

OBOE



TOP SECRET RADAR, WWII

Prepared by A. Cassidy

OBOE

OBOE

CONTENTS

Top Secret Radar, WW2.....	XIII-5
Pathfinder Operations.....	XIII-11
Hawkshill Down.....	XIII-13
Beachy Head and Buzz-bombs.....	XIII-14
109 Pathfinder Squadron.....	XIII-19
Across the Channel to the Ardennes.....	XIII-23
Across the Channel to Holland.....	XIII-25
Across the Channel to Mutzig.....	XIII-31
Across the Rhine and into the trees.....	XIII-34
Type 9000 and GEE type 100.....	XIII-37
Buchenwald.....	XIII-40

PHOTOGRAPHS

Figure 1 - OBOE Control Console, Mutzig.....	XIII-9
Figure 2 - Two of the four OBOE trailers at Mutzig, 1945.....	XIII-9
Figure 3 - The Allied Advance, October/November, 1944.....	XIII-10
Figure 4 - Giant Wurzburg antenna, Horstmar, Germany, 1945.....	XIII-18
Figure 5 - Mosquito Pathfinder aircraft.....	XIII-22
Figure 6 - Test van with power generator.....	XIII-22
Figure 7 - In the mud at our Laroche Site, 16 December, 1944.....	XIII-24
Figure 8 - The Ardennes Bulge, December, 1944.....	XIII-24
Figure 9 - The Battle for the Scheldt.....	XIII-30
Figure 10-Strasbourg Front, November/December, 1944.....	XIII-33
Figure 11-Convoy 6/9000 OBOE trailers, #1 and #2, at Horstmar, 1945....	XIII-36
Figure 12-OBOE trailers, #3 and #4 at Horstmar, 1945.....	XIII-36
Figure 13-Radar trailer type SCR-584.....	XIII-39

OBOE

PREFACE and ACKNOWLEDGEMENTS

This chapter tells the story of OBOE, the remote control radar system that, in conjunction with the navigation system GEE, played an important part in the RAF Bomber Command and the United States Army Air Force bombing campaigns against Germany in WWII.

The Introduction gives a brief account of the whys and wherefores of the system's development, how the system worked and how it was used and deployed operationally.

This is followed by a number of personal stories by a few of the many RCAF radar officers and mechanics who contributed so much to the success of the first blind-bombing, remote control push button warfare system.

I wish to extend my thanks to all those who contributed their OBOE stories and have provided a great deal of advice and assistance to me in the compilation of this chapter.

A. Cassidy, Delta, Ontario

May, 2000

OBOE

TOP SECRET RADAR, WWII

Introduction

OBOE, the top secret radar of WWII, was the first electronically-controlled precision bombing system of both the RAF and the USAF and it played an important part in the Allied Air Forces' bombing campaign against Germany. Its success can best be summarized by quoting the following from Air Marshall Harris's account of the Operations of Bomber Command.:

"At long last we were ready and equipped and Bomber Command's main offensive began at a precise moment, the moment of the first major attack on an objective in Germany by means of OBOE. This was the night of March 5/6 1943, when I was at last able to undertake, with any real hope of success, the task which had been given to me when I first took over Bomber Command at the beginning of 1942 - the task of destroying the industrial capability of Germany. "

The city was Essen, and the target was Krupps, perhaps the greatest and most notorious armament manufacturer the world has known. A German source, commenting on this raid, found great devastation in the main industrial area and this was a complete change from previous raids when the bombs had been scattered all over the Ruhr.

The Development of OBOE

After Operation Sea Lion, Hitler's plan to invade England was cancelled in September, 1940, and there was no immediate threat of invasion, the RAF began to build up its bomber force and to take the war to Germany. The results of these early attacks by Bomber Command were absolutely dismal for two reasons. First, daylight bombing was now out of the question and it was difficult navigating the 300 mile distance to the German cities in the Ruhr Valley at night without navigational aids. Sometimes the bombers missed the target city completely. Secondly, if and when they got near them, the bomb aimers couldn't see the targets through their optical bomb sights because it was dark and cloud and smog usually covered them.

For their attacks on English cities, the Germans used a navigation system called Lorenz, that used beams from two ground transmitters located just across the English Channel, and pointed to intersect over the target. Like all radio beams, the beams get wider as the distance increases. At the relatively short ranges to the English cities from the transmitters in France, the accuracy of this type of system was acceptable for bombing cities, as the Germans did, but not acceptable to the RAF for use against targets such as the factories in the Ruhr Valley, 300 miles away.

So, of course, necessity is the mother of invention and it wasn't long, therefore, until the boffins at TRE (Telecommunications Research Establishment, Malvern) were assigned the task of finding a solution to the two problems. They quickly came up with an answer to the first with the navigational system called GEE which worked somewhat on the principle of radar and is described in more detail in another chapter. "G" was an extremely good navigation system. It got the navigators to the target cities and back to their bases. However, "G" was not accurate enough to release bombs on the factories in the Ruhr and on other German targets.

OBOE

To overcome this accuracy problem, the idea of using a pair of ground radar stations with their inherent capability to measure range accurately, regardless of range, was put forward in 1941. One station, called the Cat, gave the pilot a narrow beam to fly over the target based upon the radar range and the second station, called the Mouse, gave a signal to the navigator/ bomb-aimer to release the bombs based upon its radar range to the target. To overcome the problem of detecting and controlling the aircraft at ranges up to 300 miles, a transponder was used in the aircraft. This transponder received the pulses from the two ground stations and re-transmitted them back to the two stations. The radar pulses were also used for communicating information from the Cat and Mouse stations to the pilot and navigator by modulating them with Dots and Dashes which would be heard similar to morse code as Dits and Dahs.

The operation of the Cat and Mouse stations was quite similar and could be used interchangeably. At the Cat station, a marker, called the target marker, would be set on the radar scope to the range of the target for the mission with an accuracy of 1/100 of a mile or 52.8 feet, independent of range. Almost as good as the cruise missiles used by NATO in the bombing of Serbia in 1999, 56 years later. The relative position of the aircraft echo or blip to the target marker produced the signals to which the pilot responded. He would hear dits in his headset on one side of the marker, a steady note on the marker and then dabs on the other side of the marker. By flying the aircraft to keep the steady note, the pilot would then fly a track, which was an arc of a circle, toward and then over the target. To quote Group Captain Keith Sommerville, one of the early Oboe test pilots:

"The Mosquito was so beautifully manoeuvrable that with the slightest touch on the rudder, you could keep straight down the narrow line between the signals, which was actually narrower than the width of the plane."

Although it was referred to as flying the beam, there was no actual beam in space.

At the Mouse station, which was located some distance from the Cat station, the target marker would be set to the range of the target for that mission in a similar manner as at the Cat. Due to its ballistic or arced trajectory to the ground, a bomb must be released at some point before the target. Information regarding the altitude of the aircraft and the time of bomb fall would also be set into the panel on the console, called the "micestro", that calculated the release point. As the aircraft flew along the track toward the target, the navigator would hear in his earphones a series of signals indicating the flying time to the release point. At 10 minutes it was 4 morse code A's; then 4 B's; then C's; 3 mins D's, silence, then at the release point 5 dits, a long dash, at the end of which the navigator pressed the bomb release button. The flying of the aircraft could have been controlled by the autopilot and the release signal could have been automatic but the aircrew felt they could do it better. By the end of 1942, the system called OBOE based on this idea, had been developed, tested with great success against actual German targets and was ready for operations.

