RAID

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EDITOR'S NOTE

For ease of comparison between types, Imperial/American measurements are used almost exclusively throughout this book. The following data will help in converting the Imperial/American measurements to metric:

1 mile = 1.6km

1lb = 0.45kg

1yd = 0.9m

1ft = 0.3m

1in = 2.54cm/25.4mm

1gal = 4.5 liters

1 ton (US) = 0.9 tonnes

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INTRODUCTION

Prior to World War II, both Britain and Germany had independently discovered that radio waves could be used to detect aircraft. Thus began the race to develop and deploy radar before the other side could put the process to effective use. For the first year or so of the conflict, each side thought that it was leading the race.

Britain was confident that it was well ahead in the radar war and in a sense it was. Although German radar was of a high quality and as advanced as British equipment, its application and administration was not as effective. The Nazi military still regarded their role as being offensive rather than defensive and tried to employ the new technology to that end. Britain, in contrast, was more inclined to use the new equipment to protect itself from the horrors of aerial bombardment and had effectively integrated radar into its inter-service defence network. It had set up systems to exploit the information gained from radar. In this respect it was well ahead of Germany.

Britain had begun its research into what was eventually to become known as radar in 1935. At the time its scientists were studying the possibility of destroying enemy aircraft by means of 'death rays'. Such an idea might seem fanciful now, but in the 1930s the advances made in science appeared to show that anything was possible. A common fear was that enemy bombers could suddenly appear overhead to wreak havoc on civilian populations and every method that could lead to their detection and destruction was given serious thought.

A leading member of the committee at that time looking into air defence was a scientist from the Radio Research Station, Robert Watson-Watt. He concluded that whilst it was impossible to destroy enemy aircraft through radio waves, it should be possible to detect them by bouncing radio energy back from the aircraft's metal body. He was led to this conclusion by investigations made by one of his colleagues, Arnold Wilkins, who was intrigued by observations made by Post Office radio engineers that aircraft flying though a high-frequency radio beam caused the beam to become distorted. An experiment was set up to prove this point to RAF observers in

February 1935 and the results were so impressive that funds were made available to develop the idea. The process was termed Radio Detection Finding (RDF) and the whole procedure was considered so revolutionary and important that it was given a Top Secret level of security.

The early development of RDF, which eventually became known as RAdio Detection And Ranging – RADAR (later to lose its capital letters and become 'radar'), was carried out by Watson-Watt's team at the Telecommunications Research Establishment (TRE) at Bawdsey Manor in Suffolk. Within a year a working system had been developed. It used transmitters radiating a pulsed sequence of radio waves in the 20MHz–30MHz band, which were reflected by aircraft flying into the beam. The reflections would then be detected on receivers located adjacent to the transmitters. The system demonstrated itself capable of detecting aircraft up to a distance of 130km. This proven arrangement was then integrated into Britain's air defences and, by the time that war was declared, a string of these radar stations, known as Chain Home, were located along the east and south coast of England and the east coast of Scotland.

The Chain Home stations did valuable work identifying German attacks during the Battle of Britain in 1940. The system would pick up incoming enemy aircraft whilst they were well out to sea and its controllers would vector RAF fighters to intercept them. The arrangement worked well but its

The buildings of Le Presbytère at Bruneval. The farm complex was used as a barracks for the Luftwaffe signallers and operators manning the radar sites. After the raid the area was fortified with the addition of Tobruk machine-gun posts and concrete gun emplacements. (Ken Ford)

Home are the conquering heroes. A group of delighted paratroopers from C Company arrive alongside the *Prinz Albert* in the Solent after their return from the raid on Bruneval. This successful airborne operation against Hitler's occupied Europe became the first battle honour awarded to the Parachute Regiment. (IWM H17358)

effectiveness and importance was not immediately realized by the Luftwaffe, which allowed the RAF to have the upper hand during a most crucial period.

Further development work in Britain saw improvements in radar ground control interception of enemy aircraft using rotating antennae and higher frequencies. Other smaller airborne systems were engineered to allow aircraft-to-aircraft interception and the detection of submarines by aircraft whilst the boats were on the surface. Perhaps the most important development in the history of radar was the invention of the cavity magnetron by John Randall and Harry Boot at Birmingham University in 1940. This small device allowed for the generation of microwave frequencies much more efficiently, and enabled Britain to develop radar in the 3GHz band. These ultra-high frequencies enabled the detection of smaller objects

using much more compact antennae and consequentially freed up the deployment of radar apparatus from the cumbersome equipment of the previous years. The cavity magnetron was the single most important invention in the history of radar. This remarkable piece of apparatus was given as a free gift to the USA, along with several other inventions, as part of an inducement to enter the war on the side of the British.

