who, after the war, became a judge of the Supreme Court and then, in the 1970s, following a complete change of political direction, he joined the Progressive Federal Party and became an outspoken critic of apartheid.

None of those transmitters produced much output power, perhaps 10 to 20 W at most. The primary reason was the difficulty of obtaining suitable high-frequency thermionic valves. Any attempt to purchase such things (as well as the quartz crystals needed to determine the transmit frequency) from the various suppliers of amateur radio components was viewed with suspicion and would assuredly lead to a visit from the police because amateur radio had been closed down by government decree soon after the beginning of the war.

Sittig, now operating in the guise of FELIX, made his first radio transmission in May 1942 more in hope than expectation. Its purpose was to test the communication link between Pretoria and Lourenco Marques, but the optimists among them thought that Berlin might also receive his signal. No one did. The German consulate was ill-prepared in every way: they only had a domestic radio receiver and no skilled radio operators among their consular staff. It was the Italian consul, Umberto Campini, who stepped in to assist his Axis allies by ordering the radio operators aboard an Italian vessel stranded in the harbour to use their much more sophisticated receiver to listen out for FELIX's signals. The agreed schedule of transmissions was to be every Sunday, Tuesday and Thursday at 2315 SAST and on every occasion FELIX would



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transmit 'blind', in other words, there would be no reply from LM because the Portuguese were monitoring the activities of the warring countries that they had the privilege of hosting on their neutral shores. Such transmissions would've violated international agreements, and the consulate concerned would've faced immediate closure. So this is where Olaf Andresen's music played a significant role. On receipt of a message from FELIX, Luitpold Werz would decipher it in LM and then re-encipher it in the diplomatic code used between his consulate and the German Foreign Office in Berlin. The message would then be sent to Germany via the regular landline diplomatic telegraphic service.

Along with all other landlines from the Portuguese territory that line went through Johannesburg before making its way to Cape Town and onward to Europe by undersea cable. The Germans would then acknowledge receipt of the message in Berlin by using the regular Afrikaans transmission from Radio Zeesen, the high-power shortwave transmitter near Berlin, to play 'Opsaal Boere'. So this is also where the British Intelligence agencies joined the fray.

All radio transmissions emanating from South Africa were being monitored by the Royal Navy's Wireless intercept stations, known as the 'Y Service', situated in all South Africa's major ports. Also, the two British security services, MI5 and MI6 (more accurately known as the SIS), which had direct responsibility for security within all the British Dominions, had 'tapped' the line from Lourenco Marques in Johannesburg's Central Telephone Exchange. Everything transmitted by FELIX ended up, ultimately,



*Fig 3: The Groeneveld high-power transmitter used by FELIX.*

in Bletchley Park where the codebreakers there attended to it as a routine matter. The simple codes used presented a few problems, and so British Intelligence was able to follow FELIX's every move.

It would not be until May 1943 that FELIX's transmissions were received directly in Berlin without any intervention by Werz in LM. This only happened after FELIX began using a transmitter of considerably greater power (Fig 3). It was designed and built for him by another OB member, a Post Office technician by the name of Reijer Groeneveld, a Hollander who had expressed no desire to become a South African citizen as long as that required his allegiance to the King of England. Again, it was Heimer Anderson who was instrumental in setting Groeneveld up on the farm of a prominent OB supporter near Pretoria. There Groeneveld, assisted

by his Post Office colleague Hans Thomas, built the transmitter. Its considerably increased output was made possible by the removal ('hy het voete gekry'), from the hospital in Bloemfontein, of a diathermy machine which Groeneveld himself had installed some while before for his previous employer, a supplier in Cape Town. The transmitter itself was housed in a steel box, and its power source was a 1 horsepower (746 W) petrol-driven alternator that produced 110V AC. Both the transmitter and its power supply were placed in a hole in the ground some 2,5 metres on a side. This was done to make them as inconspicuous as possible even though, by this time all FELIX's transmissions took place well away from any habitation on Hans van Rensburg's other farm near Vryburg in the western Transvaal. The two 60 foot antenna masts, assembled in three sections, came down during daylight hours and were covered by vegetation. Then, at around midnight on the scheduled days, they were re-erected, the antenna pulled up, and FELIX's transmissions commenced and continued until around 3 am.