How OBOE was used Operationally - The Ground Stations

As you will note from the brief technical explanation of OBOE, it took two stations to control one aircraft at a time to and over the target. The "Start Point" of this control was a designated point 10 minutes flying time from the target, or for the Mosquito aircraft, approximately 50 miles to the release

OBOE

point. Allowing a couple of minutes more for each aircraft, these two stations would be able to control only about 5 a/c in one hour at the maximum. Normally, it was about 3 per hour. So quite a few stations were required for each mission. This need was met initially by building several sites along the South and South East Coast of England with several control stations at each site. Some of these stations were in fixed buildings and others were in mobile trailers. During an operational mission, a Cat and Mouse station would exchange pertinent data with each other by a "scrambled" telephone link. Other than the info transmitted to the aircraft via the transmitted radar pulses, there was no communication between the aircraft and ground stations.

Shortly before "Zero Hour" (the time that the control of the first pathfinder aircraft of the operation would commence) the dual dish antenna (Fig.2) located at both the Cat and Mouse stations would be slowly rotated to the bearing of the Start Point. Communication would be made between the two stations. The navigator in the lead aircraft, using Gee, would be timing his arrival at the Start Point at "Zero Hour". The controller, two radar operators and a radar mechanic waited as the countdown continued to zero at which time the transmitter would be switched on. A radar operator would slowly move the antenna back and forth and a blip from the aircraft would appear on the radar scope (Fig. 1). The operator would then continue to make fine adjustments of the antenna to keep the signal tuned in. An electronic marker, called a walking strobe, would be moved over the blip and "lock on" would occur and the other station would be notified. Hopefully, a similar report of "lock on" would be received back. The control of the aircraft down the track toward the target would continue for the next 10 minutes. When the navigator pressed the "Bomb Release Button", the transponder in the aircraft would be switched off and the blip would disappear from both the CAT and MOUSE scopes. The antennas would then be turned back to the original bearing and the control would continue for the next aircraft scheduled to fly down the track. A similar routine would be repeated in the other fixed station or trailers at the same site with each controlling a separate aircraft with different designated times. This entire coordinated operation would then continue till the end of the bombing raid.

Pathfinder Squadron Operations

The airborne OBOE equipment was installed mainly in the Mosquito aircraft of the Pathfinder Squadrons because they were the only RAF aircraft that could fly above the 30,000 ft altitude that was needed to maintain radar contact at the 300 mile range. The high speed of the Mossies was also a factor. OBOE was also installed in some Lancaster bombers but with disastrous results. Their lower speed, lower maximum altitude and the necessity for a straight and level flight for 10 minutes made them very vulnerable to both ack-ack fire and night-fighters. OBOE was also installed in the lead bombers of some US 8th Air Force flying fortress squadrons. Since the USAF only flew missions in the daylight, if the target could be seen, the lead bomber would switch OBOE off and use the world famous Norden bomb sight. If not, the lead bomber, upon hearing the OBOE release signal, would signal his squadron to release their bombs.

The Mossies were usually used to mark the target with special flares called target indicators for the

OBOE

following force of bombers to aim on, hence the name Pathfinders. Each canister released "candles"-perhaps 60 or so of them at about 3000 feet forming a circle of about 100 yards. The usual colour was red and the bomber crews generally accepted this OBOE marker as being accurate. It was sometimes backed up by green markers dropped by other aircraft to confuse the Germans. There were also sky markers which were used when clouds obscured the ground as well as other markers used for particular situations. The Mossie could carry four target indicator canisters, or four 500lb bombs, or two 1000 pounders or with special modification, one 4,000 lb., all of which were used for special bombing missions such as V1 and V2 launching sites and the big German guns along the coast just before and on D-Day.

OBOE Operations on the Continent

Shortly after D-Day, the OBOE trailers that were at the fixed sites in England were organized into two mobile units, called Type 9K convoys, and deployed to the Continent. Each convoy had 4 radar trailers, a workshop, diesel electric generators, an operations van and all the other support equipment, including pots and pans, that was required to keep approximately 200 men operational in the field. After the breakthrough of the Allied armies in Normandy, one convoy was moved up to the Ardennes Mountains in Belgium, near Bastogne, and the other to the Voges Mountains, near Strasbourg, in France (Fig. 3). This brought a new series of targets in Germany within OBOE range. These first convoys were followed by other convoys as quickly as personnel could be trained and the necessary equipment brought together. By the end of the war, a total of six 9K convoys were deployed in France, Belgium, Holland and Germany.

Final Oboe Runs

One of the last operations for OBOE was Berchtesgaden, Hitler's Alpine retreat. It was attacked by OBOE fitted aircraft in late April 1945, but not very successfully due to reflections of the signals from the mountains. Even if the raid had been successful from the bombing point of view, it would not have destroyed the real target. He was in his bunker in Berlin.

The final use of OBOE in WWII ended on a happier note. The bombs this time were food bombs dropped on Holland in the final days of the war for the starving Dutch people. By pre-arrangement with the Dutch resistance, a site was chosen for a drop well away from the German Security forces. The precise aiming point was signalled to London and the Cat/Mouse ranges calculated. At a pre-arranged time, Lancasters, carrying food canisters, set out to rendezvous with the Dutch resistance. Marked by OBOE, the cannisters were dropped to within 30 yards of the aiming point; far better than any parachute drop or cruise missile could have done. Eager hands rapidly distributed the much needed contents. A fitting end to OBOE in WWII.

The RCAF Contribution

A large number of RCAF radar officers and technicians were seconded to the RAF for the development, testing and deployment of OBOE, both in England and on the Continent. The following are a few stories of some of these officers and mechanics who contributed to the success of OBOE.

OBOE



FIG.1 - OBOE CONTROL CONSOLE, MUTZIG
(Courtesy- F. J. MacDonald)

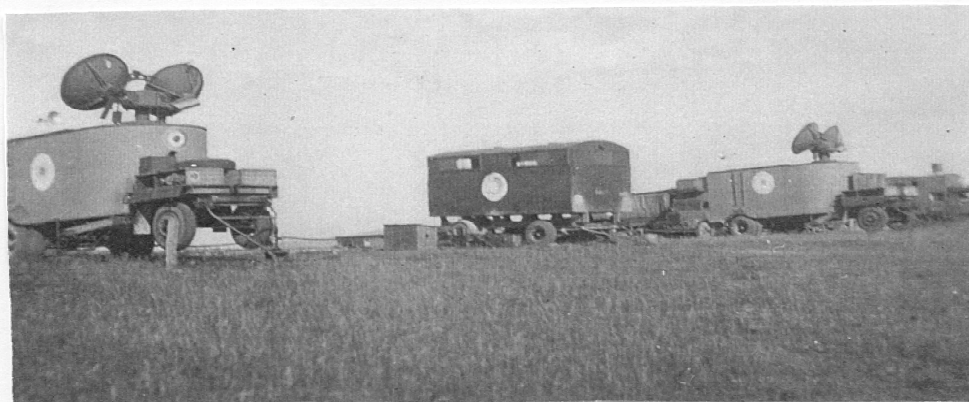


FIG.2 - TWO OF THE FOUR OBOE OPERATIONS TRAILERS AT MUTZIG, 1945
(Courtesy- F. J. MacDonald)

OBOE



(Courtesy New York Times)

FIG.3 - THE ALLIED ADVANCE, OCTOBER, NOVEMBER, 1944

OBOE

PATH FINDER OPERATIONS

L.R. McNarry

(from his story, OBOE as I Remember It)

Preface

OBOE was not a monotonous job. There were some periods of waiting, but these were compensated for by the tense excitement of the attack. Mechanics had the heavy responsibility of maintaining a system which was complex and being worked to the limit, day and night, and for which little, if any, reserve equipment existed, particularly on the mobile units. Operators had the tense and important job of ensuring that the attack was successfully carried out.