In the meantime, Britain was slow to appreciate that Germany and many other countries were also making progress in the field of radio waves. Each had scientists working on equipment that operated at shorter and shorter wavelengths, and each was very protective of the knowledge gained by its researchers. There was little interchange between countries on developments, all therefore progressed in something of a vacuum, so Britain entered the war with many of its important scientific advisers believing that the country was far ahead of any of its rivals and certainly well ahead of Germany.

Radar was not the only field in which other nations were making remarkable progress and often led the way. Germany was at the forefront in tank, aircraft and weapons design and was innovative in the way these new machines were being deployed. Air power was fundamental to the success of Germany's 'Blitzkrieg' tactics and its experimentation in the use of airborne troops gave the country a powerful edge over other belligerent nations. Nor was the use of paratroops confined to the Nazi regime, for Soviet Russia had for years been experimenting with airborne forces. On a trip to Russia in 1936, General Wavell had watched a demonstration of Stalin's air power. He witnessed a whole battalion of 1,200 men, led by a general and complete with 150 machine-guns and eighteen light field guns, successfully drop on its target. 'If I had not witnessed the descents,' he later wrote, 'I could not have believed such an operation possible.' Britain lagged well behind these new developments and at the start of the war had no airborne forces of its own.

ORIGINS

Before World War II, Germany had made great advances in the field of radio. By the outbreak of the conflict it had perfected a system of guiding its bombers to their targets at night using narrow beams. Called 'Knickebein', it allowed bombers to fly along a precise radio beam pointed at its target. If the aircraft deviated from the prescribed bearing, the signal would change and the pilot was able to correct his direction in order to stay on the beam. Once over the target the bomber intercepted another beam, which became the signal for the warplane to drop its bombs. The system was used operationally against Britain in 1940 and was gradually perfected to become first 'X-Gerät', using three intercept beams for more accuracy and then 'Y-Gerät', which utilized a single-beam method that triggered a response from the aircraft so the ground controller could determine its position and initiate the point at which bombs should be dropped. All three methods were very accurate navigational tools, far in advance of anything Britain had to offer.

Precise though these systems were – their pinpoint accuracy was amply demonstrated in the destruction of Coventry on the night of 14/15 November 1940 – they were susceptible to jamming by British countermeasures as its scientists gradually discovered more about how they worked. By the end of 1940 most enemy efforts to use the beams had been jammed. Germany was then obliged to turn its 'blitz' on Britain against major sites that were easily recognizable from the air, such as London and the large ports of Southampton, Portsmouth, Bristol and Plymouth. It was thus forced to carry out area, rather than precision, bombing.

Leading the task of discovering what Germany was doing in the field of radio was a civilian scientist attached to the Air Ministry's Scientific Information Branch, Dr Reginald Victor Jones. It was fortunate that the nation had such a man as Jones working in this sphere at that time, for he had a remarkable ability to predict what logical developments could be achieved by the enemy, even before they had become a reality. It was this deductive technical capacity of Dr Jones's that allowed Britain to keep track of the Germans in the evolution of radar. Germany's use of narrow radio beams to aid navigation prompted Jones into thinking that they were also

OPPOSITE
The bespectacled radar transmitter specialist Donald Priest, from the Telecommunications Research Establishment at Swanage, talks to the commander of the Combined Operations support ship *Prinz Albert* after the raid. Priest went over to Bruneval with Commander Cook's flotilla as a technical adviser with the understanding that he would go ashore only if the area was totally secure. His knowledge of British radar development made it imperative that he did not fall into enemy hands. (IWM H17356)

using narrow beams for radar, even though many at the top of the scientific world in Britain felt otherwise.

In fact Germany was, as Jones predicted, making startling progress with the idea of using radio beams in the area of radio detection systems. However, unlike the British the scientists and engineers working in this field all belonged to commercial companies and each developed their work more or less in isolation. Systems were built and then demonstrated to the military, rather than progressing in concert with the requirements of the German

Kriegsmarine and the Luftwaffe. This tended to slow down advances and lead to inter-service rivalries.