Signalling direct to Berlin carried on, very sporadically, for about a year. The messages enciphered by Sittig and Paasche, who had now joined his colleague, were mostly transmitted by Hans Thomas, a trained telegraphist. Berlin had expressed, again via the consulate in LM, their unqualified congratulations to FELIX on his achievement and, presumably spurred on by this, they agreed to reply to his messages by direct transmissions themselves. Sittig was quick to ask that all those messages be sent slowly because of the limited Morse code skills of Paasche and himself when Thomas was not around. The content of FELIX's messages was, in the main, very



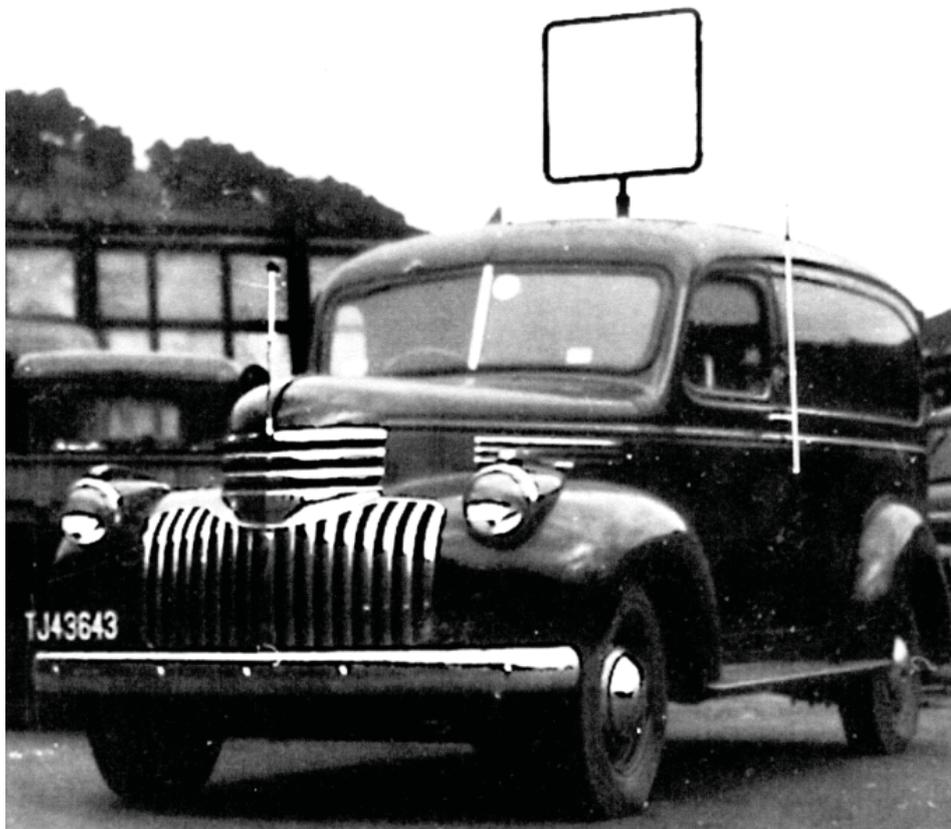


Fig 4: A Price-Milne Organisation mobile direction-finding vehicle with its loop antenna.

mundane. They consisted of extracts from fiery speeches by van Rensburg or shipping information, gleaned at the major ports, which was usually highly inaccurate and always out-of-date by the time it reached Vryburg, having been sent by post to van Rensburg in Pretoria for his approval before onward transmission to Berlin.