OBOE in Operation

A typical operation began with the Senior controller receiving the target and timing information in a coded message from 8 Group HQ of Bomber Command. He immediately notified the Technical Officer, like myself, who then made sure that the equipment was fully functional. The controllers were all ex-aircrew and, generally, did not know much about the complex ground equipment. Hence, liaison between the controllers and the technical staff was sometimes in a delicate balance.

The radar operators, generally Womens Auxiliary Air Force (WAAF) who assisted the controllers, tracked the range and bearing of the aircraft on the radar screens and plotted the resulting "track" for the operation on a plotting board using long, movable range rulers which were pivoted on the location of both the Cat and the Mouse stations. Each OBOE station could be operated in either Cat or Mouse mode and in either mode it was the controller's responsibility to set the target range marker for each operation. It was the duty radar mechanic's responsibility to ensure that all other controls were set and functioning correctly.

72Wing

Justice to the work of 72 Wing HQ cannot be done in a mere paragraph. The work of this great Wing and the experiences and stories of its officers and men would fill a book. It was the all-Radar Navigation Aids (RNA) Wing of 60 Group, RAF, designed to deploy the ground systems essential to the bombing offensive of the Allied Air Forces against the enemy in the European Theatre of Operations. It entered Europe by the beaches of Normandy and began the deployment of GEE, G-H and OBOE units in an ever-increasing scale. It first found itself putting up stations in what was almost a vacuum, for the enemy's retreat in late summer of 1944 across France and Belgium was so rapid that even the fast-moving 72 Wing could not keep pace. Later, the Germans made a stand, building up fronts which for months to come were to withstand our attacks. Against these fronts, 72 Wing proceeded to deploy its many mobile OBOE, GEE and G-H units in such a manner that all the Allied Air Forces were given the best and maximum navigational support.

OBOE

Memories

All who worked on OBOE on stations from Norfolk to Lands End in England, or on the mobile units that moved forward on the Continent with 72 Wing from the Beaches of Normandy to as far east as the borders of Czechoslovakia, will remember the excitement, the challenges and camaraderie of those days.

L. R. McNarry
RCAF

OBOE

HAWKSHILL DOWN

W.R.Vernon

Hawkshill Down

I was on the OBOE station at Hawkshill Down, near Deal, when we were trying to bomb Essen, one of the major manufacturing plants in Germany. The Mosquito had one 500 lb. bomb and we were lucky enough to drop it on the chimney of the factory we were after. When we saw the pictures taken by the photo-reccey plane, things changed rather quickly and our priority on materials and parts was raised to top level.

I was fortunate to be chosen to work on a headquarters party with one officer and a van to drive us about the country to the various stations to make modifications to the equipment. One memorable occasion occurred when we were at Swingate near Dover. Jerry was shelling Dover and Deal with their 18" guns across the Channel. We had a shell warning alert and went to the shelter which was a Nissen hut sunk almost into the ground. The duty F/Sgt. was on an inspection tour at the time and came to the same shelter and told us to move to another one as there were too many in that one. He told me to go along with the others, and I replied that I would not. Luckily, I was a F/Sgt. as well, so he did not make an issue of it. Fifteen minutes later a shell landed at the end of the shelter we were to move to and the metal end of the building was blown down the passage between the beds and 13 people were injured and some killed. I have no idea why I refused to move but this made a believer out of me that someone was looking out for me.

That was the closest I had to enemy action, although once in London a VI exploded down the street about a quarter of a mile and I was given a boost of about 6 feet in the direction I was walking.

At Trimingham on the East coast we could see the smoke trails of the V2 rockets lifting off from the Continent. One landed on the seacoast near our station while I was there. I saw the results of several that got as far as London where a whole block was demolished.

As the war progressed we were called upon to mark any target within 300 miles of our stations so the heavy bombers could hit the targets. Towards the end of the war the Germans caught-on to our system but were unable to stop it due to their lack of equipment at that point.

After 4 years in England, I returned to Canada.

OBOE

BEACHY HEAD and BUZZ BOMBS

A.Colonval

Reality Dawns

My introduction to OBOE was at an indoctrination process at a fixed OBOE station, Hawkshill Downs, located near Walmer, on the South East coast of England. There were two of us and we stood well back in a large room full of RAF and WAAF personnel of many ranks. There was much technical equipment, transmitter, console, rolled paper recorder, a computer of electrical relays plus several other curious metal boxes of obvious importance.

We were there for some time, talking to some of those around us. Nothing important seemed to be happening. Things were calm, people were talking in small groups, drinking tea and smoking cigarettes or pipes. The room was fairly brightly lit for a radar room. Then it happened! A senior officer came in, there were hurried, short discussions and then the room transformed. A few left the room, the others went to their particular positions, the lights went low. We could hear comments between those working on or near the console. After about ten minutes there was a pulse of activity and equipment sounds, then the lights all went on again and everyone was up and about once more. The senior officers left. We realized that we had just witnessed the control of an important and powerful bomb attack.

This was so different from the reactive and constant watching of the skies of my past CH and CHL experience. I was accustomed to the dim but adequate light of the receiver and/or transmitter rooms, to several people watching the tubes, reporting over telephones and plotting on charts, hours on end. The equipment buzzed on endlessly and it was all action stations for the Mech on duty if anything stopped working just right! Now, I felt that I would be like the hunter, spending much time oiling and polishing his gun in readiness for the time when he would be called upon to fire one or two important shots. I later found that I would spend up to four hours in pre-op checking to get the console calibrated and stabilized for an operation that it would take only minutes to perform.

First Mobile OBOE Station

On April 19th, 1944, I was assigned to AMES 9421, known as Keston, located at Beachy Head, a stone's throw from a cluster of CH, and CHL/GCI Radar stations, plus a GEE Unit. Our Unit Personnel were billeted in the Oban Hotel in Eastbourne. I shared a room with another Canadian Mech., Bob Goodwin. He was much older than I, so I took the upper bunk!

Eastbourne became very crowded as D-Day approached. The shore line was ringed with several layers of landing craft and the streets were busy with various army squads, usually running on the double with full fighting gear. Our station trailer sat on a gravel pad within six feet of the very edge of the cliff. You could lie on your stomach and look over the edge at the nesting activities of the seagulls!

We were very busy in the weeks before and on D-Day, wiping out various heavy defences and

OBOE

weapons strongholds. On D-Day I couldn't believe my eyes! All the tanks, landing craft and soldiers were gone! We got even busier. I had been granted leave of absence to get married on June 12th to Leading Wren Joyce Allan, but expected to have the leave canceled. To my surprise and relief, the leave was permitted. It was during our one-week honeymoon that the first VIs were reported, better known as the Buzz Bombs.

The Buzz Bomb bombardment of London was quite severe, despite England's many defence tactics. Joyce was working as a Teleprinter Operator in the Admiralty building, where Churchill had his war room and headquarters. The Wrens were given time off in turns in order to get away from the tension and Joyce came to Eastbourne to be with me and to enjoy some peace and quiet. It was like going from the frying pan into the fire for Joyce, for it was a veritable Buzz Bomb alley over Eastbourne, where several lanes of VI s were being used at the same time. Our hotel window faced out to sea and we often watched them coming at us and flying over our hotel, and the various onslaughts by our Forces. First would be the warships' anti-aircraft guns, then the Spitfires, then the shore anti-aircraft guns and finally there were the balloon barrages dotted all over between us and London. The shore anti-aircraft guns were close to us so we experienced the shock of the sound of their gunfire and received a peppering of flack. Moving from one trailer to the other required a tin helmet to protect against the shrapnel.