By the time war broke out the Kriegsmarine was sponsoring radar work and had on its major warships a serviceable short-wave system (60cm) built and developed by the electronics company GEMA. Known as 'Seetakt', it was capable of locating surface ships, in perfect conditions, up to 160km away, but was primarily designed for ranging purposes rather than for detection. Over 200 Seetakt radars were built, a number of which were used for coastal defence. Another system developed by GEMA for the German Navy used long-wave technology and worked in the 2.5-metre waveband at 120MHz. This became known as the 'Freya' early warning radar system. It had a range of almost 160km but, unlike the British Chain Home system, could not determine the altitude of any intruding aircraft. The Luftwaffe had little knowledge of these developments until 1938 for the German Navy kept the development work secret. Once Generalfeldmarschall Göring got to hear of Freya's ability to detect aircraft, the Luftwaffe immediately ordered a number of Freya systems for its own use.

By mid-1940 Britain knew that Germany had some practical radar, but had few details of its size and performance. Intelligence suggested that a system called Freya was employed in France although what it looked like and how it was used was still not known. Dr Jones needed the answers to these questions and knowledge of the actual frequencies Freya operated over, but first a working system had to be located so that it could be carefully studied. There was some suspicion that some kind of radar station on the Cherbourg Peninsula in France had detected the destroyer HMS *Delight* when it was 30km off Portland Bill and then directed German bombers to intercept and sink the warship. Aerial photo-reconnaissance later indicated that there was an unknown installation close by a compound near to Cherbourg that included known X-Gerät and Y-Gerät transmitters, which might be Freya radar.

Further aerial pictures gave Jones the evidence he was looking for. Careful study of two sequential photographs made on 22 February 1941 showed a rotating antenna around 9m high. In the meantime an assistant of Dr Jones's, Derrick Garrard, had taken a suitable radio receiver down to the south coast and was listening for enemy radar transmissions. Two days later he succeeded in hearing Freya transmissions around the 120MHz frequency. The two pieces of evidence proved to the Air Ministry that the Germans had radar and were using it.

During the next few months more and more intelligence, supported by technical deductions made by Jones, all indicated that Freya was being used as a long-distance directional radar. It also indicated the existence of another type of radar, called 'Würzburg', which was being employed in conjunction with Freya to give short-range information on the height and bearing of intruding aircraft. Intelligence suggested numbers of these two radars working together made up an effective defence line across northern Europe. The Kammhuber Line, as it was called, controlled intercepting German night-fighter groups and directed them on to incoming British

bombers. The system was most effective and proving to be costly to RAF Bomber Command.

Jones quickly realized that the technical make-up of Würzburg would need to be analysed so that some sort of jamming arrangements could be employed to counter its effects. It was clear that Würzburg was one of the most important of the enemy's radars, employing the latest German developments. There was much evidence of its existence, for intelligence sources had claimed to have seen a mysterious parabolic antenna in Germany

Diagram of a German Freya radar of the type based at Bruneval. It was the discovery of this type of installation at Bruneval that helped the British locate the presence of a Würzburg radar on the same site. Experts had reasoned that the inherent efficiency of the Germans would most likely lead them to put the newer radar close by existing Freya equipment. (US War Department)

The picture that initiated the planning of Operation *Biting*. This photograph, from the archives of Combined Operations, highlights the 'small black object' that aroused so much interest in the Photographic Interpretation Section when it was looking for the location of a Würzburg radar installation. It was nothing more than a speck on a photographic plate, but it was the first indication that the radar existed. (Crown Copyright)

and listening groups from the TRE had detected pulsed German transmissions opposite Dover in the 50cm waveband at around 570MHz. The information pointed to the possibility that the enemy was employing Würzburg to detect incoming British aircraft as they approached the French coast. Further investigation by scientists from TRE in aircraft fitted with high-powered radio receivers had detected transmissions in the 50cm waveband all along the Channel coast.

Jones now lobbied for aerial reconnaissance photographs to be studied in detail to find one of these elusive and mysterious parabolic antennae. It was accepted that the apparatus worked in the 50cm band and transmitted a pulsed beam with a repetition rate of between 3,600 and 4,000 per second. From this it was relatively straightforward to deduce that the radar had a range of about 40km. Therefore to cover the whole coastline there would have to be one station every 80km along the French coast. The likely sites were narrowed down by employing the theory that the Germans would apply themselves to their normal dictate of convenience and security and locate their Würzburgs in the same compounds as their Freyas.