Once again the energy and initiative of Lothar Sittig came to the fore. Fully aware of the tardiness of the OB's Intelligence, he suggested to Berlin that he should be allowed to transmit directly to the U-boats when they surfaced at night to charge their batteries and communicate with their HQ. Unsurprisingly the Kriegsmarine gave this idea short shrift, but it was followed shortly after that by another one from

Sittig. This time FELIX requested that a U-boat should enter St Francis Bay, near Port Elizabeth, where it would be met by an OB shore party who would take delivery of arms, ammunition as well as powerful radio transmitters. Moreover, then Sittig himself would return to Germany on the U-boat to brief the Abwehr on OB matters in South Africa. This suggestion caused the Germans to at least give it some serious consideration before deciding it was too risky. Of particular interest is that Sittig had warned Berlin that there existed around South Africa's coastline a means of detecting a surfaced submarine by its reflection of 'electric waves'. That, of course, was the network of radar stations operated by the Special Signals Service (SSS) of the army.

Unsurprisingly, the Royal Navy's Y Service had monitored all this radio traffic, and between them, the Navy, MI5 and SIS had been preparing, with the selective assistance of the UDF, a 'welcoming party' for the U-boat and its cargo had they ever arrived.

Remarkably, despite his numerous radio transmissions, FELIX was never apprehended even though the Royal Navy's radio direction finding (DF) stations had obtained many accurate bearings on his transmitter near Vryburg. The main reason for this was the South African Police, who would have been responsible for carrying out the raids to arrest Sittig and his co-conspirators, were severely compromised by the degree of infiltration of their ranks by the Ossewabrandwag. The second-in-command of the SAP, one Colonel 'Bill' Coetzee, was a known OB collaborator who harboured strongly-held anti-British views. Also, this degree of mistrust between the government of General Jan Smuts and his security forces even included sections of his military, the UDF.

This nest of vipers so close to the heart of government caused Smuts to request his scientific adviser, Dr H J van der Bijl, to commission the design of a radio direction-finding system that would remain completely independent of the SAP and UDF. The body that fulfilled this task became known as the Price-Milne Organisation after the two senior engineers from the Electricity Supply Commission and the Post Office who supervised their staff in the design and construction of highly secret fixed and mobile DF equipment for service across the country. (Fig 4) In 1943 the South African equipment came under the control of the Royal Navy in Simon's Town.

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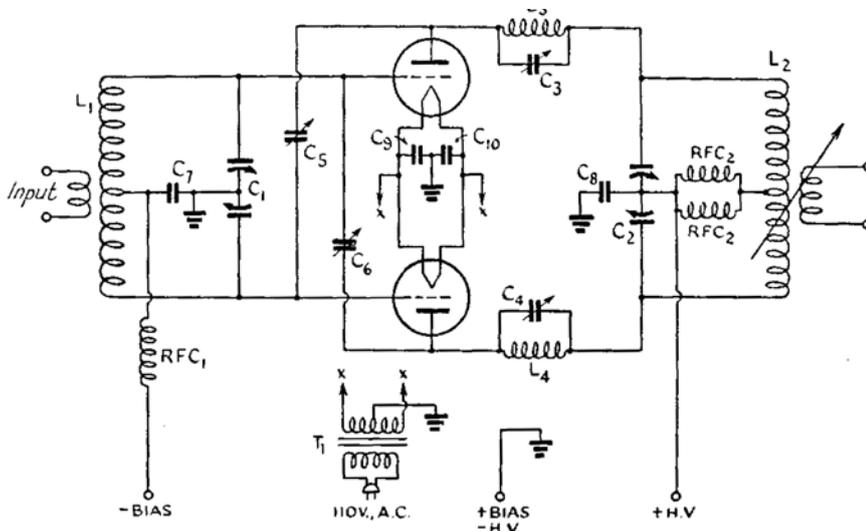


Fig 5: A suggested circuit diagram of the power amplifier of FELIX's transmitter.

the dipole antenna.

The circuit diagram shows the link-coupled input-output configuration that Groeneveld used. It's of conventional design with cross-neutralisation to prevent the amplifier from going into self-oscillation. The two neutralising capacitors (C5 and C6), one immediately behind the other in the photograph, are worthy of attention because of the high voltage breakdown requirement they had to meet. Given the difficulty these OB renegades in South Africa would've had in obtaining components through the usual channels, Groeneveld resorted to an ingenious solution by constructing two capacitors from everyday items (see Fig 3).