AMES 9421 Goes to Europe

On September 6th, 1944, our mobile crew was sent to Renscombe Downs, 21 STU, 75 Wing, where we received special training to make us self-sufficient and self-protective. We learned several skills, tenting, making a field stove fired by sump oil on water, information on hand grenades, mines and booby traps. We learned to fire various machine guns and rifles and to properly throw grenades. We had a choice of a 303 rifle or a Sten Gun. I took the Sten Gun. I learned how to drive heavy trucks. We used rubberized material from damaged barrage balloons to waterproof our vehicles.

On September 13th, AMES 9421 left Beachy Head. I was assigned the truck holding the 25Kva Lister Diesel Generator. I painted "Joyce" on the front, just above the windshield. I drove that truck through parts of England, France, Belgium, Holland and Germany, always in convoy!

The trick was to keep the vehicle in front of you always in sight - not an easy task! My heavy truck could not accelerate and manoeuvre as could the little Fordson carrying our C.O. at the head of the convoy, so my speeds and panic slowdowns kept my cab buddy, David, on his guard. I recall speeding through a town's narrow road, horrified to see a horse-drawn hay wagon plodding along towards us. The farmer just managed to get his wagon to one side, into a wider section, and we flew by! There was hay flying everywhere and the trucks behind us got the farmer's abuse!

Channel Crossing

On September 19th 1944, our convoy drove to a marshalling beach of hard, flat sand. There were scores of vehicles of every sort waiting to be loaded onto the large landing crafts which awaited, with their inclined ramps resting on the beach. The Army was in charge and one officer appeared to have

OBOE

full and total control. He had us advance our vehicles in single file across the row of landing barges, stopping each one in turn and backing it up a ramp and into the barge, using hand signals only. My official papers refer to PTC, Old Sarum.

When it was my turn, mindful of my heavy load, I knew that I had to put my full trust in him and backed up the terrible incline, roaring the engine and torturing the clutch! When he signalled me to stop and to cut the engine, I found myself buried snugly between two other trucks, so closely that, in order to get out, David and I had to crawl through the window of our truck and into and through the windows of the truck next to us.

The crossing was uneventful, the water reasonably calm, and after a few hours we arrived at Calais, France. It was every bit as hairy coming down the ramp! We could only imagine how it must have been for the men who were here on D-Day, in bad weather and rough water.

Convoying Through Western Europe

We drove North, through France, following the painted rings on the roadside trees, getting off the road periodically for convoys of large tank carriers being deployed elsewhere. At intervals along the shoulder of the road, the Sappers had placed signs stating, "verges cleared to 8 feet" or some other distance, or "verges not cleared." We were careful to stay close to the road, within the distance stated on the signs.

At the end of one rainy day, in the dark, we reached one of our destinations. We pulled off the road into a large field, soft and slippery, with the wheels of our vehicles digging deep. Some got stuck and we had to put shoulders to them to get them moved. Then we had to set up camp and pitch our tents, in the dark. It was impossible to determine the slope of the land, so a few tents suffered from water run off entering them. In the morning the weather cleared up. We found that we were only about 6 kms outside of Mons, Belgium.

Our tents served 4 to 6 persons. There was a fly sheet, but no ground sheet. We could understand why we had been issued ground sheets instead of raincoats! We put the ground sheet down to protect us from the earth's moisture, and then placed our blanket on top of it. The blanket was made of wool, and by the use of a few properly placed safety pins, became a sleeping-bag.

Living Under Canvas

We had no lights, so most of us kept a short candle in a round cigarette tin. Many are the letters I wrote by the light of my one candle!

Laundry was a problem. We had water, but no hot water. The landscape was dotted by wrecked tanks and trucks, shot up and usually burned. A tent buddy and I removed the radiator from one of the trucks and propped it up in a clearing just outside our tent. We found that a small amount of burning paper, set with the flames venting through the radiator coils, would create boiling hot water in seconds. You had only to pour a bucket of cold water into the radiator to displace the hot water

OBOE

into another bucket. We shared our water heater with our buddies in adjoining tents. They would use our device and then repay us by leaving some fuel for our use.

The cooks used a field stove comprised of a couple of pieces of sheet iron placed end to end, supported at each side by a low wall of stones or bricks, forming a tunnel. At one end, a chimney was made with a roll of thin iron sheeting, held in place with stones. A short length of metal, bent lengthwise to form a trough, is held down at the high end by a tin can, filled with water and oil. Two small holes are punched in the side of the can, one at the bottom and one half way up. A wooden match is placed in each hole, then moved around to release the liquids in a controlled manner.

The iron plate is heated up first by burning fuel under it, such as oily rags. When hot, it acts as a flash plate. Oil, being lighter than water, floats to the top half of the can and is permitted, by moving the match, to run as a thin, slow stream down the trough to fall on the flash plate. The bottom match is then adjusted to permit water to drop on the oil slick at about 1 to 2 inch intervals. The mixture, hitting the hot plate, creates a very high heat which then independently keeps the plate hot. Air carries the heat to the entire top plate on its way to the chimney. The cooks placed their large pots on the iron plates and were able to cook the meals for our whole unit in a reasonable time.

The Battle of the Bulge

On our way to our Mons campsite, we had noticed the stockpiles of artillery shells left alongside the road, at regular intervals. They were soon to be used, because one evening the guns started! The bombardment went on for hours, all evening and all night, without stopping. I stood by our tent and looked out at the horizon. It was all lit up with a jumble of flashing orange lights. The next day, we broke camp and headed North. We frequently had to make way for large numbers of American tank carriers and trucks, heading South. We discovered later that the Germans had broken through the Ardennes and part of Alsace-Lorraine, that we were closed off in the Bulge and that the American forces had been deployed to help break through the encirclement. Meanwhile, we continued on to Holland, where we set up our equipment at a pre-arranged site. Our camp was located a few kms. away, in a wooded area. We tented for part of the winter, in over six inches of snow!

We did our own guard duties. There was no definitive front line. You were never certain when travelling in the dark whether you were in our side or their side! There were no street signs to guide us and our driver, taking us back to camp, found himself on the wrong road more than once. Then it was a matter of quickly turning around and driving back as quickly and as silently as possible!

The Turning of the Tide

Our OBOE equipment was needed to control bombers due to its extreme accuracy, independent of range. The range was limited, however, to about 300 miles. In order to target-bomb Berlin, we had to be within 300 miles of it, so our unit followed our fighting forces as they pushed the front line back into Germany. We went from Eindhoven, through Tilburg, Nijmegen, crossing the Rhine River on a floating Bailey Bridge (which seemed to submerge a bit under the weight of my truck) and on to Arnhem and Munster, establishing ourselves at Horstmar, Germany. The Germany we found was a

OBOE

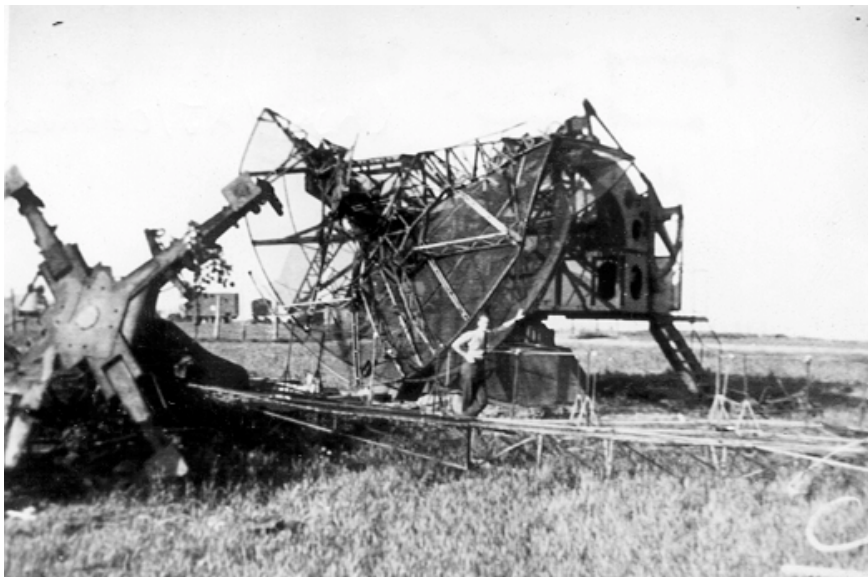
land of devastation, dead cattle lying, bloated, feet stiffly up, trees broken and leafless, buildings gutted and some streets so filled with the bricks of the bombed buildings that we could not get through.