On 15 November 1941, sortie T/953 by the RAF Photo-Reconnaissance Unit took pictures of the coastline north of Le Havre in France. The Central Interpretation Unit (CIU) staff at Medmenham found Photograph 02Y to be

of great interest, for it showed a Freya station located on top of the cliffs along the coast near Cap d'Antifer. Study of the photograph showed a fairly standard layout for the site with the usual large antenna emplacements. Dr Jones's insistence that these sites should be carefully examined prompted his assistant, Dr F. C. Frank, to scrutinize the photograph in greater detail.

NOVEMBER 15 1941

Freya station discovered at Bruneval

Dr Frank pointed out that a path led along the cliff edge for some distance towards a large villa. It stopped, however, a few metres short of the house in a large loop. At the end of the loop was a small black object, no more that a tiny pinprick on the 12.5cm by 12.5cm contact print that the doctor was studying. Frank suggested that someone had considered it necessary to make a track from the main Freya station to this object. Might it therefore, he reasoned, itself be a radar of some sort?

When the discovery was reported to Jones he used his influence to get the object photographed in more detail. He contacted the CIU and asked for low-level pictures of the installation at Cap d'Antifer, explaining that what he was looking for might resemble a large electric bowl fire. On 4 December 1941 Flight Lieutenant Tony Hill DFC made a photographic reconnaissance sortie over the site and saw the apparatus in question, reporting that it did indeed look like an electric bowl fire. Unfortunately the photographs he took missed the object itself and were inconclusive. Undaunted, he successfully repeated the flight the next day at great personal risk and brought back two incredibly detailed pictures of the installation.

Jones was overjoyed when he received the photographs for they confirmed the existence of Würzburg in the form that he had expected. Its antenna was a parabolic dish with a diameter of around 3m. Its equipment appeared to be housed in a small shed located at the base of the aerial. The whole installation was situated remote from any other building in a low-banked hollow. Close by was a nineteenth-century villa, which no doubt housed the technicians manning the radar installation. The site itself was no more than 100 metres from the cliff edge, with a clear view out to sea.

As Jones and Frank studied the terrain surrounding the radars, they were struck by the openness of the compound. It was perched close to the cliff's edge with a path running down to a small beach. To its rear was wide-open countryside with no town of any significant size nearby. Its vulnerability to attack was plain to see. The idea began to form in their minds of a raid being mounted to steal the radar. The component parts of the Würzburg if studied at first hand would yield any number of enemy secrets. Jones was at first loath to suggest anything that might cause any loss of life, but possession of the radar could help stifle the enemy's advances in the use of radar and might help shorten the war. It was a risk that, on balance, was worth taking.

DECEMBER 4–5 1941

Radar identified at Bruneval

INITIAL STRATEGY

After the British retreat from the mainland of Europe via Dunkirk in June 1940, Britain was besieged by Nazi forces just 42km away in France and the Low Countries. To harness the country's spirit of resistance, Prime Minister Winston Churchill urged the setting up of special forces with the specific task of striking back at the enemy across the Channel.

A full-scale invasion would be out of the question for some time, so special units, such as the commandos, were raised to raid and harass the enemy at times and places he would least expect. To co-ordinate these special tasks a new organization was set up in July 1940, which was intended to integrate small-scale land, sea and air operations against enemy-held territories. This new department, Combined Operations (CO), was originally headed by the architect of the 1918 Zeebrugge raid, Admiral of the Fleet Lord Roger Keyes, but by October 1941 the young and energetic Lord Louis Mountbatten, a cousin of the king, had taken over command. The organization had no fighting troops of its own, but consisted of background staff whose job was to plan operations and to develop ideas and equipment with which to harass the enemy in any way possible. Its HQ planning teams evaluated any suggestions, co-ordinated a workable plan and calculated the units required, before deciding whether or not to forward the proposal to the Combined Chiefs of Staff Committee for permission to execute the raid.