He used the cylindrical metal containers intended for shaving soap (manufactured by Colgate) as the outer conductors of a pair of coaxial capacitors. The smaller, inner conductors were mounted on threaded shafts each of which screwed into a porcelain stand-off insulator. Removing the crocodile clip allowed the capacitance to be changed by merely screwing the inner cylinder in or out until neutralisation was obtained as indicated, in the usual way, by observing the meter monitoring the grids of the two valves. The small tuned circuit connected directly to the valve's anode terminal is one of two parasitic suppressors shown in the circuit diagram.

The CW exciter (Fig 6) was also conventional. It consisted of a crystal-controlled oscillator, using a 6L6 tetrode, driving a pair of 6L6s in push-pull. The output tuned-circuit is made up of the large inductor on the right of the PA valves with its associated variable capacitor (and calibrated scale) on the panel below. It needs be the oscillator and the two push-

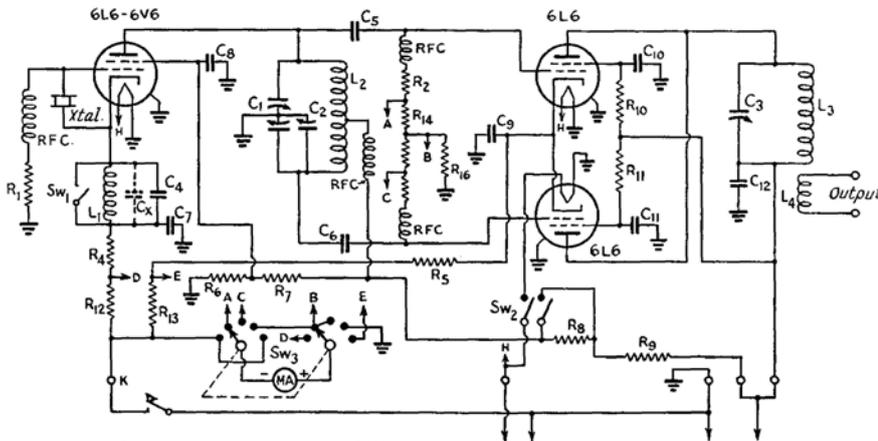


Fig 6: A proposed circuit diagram of the CW exciter of the transmitter.

There is no doubt that Reijer Groeneveld's transmitter which enabled FELIX to communicate directly with Berlin was a remarkable achievement. As such it deserves some special attention. The output power it produced can be estimated from the available power source: a 1HP petrol-fuelled motor and generator. After allowing for the primary power consumption of the five valves that made up the transmitter, and the efficiency of the Class C power amplifier stage, we estimate that the available output power was about 230 W (Fig 5). That final

amplifier used the two Amperex P-150 triodes, obtained from the diathermy machine removed from the Bloemfontein hospital. From their specification, it is clear that the motor-generator set was the limiting factor and not the valves themselves: two HF-100s in push-pull were capable of 340W output from just 12 W of driving power from the CW exciter. The transmitter output is connected to the two insulated screw terminals visible on the left of the upper shelf. Two torch bulbs indicated the power output to the open-wire feedline to



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Aug 1943          SSN = 14.          Minimum Angle= 0.100 degrees
VRYBURG          BERLIN              AZIMUTHS          N. MI.          KM
27.00 S          24.90 E - 52.60 N    13.40 E          352.94 169.62  4816.8
XMTX 2-30 IONCAP #23[default\hdip 18m.ant ] Az=352.9 OFFaz= 0.0  0.230kW
RCVR 2-30 2-D Table [default\CONST12.ant ] Az=169.6 OFFaz= 0.0
3 MHz NOISE = -150.0 dBW          REQ. REL = 90%          REQ. SNR = 30.0 dB
MULTIPATH POWER TOLERANCE = 3.0 dB  MULTIPATH DELAY TOLERANCE = 0.100 ms
  