Christmas Day through New Year's Day was a period of Germany's last desperate air battles. The sky was full of aeroplanes, dog-fighting. Aeroplanes were diving down on one another, shooting in all directions. Many were hit and fell out of the sky, mostly the German aircraft. Our crew recovered some of the bodies and later found it difficult to bury them because of the frozen ground. They thawed the gravesights by soaking petrol into the ground and lighting it. By this time we were in better digs, using the barracks formerly used by the German troops.

The Luftwaffe had been overpowered and the Allies ruled the skies. OBOE had helped to wipe out Peenemunde, the heart of the German VI and V2 development and testing, and to bomb Berlin. The BLA (British Liberation Army) was gaining ground every day while the day and night saturation bombing of the German cities, industries and weapons centres, along with the Soviets knocking at the door of Berlin, caused the Germans to realize that they had failed in their endeavour and were about to be defeated.

We were not surprised when Germany surrendered on May 7th, 1945. Our unit remained in Bergsteinfort, as part of the army of occupation, while the RAF and RCAF decided what to do with us and our equipment.

Aime (Ajax) Colonval, R100431



(Fig 4). Giant Würzburg Antenna - Horstmar, Germany, 1945

(Courtesy A. Colonval)

OBOE

109 PATHFINDER SQUADRON

Julien J. Olson

Training. In February, 1942, I was posted to Malvern, the centre for experimental radar development, for training on OBOE airborne radar equipment. After this course, I was posted to 109 Pathfinder Squadron at Little Staughten. The other Pathfinder Squadron, 105, was located at Kings Lynn. Both squadrons were equipped with high flying Mosquito aircraft.

Equipment. The Oboe system in each aircraft received two signals from ground control radar stations; one from the tracking station, called the Cat, and the other from the releasing station, called the Mouse. Consequently, three large pieces of equipment were installed in the nose of the aircraft for this purpose. The aircraft re-transmitted a signal back to the two ground stations. The pressurized transmitter for this was located to the rear of the bomb-bay with a rotating box antenna below it.

Servicing. To service all these units and generate the test signals normally received from the ground stations, we had a test vehicle for each flight (Fig. 6). A lot of mileage was put on these vehicles servicing all the aircraft. Normally all aircraft checks would be completed before bombing up took place. Radar tests were the last to be done and we often overlapped with the armourers bombing up. I recall one pre-flight test very vividly. While I was in the cockpit running a test, a great thud shook the aircraft. While the armourers were hoisting a 4,000 lb. bomb (Fig. 5), a cable broke and the bomb had fallen to the ground. For a horrible few minutes no one moved, hearts stopped, not knowing what would happen. Since nothing did happen, the armourers quickly realized that the bomb was not "armed" and continued bombing up by replacing the cable.

Test Flights. There were occasions when ground testing did not show an OBOE problem so I would sit in the navigator's seat for a flight test. This would usually include the pilot testing the engines and controls which would require tight turns, dives and climbs causing considerable G-forces and making it most difficult to reach the controls to make adjustments. Although the flights were thrilling, the radar operation would be much more difficult to do when experienced by the navigator during an operational flight.

Operations. From D-Day onward, the squadrons flew day, evening and night trips, weather permitting. Squadrons had three flights with 15 aircraft each. We worked twelve hour shifts, finishing around 03:00 and often at 05:00 when the last aircraft returned. The radar mechs were the first, under obligation, to interview the navigator as he exited the aircraft, obtaining his assessment of the performance of the OBOE equipment. The performance of OBOE was very critical to Bomber Command. When aircraft were not needed to "mark" targets, those modified to carry a 4,000 lb. "block buster" bomb were sent out to bomb VI and V2 sites, or other special targets needing pin-point drops.

The 582 Pathfinder Squadron of Lancasters, using H2S radar, was also on the same station as 109

OBOE

Squadron. On July 11th, 1944, one of the Lancs was fitted with OBOE. Although the trial flights were successful, disaster occurred on December 23rd when the Lancs were used during a daylight target marking operation near the front line. Four of the Lancs from the squadron were shot down while flying at a lower altitude than the high flying Mosquitos and flying the OBOE "beam" which did not allow for evasive action. OBOE was not used in Lancaster aircraft again. The two Mosquito squadrons continued to be sufficient to meet the target marking requirements of Bomber Command.

Winter 1944/45.

The winter of 1944/45 was cold with lots of snow in January. Because of the long hours and work stress, a rum ration was issued during night duty. This was greatly appreciated. To keep flying, there were occasions when all able-bodied persons were out on the runway with shovels to clear it of snow!! Hard to believe now.

Once a Junkers 88 was flown in after being captured on the Continent. We had many types of aircraft making emergency landings as we were on the flight path to enemy territory.

The invasion provided a great view of airborne traffic, including large flights of aircraft towing gliders.

All around our airfield, there were many bomber stations of the US Air Force. Their aircraft would take off over us in the morning, circle for some hours, reaching maximum altitude and fully formed flights, and then head toward the Continent. Late afternoon they would start returning singly at low altitude, fuel spent and badly shot up, often with pieces dangling. We were amazed to see these Fortresses still flying with large pieces of wing or tail missing.

I had a very close call with one of these aircraft early one morning while driving my test van on the perimeter track after completing checks on the returning Mosquitoes. There was a tremendous explosion and balls of fire and pieces rolling by me which were later identified as radial engines of a Fortress that had pan-caked on our airfield. Only a few ground crew had seen it come in, thinking it to be an emergency landing. It had glided quietly in until striking the ground. As soon as we were able, we ran into the debris, scattered for 1/2 a mile, seeing flight jackets, split bombs, ammunition and thousands of pieces of aircraft. But not a single body or body part. This aircraft had been abandoned shortly after take-off after engine failure but, astonishingly, had maintained a gradual rate of descent. It hit our airfield at midfield, not damaging any of the Mosquitoes and Lancasters which were dispersed all around the perimeter of the field. Another quarter of a mile and it would have hit the bomb dump which was directly along its flight path.

Equipment Updates. In late October, 1944, I went to Bomber Headquarters to learn the operation and servicing of Loran navigation equipment. Our Mosquitoes had carried GEE navigation sets and after October, they were fitted with the new, longer-range Loran sets, the ultimate for navigation at night and the forerunner of the navigation system used commercially for many years after the war. By war's end we had also moved up to Mark III OBOE equipment which illustrates how quickly

OBOE

design improvements and production could be accomplished.

VE Day, 1945.

The spring of 1945 saw many events occur, such as the ending of the blackouts on April 23, a condition that had lasted in the UK since September, 1939. Bombing operations continued right up to VE Day with our last major send-off taking place at 05:00 on May 5th.

On VE Day, all personnel were confined to camp but three of us Canadian mechanics, as well as some Canadian aircrew, went down to London for the celebration. Nothing was said upon our return - being that the RAF were prone to believe that the "Colonials" were quite casual about orders. The memory of the crowds - and being among them in front of Buckingham Palace to greet the Royal Family - still stands out most clearly.