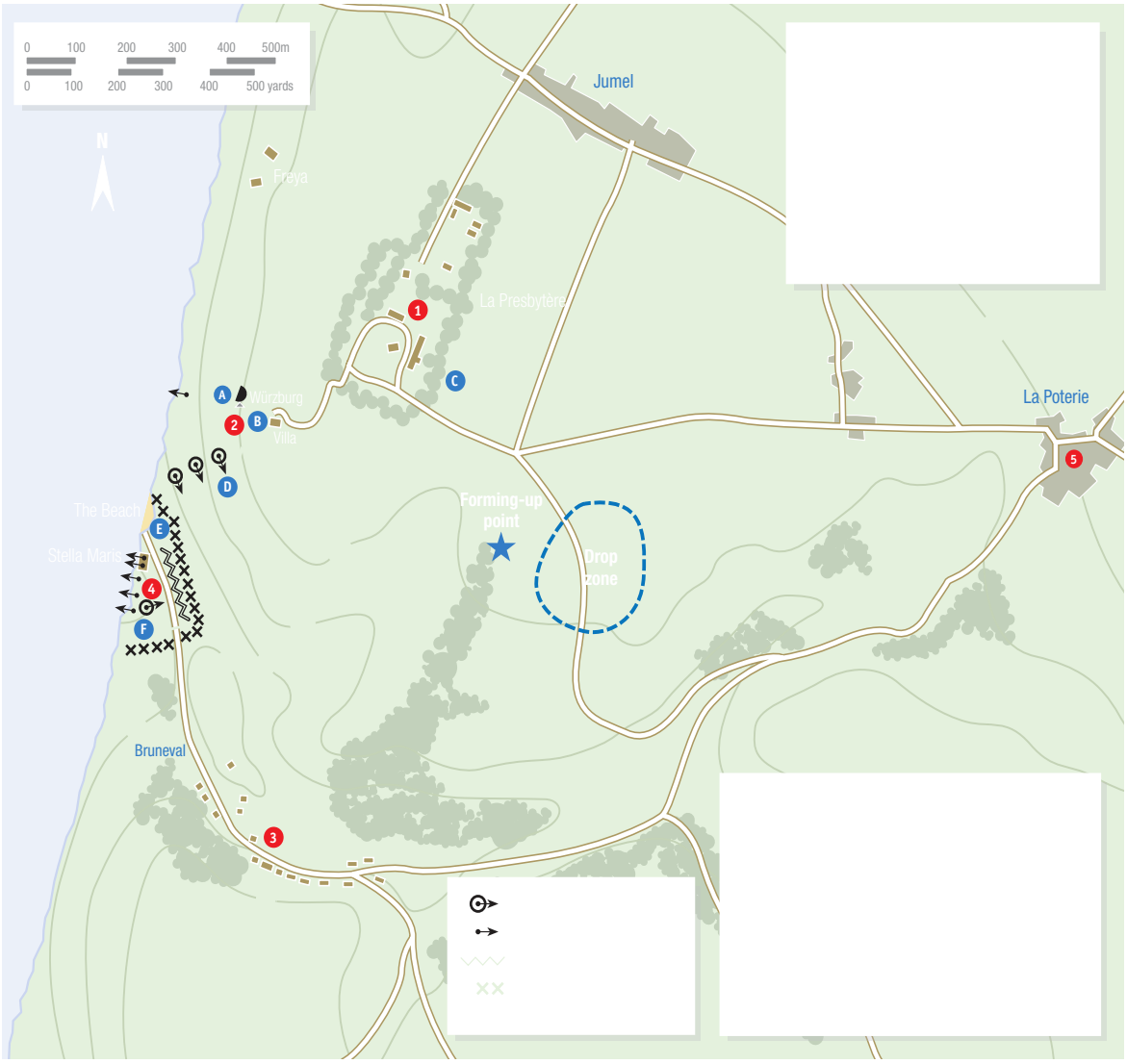
It was to COHQ that Dr Jones's request for a raid to be mounted against the German radar site at Bruneval near Cap d'Antifer was put in December 1941. It was met with a great deal of enthusiasm, for the raid was just the type of enterprise that Combined Operations were looking for. The attack was not intended merely to be an in-and-out punitive foray, for it had a worthwhile objective that would contribute to the nation's security. It was also an operation that would cause great disquiet within the Nazi hierarchy, a thought that would please the Prime Minister immensely. The location of the radar site on top of a cliff adjacent to the beach at Bruneval made it a most attractive location both for landings and embarkation; a commando unit could be set down and embarked with few problems. This was a raid

that, if executed with some dash and a lot of determination, had a very good chance of complete success.

The obvious method of attack and withdrawal was by sea. With a landing beach close by it was clearly the simplest and most cost-effective way, but there was another method that might be used, which had an element of politics about it. Britain's fledgling airborne forces were looking for some way of redeeming themselves after their disastrous first operation in Italy and this raid might be the very thing they too were looking for.