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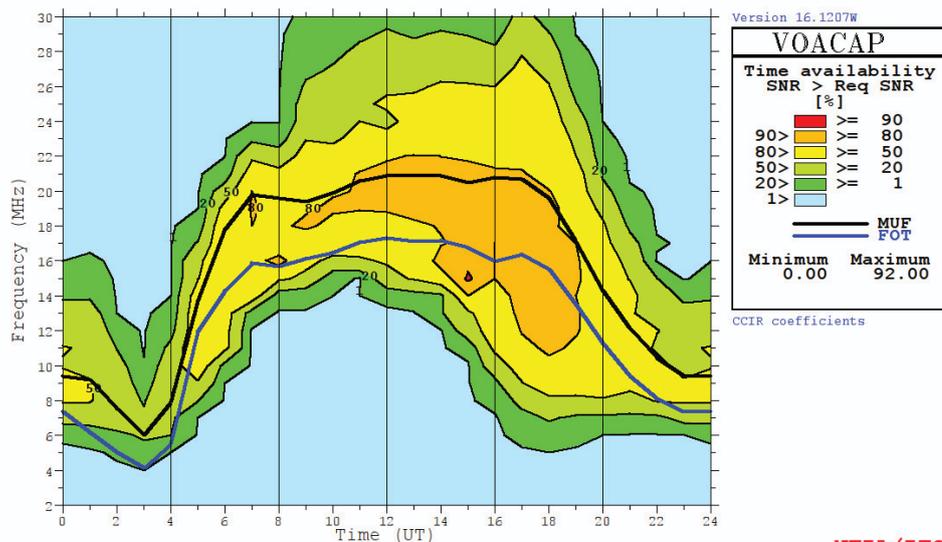


Fig 7: The VOACAP prediction for August 1943 of the Vryburg – Berlin path.

pull 6L6s could operate as frequency doublers thereby allowing a single third-overtone crystal to produce output on three different frequencies. Though FELIX only worked on one frequency (7.2 MHz), his transmitter allowed for some frequency agility if suitable crystals were to hand. From the available transcripts of the radio traffic between himself and Germany it is clear that he requested Berlin to use a U-Boat to smuggle suitable crystals to him but, as we have seen, none of those ventures ever took place. The success of his long-haul links between Vryburg and Berlin were always at the mercy of the ionosphere. During the period of two years, from mid-1942 when FELIX was active, the sunspot cycle was in decline, reaching its nadir around January 1944. As a result, the critical frequency of the F region – the most important one for long-haul circuits – was very low and this necessitated the careful selection of frequencies to establish

and maintain contact over the nearly 9000 km path between Vryburg and Berlin. Given the need for absolute secrecy, FELIX never transmitted during daylight when his two 18m poles supporting the antenna would've been far too visible. As described above, those two poles, plus the centre-fed dipole between them, only went aloft after midnight on the three days of the week when he was at his transmitter, and they came down again before sunrise. His use of the 41.6m wavelength, a figure frequently mentioned in numerous FELIX-related files in the files at The National Archives in London, was reasonably close to the FOT (the optimum traffic frequency) for that path over some of that period. Analysis of the propagation using a sophisticated piece of software, known as VOACAP, (Fig 7) enabled us to assess the reliability of CW communication from Vryburg to Berlin. From the VOACAP predictions, it is clear that, for a limited signal-to-noise ratio of

30 dBHz for CW communications, the mean value of the reliability of the propagation path, expressed as time availability, was around 44%. In other words, if FELIX transmitted, typically, on twelve days per month, he was likely to have been received in Germany on around five of them. A similarly dedicated (though less numerically accurate) examination of the detailed MI5/MI6 records in the London archives suggests that this is probably not too wide of the mark. At best FELIX's success rate could be described as marginal; his radio communications were sporadic. However, none of that diminishes the achievement which was remarkable. **WN**

## ACKNOWLEDGEMENTS

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