The squadron kept quite busy after VE Day. No quick shut down but continued flying and servicing with some flights for ground crew to see the bomb damage in Germany. In September the squadron was shut down with much of the staff gone and the equipment sent off allowing the station to revert back to farmers' fields as it was just a few years earlier.

Like all the other radar mechanics and officers who had been attached to the RAF, I was soon back in Canada and then on my way to the University of Manitoba.

**J. J. Olson, RCAF
1999**

OBOE

Fig. 5 - MOSQUITO PATHFINDER AIRCRAFT
(note flare canister in front of J. Olson and
OBOE antenna at rear of bomb bay).



Fig. 6 - TEST VAN WITH POWER GENERATOR PANEL EXPOSED

Photos courtesy J. Olson

OBOE

ACROSS THE CHANNEL TO THE ARDENNES

A. R. Craig

Shortly after my arrival in Bournemouth, as a Pilot Officer, I was posted to RAF Sennen which was a CH and CHL station at Land's End. I was the Tech Officer at the CH part until about April 1943 when I was sent to Great Malvern to learn the mysteries of OBOE. There, one of my instructors was Dr.F.E. Jones (along with Reeves, the inventors of OBOE) so it was a pretty exciting time.

I was sent back to Sennen where we began construction -from scratch-of RAF Treen which was a new OBOE station. Two new Controllers arrived, Bill Green, DFC and Jimmy Newman, DFC. The other Tech Officer was Ted Palmer from NZ. When the station was ready, we marked the submarine pens at St Nazaire and Lorient with some success. I had more training at Great Malvern and was also briefly attached to 109 Squadron at Wyton.

Green, Newman and I were posted to RAF Winterton where the CO was F/Lt. Carl Conway. I was Senior Tech Officer. This was a busy place and we were doing a number on the Ruhr and other places. I stayed there until about July, 1944, when I went to Beachy Head where I was OC. Then in September I was posted to Cardington, where I became OC AMES 9442 to ready the unit for service on the Continent. We reported to G/C Phillips about six miles north of Caen about September 18th, 1944, after crossing the Channel on LSTs without incident, landing at Arromanches. Then on to Mons and to Laroche in Belgium on October 8th.

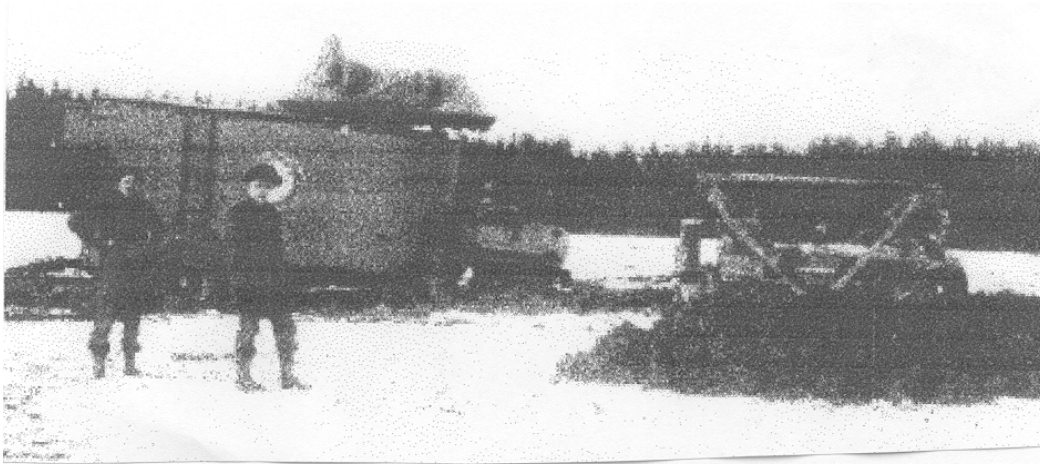
We were chased out of Laroche on December 16th by the Germans, at the beginning of the Ardennes Offensive (see map Fig. 8), escaping by the skin of our teeth (Fig. 7), and headed back to Mons in dribs and drabs. We spent Xmas in Mons and then headed for Seligny in France where we refitted. Then back to Laroche on 3 February, 1945, and became operational on February 4, which pleased Phillips so much that he sent us a secret signal which said "F/LT. CRAIG FROM PHILLIPS. GOOD SHOW." Not bad considering that I had had a real row with him just before Christmas. We stayed there some time and then went to a site near Wurtzburg in Germany. The European war ended and we moved to Willheimshaven. My notice for repat. came in September and I headed for the U.K. and home sweet home.

It was, all in all, a wonderful experience. Our work was of great importance and our men (and women) did noble work - often under rather poor conditions. We were not casualty-free either.

So, there is a thumbnail sketch of my activities on OBOE.

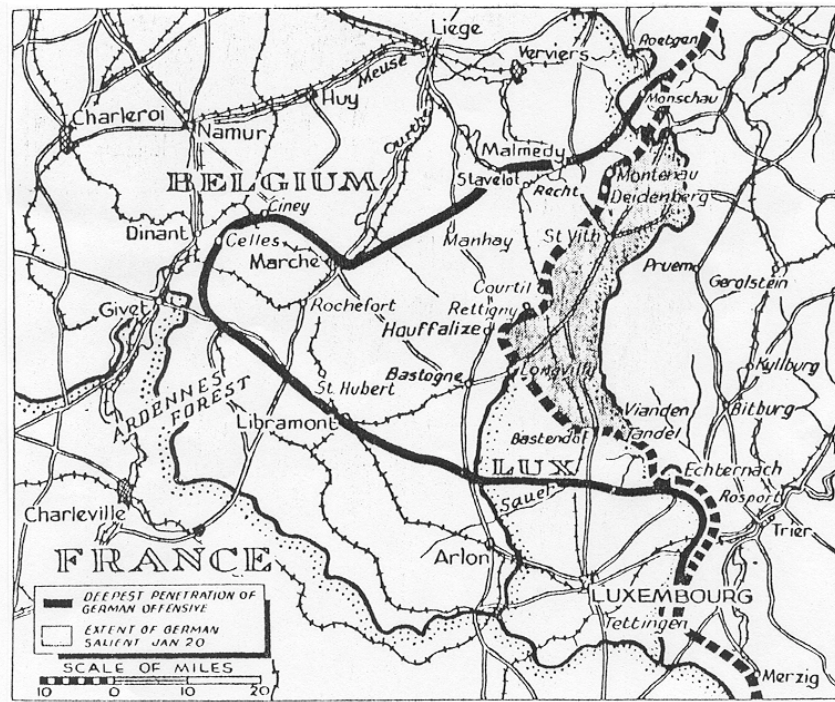
F/L A.R. Craig RCAF

OBOE



(Courtesy A. R. Craig)

(Fig.7) IN THE MUD AT OUR LAROCHE SITE , 16 DECEMBER, 1944.
"Against almost insurmountable odds, the two American Army sergeants managed to get all our important technical units onto the road and safely on our way to Mons just a few hours before the site was overrun by the German army."



(Courtesy New York Times)

(Fig.8) THE ARDENNES BULGE, DECEMBER, 1944

OBOE

ACROSS THE CHANNEL TO HOLLAND

W. G. Robson

After completion of the RAF basic radar technicians' training course at Yatesbury, Wiltshire, in February 1942, I experienced the technical responsibilities at CHL stations (some of which also involved the maintenance of 10 cm. coastal radars) in the Orkneys and Shetland Islands, also in Northeastern Scotland. Having progressed through the ranks in this period, further interviews and the RAF officers' training courses followed. My first technical officer posting was to the radar station Cresswell, Northumberland, over the period from the fall of 43 to the spring of 44. Then interviews at 60 Group Headquarters cleared me to a further course at Yatesbury. This time it was on the relatively new secret equipment, OBOE, for ground control of pathfinder aircraft. This course started on June 7, 1944, one day after D-Day, and coincided with the V1 buzz bombs falling into London. I had the unhappy experience of those deadly weapons over a two-day period in London.