Britain's first airborne unit began its life as No. 2 Commando in 1940, selected and trained specifically for parachute operations. On 21 November of that year it was redesignated 11th Special Air Service Battalion and by 17 December the battalion felt that it was ready for action, having completed all of its parachute training and demonstrated its ability in a number of exercises. It was felt that this new type of warfare needed to be tested under fire and a raid was planned to test its methods of deployment, its equipment and the aircraft it used. On 7 February 1941 a small group from 11th SAS Battalion was parachuted into Italy to attack the aqueduct across the River Tragino near Calitri in the province of Campania. It was intended that the raiders would demolish the aqueduct and then withdraw to the coast near the mouth of the River Sele to be evacuated by the submarine HMS *Triumph*.

Flight Lieutenant Tony Hill's famous oblique photograph of the Würzburg installation at Bruneval. From this one picture everything that was suspected about the radar was confirmed. Its existence and vulnerability on the cliffs above a small beach so excited Dr Jones that he pressed for a raid to be mounted to steal its secrets. (IWM D12870)



The raid was not a great success. Several loads of vital equipment were lost and some paratroopers were dropped wide of the mark and failed to reach the target. The aqueduct was, however, eventually destroyed along with an adjacent bridge, but everyone who took part in the raid, except one man, was captured and made a prisoner of war. Within a short time the aqueduct was repaired and the region's water supplies remained unaffected throughout. Nonetheless, although the raid was not the *coup de main* and national morale builder that had been hoped for, several important lessons were learned from the operation, the main one being that there was a future for airborne troops, and so further steps were taken to build up a parachute force.

On 5 September 1941 HQ 1st Parachute Brigade was formed, with Brigadier Richard Gale at its head. Its three battalions came into being the same month, with the 1st Battalion being created from the already trained

11th Special Air Service Battalion and the 2nd and 3rd Battalions raised from army volunteers. A month later, on 31 October 1941, the 1st Airborne Division became operational, with Major General Frederick 'Boy' Browning as its General Officer Commanding (GOC) and with the 1st Parachute Brigade placed under command. A month later still, the 1st Airlanding Brigade, formed from the 31st Infantry Brigade Group, joined the division. By the end of 1941 Britain had an airborne division in being, but not yet ready for offensive operations.

With these new airborne units being raised and gradually made ready for action at the start of 1942, there was a pressing need to have some success attached to parachute forces. Their profile required raising in the eyes of the public and experience needed to be gained from contact with the enemy. When Combined Operations planners considered the proposed raid on the radar station at Bruneval it was suggested that the raid might be undertaken not by commandos, but by paratroops. Their swift, silent approach from the sky would add an element of surprise to the operation and their

Major John Frost on board the Combined Operations support ship *Prinz Albert* after his return from Bruneval. He is recounting the raid to the GSO1 of the 1st Parachute Division. (IWM H17349)

embarkation by sea would ensure that the whole enterprise involved all three services to become a truly combined operation. Mountbatten agreed and so did the Chiefs of Staff Committee when the proposal was put to them. The only problem was, would the paras be trained and ready in time?

With permission granted for the operation to take place it became necessary for COHQ to plan the raid in detail. One factor that was very hard to determine was the strength of the enemy defences and the opposition that the raiders might have to face. Photo-reconnaissance could indicate only so much; the finer details would have to be filled in by agents in France. Fortunately there was a brilliant agent working from Paris, Gilbert Renault (code name 'Rémy'), whose network Confrérie Notre-Dame covered the whole of northern France. Rémy in turn had a very special recruit called Roger Dumont (code name 'Pol'), who conveniently had an agent working with him who was based at Le Havre, just 29km south of Bruneval and the radar station.

On 24 January 1942 Rémy received a coded radio message from his Special Operations Executive (SOE) controllers in London containing an urgent request for information about the enemy around Bruneval and the coast. They wanted to know a number of things, including the location of any machine-guns defending the cliff road; all the other defences present in the area; the number and state of preparedness of the German defenders; where enemy troops were quartered; and the positions of any barbed-wired areas. This was information that could be ascertained only by agents actually visiting the area. Rémy passed the request on to Pol, who in turn sought the help of his agent in Le Havre, Charles Chauveau, code name 'Charlemagne'.

Charles Chauveau was a garage proprietor with a permit to use his car in the region of Seine-Inférieure, the area around Le Havre. When Pol told him of the British need for details about the Germans at Bruneval, Charlemagne responded with enthusiasm. He already knew the owners of the hotel in the village quite well and reassured Pol that they were friendly to the Allied cause. He was sure that they would have much useful information to give them.