My assignment was to a mobile unit operating on Beachy Head, a spectacular site above Eastbourne (on the English Channel) where we were billeted. Directly across the Channel were launching pads for the V1s in the vicinity of Dieppe. Our prototype station was required to operate with other suitably located OBOE stations to provide the pulse-coded signals to pilot (or navigator) of the specially - equipped British Mosquito and the U S Marauder pathfinder planes. Interspersed with these bombing raids on the V1s, the equipment had to be set up to provide the signals for target indicator releases to guide following bomber forces to targets in advance of the Allied forces breaking out of the beachheads in Normandy.

At the time of my arrival, even the precision site bombings were only partially successful and there seemed to be a steady flow of V1s, particularly at night, passing over our heads. However, within a week or so, large convoys of radar-guided artillery arrived and lined up in the park overlooking the sea and also on the hills behind Eastbourne. They were also firing proximity- fused shells. There was also a squadron of special high-speed Spitfires with numerous propellers involved. The combined effect of all these counter-measures was to destroy most of the V1s over our sector of the country. During this period, we were to experience a couple of noteworthy events. During a break from the OBOE ops. room, I heard the unmistakable throb of a Buzz bomb, and looking over the cliff's edge, we noticed one of the Spitfires tailing it. It caught up and tipped its wing but the bomb kept coming overland. I turned to another airman who had come up and said, "London will be getting that one". At that point, we were amazed to see it make an aerial U-turn and come right back over the cliffs, exploding into the sea, not far beyond Beachy Head's lighthouse. The Spitfire had evidently upset the gyroscope that directed the V1. The other incident was the negative effect of the heavy artillery barrages. Normally we had our respirators and steel helmets over our shoulders whenever we were traveling, but this late afternoon just before dinner, I took a stroll around the block and a V1 came overhead and the artillery on the hill opened up. I was trapped inside the high stone walls edging the street, but raced under an overhanging tree. One piece of the shower of shrapnel missed me by inches. When it cooled, I picked it up as a souvenir, the British markings still clear on it.

OBOE

When I first arrived as technical officer of this prototype unit, I discovered that there were no detailed circuit diagrams, so the Canadian corporal and I spent many hours, between the raids underneath the set, tracing the components and wiring and transferring what we saw to paper. The urgency of this exercise became only too clear after the German resistance was broken at the Battle of Falaise Gap in Normandy. Our units were organized for movement to France; convoys, complete with dispatch riders, were formed. We drove through the heart of London to Cardington, site of the R100 and R 101 dirigibles. Here all vehicles were thoroughly checked and water-resistant sealing material applied to all under sections. Food and other supplies were also loaded, including cases of emergency ration (courtesy of the US). We then drove to the final camp in Britain before embarking on landing crafts from Gosport, north of the Isle of Wight, which we passed the next afternoon. That night we got our tents set up (two to a tent). These were to become our homes in the foreseeable future. Our trip across the English Channel was overnight and we all slept wherever there was a sheltered spot among the vehicles on the deck, with occasional breaks under the limited cover of a landing craft. Fortunately, the Channel was relatively calm, which was something of an exception.

Most of the next day, we were anchored off-shore within view of the famous Mulberry concrete temporary dock nearing completion. When the tide was favourable, the ramp was dropped and off we drove into the sea with our waterproofed vehicles, and onto the beach that had been the scene of the carnage on June 6. It was dusk when we climbed the steep, winding road above the shoreline, eventually arriving at our stopover for our first night in France. It was on a former estate that Rommel had used for his headquarters before the German retreat. We pitched our tent and only in the morning did we realize it was within feet of a temporary burial plot of an Allied soldier.

We had been aware that our first objective for an OBOE set-up was to be in Holland, and the vicinity of Arnhem was mentioned. Therefore, the route for our convoy was along the main highway paralleling the English Channel but by-passing the seaports that were still occupied by German units. As we traveled towards Caen, we passed many prisoners working along the edges of the road, under the rifles of Allied soldiers. They were clearing land mines, and if their looks could have killed, we wouldn't have survived the first day.

The devastation from our bombings and the battle to take Caen was unbelievable and it was amazing that advancing armies had been able to clear a sufficient track through the rubble in Caen itself that enabled our large convoy vehicles to cross that once beautiful city. The retreating Germans had obviously put up a stiff resistance from precision-made slit trenches that lined the road. The destruction of their military vehicles, including tanks and even ambulances, showed the devastating effect of our fighter bombers and artillery. To slow the Allied advance, every bridge on our route had been destroyed and we crossed lesser rivers and streams on Bailey bridges assembled by Army engineers. When we arrived at the Seine, the road dropped to river level and we crossed on a long pontoon bridge from which we had an excellent view of Rouen and its cathedral, which appeared to have survived the action. During one of our stops, we took time to set up our diesel generators and Oboe equipment and were pleased that everything seemed to be functioning OK. It also afforded an opportunity for some recently assigned controllers (RAF officers who had completed their flying

OBOE

tours) and technicians to brush-up on the equipment. Our schematic drawings were again brought into play.

We were now passing through the area of the battles of World War I and the large areas of white crosses for its casualties, passing through Amiens, Arras, Valenciennes etc., into Belgium. In Mons, a headquarters had been set up and we did have one night not under canvas in a school recently vacated by the Germans. The townsfolk told us of their parades held in that school yard and their graffiti was in evidence on the walls of our rooms. Wherever we stopped our greatest concern was with the probability of land mines, and we were thankful for the excellent instructions we had received back in England, to minimize the risk.

While awaiting further instructions from Bomber Command via the Mons field headquarters, we set up our tents next to our vehicles on the edge of this city that had been a centre of so much fighting in World War 1. It was here we experienced one of the 1000-bomber raids aimed at a city in the Ruhr. Although we were not the target, it gave us some idea of the fear it must have instilled in the enemy. The vibration from the mass of heavily-laden planes was beyond description.

In town we met up with members of the Free Belgium Forces who invited us to dinner at their hideaway. Using one of our transport vehicles, they guided us to it at dusk, up a steep, winding road through a heavily-forested area. Its perimeter was barb-wired, and armed guards were on patrol. It was dark when we arrived, but we were given a warm welcome into their main lodge (probably a ski lodge or resort in peace-time). There, we were served a sumptuous meal at a long rough-hewn wood table. There were no alcoholic beverages, only fruit juices. This was just as well, because on another long table behind our backs was laid out an arsenal of small arms and grenades. They seemed to be captured weapons from many countries. Also, through the course of the meal, the guards would come in and others would dress up warmly, circle themselves with belts of ammunition and take up their rifles as they left the building.

During our stay in the area we were invited to a couple of estates, the occupants having recently returned after the Germans retreated. Here again we were treated to excellent meals and drinks which they had hidden during the occupation. In restaurants and on posters outside, were long lists of names of collaborators with the Germans and we were witness to one display of the type of revenge meted out to those that were caught. The failure of the Allied paratroop and glider drops behind enemy lines to capture Arnhem in Holland had disrupted the original plan for an OBOE site, so we were stalled for a couple of weeks in Mons. Eventually, our convoy moved on through Brussels and into southern Holland to Eindhoven. We were then in the narrow strip between the marshy lands where Canadian troops were involved in the heavy fighting aimed at capturing the port of Antwerp and the advance US positions towards the German border. The front line was roughly along the Maas River up to Nijmegen (Fig.9). Its bridge over the Rhine had been captured before the enemy destroyed it.