Charlemagne was right; the owners of the Hotel Beauminet located at the top end of the village, Monsieur and Madame Venniers, had a great deal of information to give to the two agents when they visited. They told them that the Luftwaffe personnel garrisoning the radar site were housed in the great rectangle of farm buildings called Le Presbytère, which was situated just north of the villa on the cliffs. In Bruneval itself there was a platoon of German troops led by a sergeant maintaining the guard on the route down to the beach. They were housed in the hotel and in a villa overlooking the beach. Two bunkers, each containing a machine-gun, guarded the beach exit. The road itself was barred by barbed-wire emplacements and the beach and the grass verge bordering the road were mined.

Chauveau and Dumont decided they would try to have a look at the beach for themselves, even though the Venniers warned them that it was forbidden. Their bravado paid off, for the bored German sentry guarding the road allowed them down to the sea, believing the story that Dumont

was a student from Paris and wished to see the ocean before he returned to the city. The guard raised the barrier-post on the road and let them pass through to the tiny beach nestling beneath the cliffs. The '*Achtung Minen*' notices proved to be just for show, for the German followed closely behind the two men and allowed them onto the shingle. The Frenchmen behaved courteously, engaging in some friendly chitchat to put the sentry at ease. On the way back the German walked casually over the other supposedly mined area near the road with little caution whilst the two agents noted the exact positions of the machine-guns defending the exit from the sea. The two Frenchmen had seen all that there was to see and retreated back to the hotel and then on to Le Havre. The reconnaissance mission had been a great success and the required information about the area was quickly beamed back to SOE in London and then to COHQ, who now had sufficient details to go ahead with planning the fine detail of the raid.

Once the decision had been made to use paratroopers for the operation, Major-General Browning and Brigadier Richard Gale were notified on 14 January that one company, with attendant sappers, would be required for training in combined operations with a view to carrying out a raid. The two

Captain Ross speaking to some of his group on the beach in Dorset during a training exercise. Ross was Major Frost's second in command during the raid, with the added task of holding the road leading down to the beach at Bruneval against an enemy attack from the village. (IWM 17414)

JANUARY 20 1942

Major Frost's company starts special training

senior officers now had to decide which of their troops would take part. Their most experienced parachutists belonged to the 1st Parachute Battalion, which was formed from the 11th SAS, but Gale decided on a company from his 2nd Battalion. C Company had been in training for almost four months and its men had acquitted themselves well. The 2nd Battalion's commander, Lieutenant-Colonel E. W. C. Flavell, had earlier decided to form C Company from volunteers from many of the Scottish regiments. These Scotsmen arrived at the training camp seemingly in better shape than most of the others and they quickly began to forge themselves into an impressive group; 'an outstanding body of men' was how C Company's commander Major John Frost described them.

By the third week in January COHQ had evolved a working plan for the raid, now called Operation *Biting*, which had been put to the three services. On 20 January, Major Frost was briefed that his company was to embark on a special programme of training that would involve them moving south to Tilshead Camp on Salisbury Plain, the home of the recently formed Glider Pilot Regiment. To preserve secrecy, Frost was told nothing of the raid but that his unit would be training for a demonstration to the War Cabinet towards the end of February. Bad weather, most notably freezing temperatures and heavy snow, delayed this move from Yorkshire until 24 January.

Part of the flotilla of motor gun boats that took part in the Bruneval Raid, berthed alongside the *Prinz Albert* in the Solent. (IWM H17361)

The air component of the raid was in three parts. First, the RAF was required to transport the parachutists to their objective at Bruneval in France; second, it was required to distract the enemy's attention by diversionary

raids, and third, it needed to provide fighter cover during daylight hours to the naval forces employed in the operation. Group Captain Sir Nigel Norman was appointed to co-ordinate the training and preparation of the RAF units for the raid. Other RAF groups would provide fighter cover and bomber diversion. Group Captain Norman specialized in providing air support for the army and had, on 15 January 1942, raised 38 Wing RAF Army Co-operation Command to provide transport aircraft for airborne operations. The wing's first Order of Battle consisted of No. 296 and No. 297 Squadrons, both based at Netheravon in Wiltshire. However, neither of these squadrons were immediately available for operations when orders for the raid were given to Group Captain Norman just one week after he had raised the wing, so he was assigned 12 aircraft from No. 51 Squadron Bomber Command to use in the operation.

No. 51 Squadron was one of the many night bomber units that had been flying operations over Europe since 1940. Its commander, Wing Commander Percy Charles Pickard, was well known to the British public from his appearance in the propaganda film *Target for Tonight*, in which he was shown flying the Wellington bomber 'F' for Freddie on an operational sortie over Germany. Pickard was a very experienced bomber pilot who had already been awarded the Distinguished Flying Cross (DFC) and the Distinguished Service Order (DSO) and was later to earn a Bar to add to his DSO for his part in Operation *Biting*.

The Bruneval operation as a whole was under the supreme command of the Commander-in-Chief Portsmouth, Admiral Sir William 'Bubbles' James. Admiral James had acquired his unusual nickname from his having sat as the child model for the painting *Bubbles* created by his grandfather, the celebrated artist John Millais. The painting, now in the Lady Lever Art Gallery in Liverpool, was to gain worldwide acclaim through its use in an advertisement for Pears soap. Commander F. N. Cook of the Royal Australian Navy was designated Naval Force Commander reporting to Admiral James and it was his task to co-ordinate the naval craft that would evacuate the paratroopers from the beach at Bruneval and bring them back across the Channel to Portsmouth. Commander Cook at that time was in command of HMS *Tormentor*, a land-based Royal Navy Combined Operations School that was set up in August 1940 as a motor gun boat (MGB) operational and maintenance base. MGBs from this small unit located on the River Hamble close to Southampton were to be used to help embark the raiders and their landing craft from Bruneval.

The information gained by the French agents was useful but did not paint the whole picture of the enemy forces that might be encountered on the raid. Chauveau and Dumont had identified two bunkers containing machine-guns overlooking the beach at Bruneval, but there were others. Photo-reconnaissance sorties over the area showed there was a line of three emplacements linked by a network of trenches that guarded the path that led from the road near the beach up to the villa alongside the Würzburg site. Two further weapons pits were located along the cliff edge between the Würzburg and the Freya positions.

The model of the villa and Würzburg at Bruneval made especially for the raid. On this model the finer details of the attack on the house and radar installation were worked out by Frost and his junior officers. (Crown Copyright)

Careful study of the pictures and an appreciation of the information gained by the French agents indicated that some of the local defence of the site was down to Luftwaffe personnel on the ground. A company of coast defence infantry, garrisoned locally at La Poterie, looked after the coastline in the vicinity of the radar sites. At Bruneval some of these troops were located in the complex of farm buildings just to the north of the villa at Le Presbytère and would most likely be the first of the enemy to oppose the landings. The platoon of army troops garrisoned in the nearby village of Bruneval was there to guard against landings from the sea. Once roused by the arrival of low-flying aircraft and the sounds of gunfire at the radar site, they would no doubt move to man their positions guarding the beach and would provide stiff opposition to any withdrawal once the raid was completed.

PLANNING AND TRAINING

By the end of January the forces allocated to Operation *Biting* had been identified and the task of detailed planning and training was under way. For the Royal Navy it was a matter of helping to train Frost's paratroopers in embarkation techniques and arranging for the flotilla of vessels to be offshore at the appropriate time. For the men of C Company, 2nd Parachute Battalion, they had to become proficient in landing by parachute and regrouping on target, accomplishing the objectives of the raid and getting out again with as few casualties as possible. For the RAF, No. 51 Squadron had to convert its Whitley bombers to carry parachutists, train with them as airborne transport and get the men to their target safely and on time. Other RAF units would conduct diversionary raids and fighter cover as required.

Operation *Biting* was not a punitive raid; it had a much greater purpose than merely to terrorize a German garrison and take prisoners. Its main objective was to steal radar equipment and this in itself required expert personnel and engineering support. C Company was the brute force of the enterprise, intent on imposing its will on the German defenders and marshalling its men to ensure that the theft was successful. Expertise in engineering aspects was provided by a detachment from the Airborne Division's Air Troop Royal Engineers under the command of Lieutenant Dennis Vernon. Crucial to the operation was the inclusion of a radar expert who could determine what parts of the radar equipment were valuable to the objective and what were not. That expert was RAF Flight Sergeant Charles Cox.

Flt Sgt Cox was a technician at the Chain Home radar station at Hartland Point in north Devon with a good working knowledge of RDF. He was regarded as being one of the best radar mechanics in Britain. On 1 February 1942 Cox was called to the Air Ministry in London to see Air Commodore Tait. The senior officer asked him to volunteer for a dangerous mission that was vital to Britain's war effort. When asking what exactly was the mission Cox was told that the operation was still secret and the air commodore was not at liberty to divulge its objectives. Without knowing what was being asked of him, Cox immediately volunteered for the mission and was whisked away to Manchester to undergo parachute training.