Our instructions were to find a suitable site in this area near the front line from which to provide Oboe signals for bombing critical targets as deep into Germany as possible. An RAF Controller and I

OBOE

headed out in a jeep in search of such a location. Most of the area east of Eindhoven was relatively flat and much of it had been flooded by the destructive action of the Germans on the intricate canal system. We were almost calling it a day, when we came across a well-constructed road disappearing through a reforested area. At the end of it, we emerged into a wide-open flat area with no obstructions, for an arc of over 180 degrees towards Germany. Along the tree line was a system of electric wiring suspended on insulators above the ground and not far from this area was a partially destroyed 50cm radar antenna mounted on a concrete base. We identified it as part of the Wurzburg radar system. It took only minutes for us to agree that the Germans had kindly provided us our first OBOE site in occupied Europe. The next day, we were able to direct our whole convoy onto this site. The OBOE vehicles were positioned in front of the trees and immediately camouflaged to blend in with them. The nearest village, which had its own school and church, was named Rips, so we identified our station by that name.

While our technical personnel started to ready the diesel and equipment, our Admin Officer contacted the nearby army's mine-sweeping experts because we had heard of casualties, including a dead soldier, in the immediate area. One technique they used was to modify a jeep by attaching a vertical steel bar to the front of it to break trip wires that may be connected to mines. The driver depended on the speed of the vehicle to escape from the explosion.

Our tents were set up in the protective cover of the woods and the equipment was soon ready for operation. Some German equipment, such as switch gear, blower motors etc. were used when our technicians found they operated better than our own. Their electric cables were also used to supply lights in our tents from the generators. Early contact was established through our Bomber Command connections with other mobile Oboe units that were being established in the Ardennes forest in Belgium. Therefore, from October until late December, 1944, our station's signals became vital to numerous raids throughout Northwestern Germany, particularly affecting their retreating armies' supply lines.

A few weeks after our arrival, we had a breakout of dysentery among some of our technicians. Our Admin Officer was successful in arranging that they all be moved into billets in Rips and transported to the site for their shifts. However, the Controllers and myself found it more convenient to be at the equipment site, so we remained in our tents for the winter. With the use of kerosene heaters and fly sheets, they were quite warm. Courtesy of the Germans, a pile of wooden planks and conveniently sized logs were left behind, so our unit worked as a team to construct a modest log cabin with a fireplace (partly below ground level but with good drainage), also a small one-room building where we ate our meals. Getting to our outhouses posed the most serious problem during that unusually cold and snowy winter.

The successful OBOE operations were curtailed when the Germans mounted their counter-offensive into the Ardennes. Their objective was to retake the port of Antwerp and cut off British-Canadian army units in Holland, which would have included us. One of our key mobile stations at Laroche was in the direct path of the advance but they were fortunate in making a timely withdrawal. However,

OBOE

for a month or so they were ineffective as one of our partners. The cloudy winter weather was an ally for the Germans, and it was feared they might succeed, but the skies cleared enabling our aircraft to fly again. Also, 8th Army troops arrived in our area, releasing U S forces to move south to reinforce General Patton's sector, with the result that the front line was restored. British army artillery units were positioned behind our camp and our long winter nights were frequently disturbed by their barrages. Also, we regularly saw the new jet-propelled Messerschmidt 262 flying over in their photo-reconnaissance role. As the first operational jets of the war, we could hardly believe the speed they achieved.

Early morning, January 1, 1945, (too early after our New Year's Eve get-together in our log hut) we were awakened by the sound of aircraft. Looking out through our tent flap, we saw the unmistakable sight of two Messerschmidt fighters flying down our tent row, almost clipping the tree tops. Shortly afterwards, while at breakfast, another sound of a dog-fight brought us outside the building. One of Germany's fastest fighters, a Fokker Wolf, flew over so low that I saw its pilot turn his head to his rear, for a good reason - a Spitfire was right on his tail. There were seven kills in the immediate area of our camp that morning - 6 Germans and one Canadian. Our Admin Officer was involved in the recovery of the bodies and endeavoured to have them interred in the churchyard of Rips. However, their clergy would not permit the burial of the Germans in their hallowed ground, but did allow plots outside the fence.

On a very cold evening early in January, 1945, we were set up for a target-indicator raid that would use the flares to mark the point for bomb release for the bombers of the following force. Our Controller had just locked on the strobe marker to the pulse that positioned the Mosquito for the final short distance to the automatic code for "Release", when the locked pulse took a violent leap forward, indicating that there would be a premature release. We were really upset, wondering what the aircrew would have to say. To our relief, they apologized to us, noting that they had a near perfect flight with a very clear signal from our station. However, they had the misfortune of having their target indicator canister hang up in the bomb bay due to the very cold temperature.

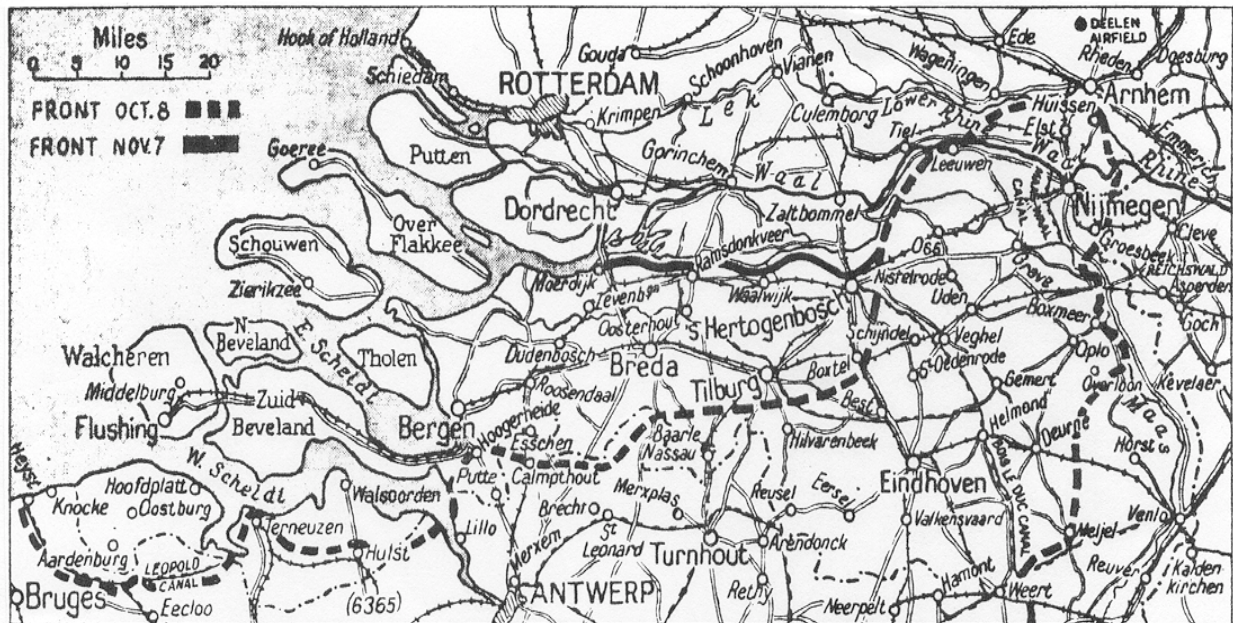
During January we had longer periods of down-time until the Ardennes station became fully operational again. So our technical staff modified the OBOE equipment to operate as a radar station. This action was taken to enable us to pinpoint the launching pads of the V2 rockets aimed at Britain, whose vapour trails we had noticed on a number of occasions. Their range was approximately 25 miles from our site and clearly visible on our cathode ray tube. We also got quite good approximations of bearings from the direction of our antennae and accurate maps. This information was directed back to Bomber Command in Britain.

Towards the end of January, I received a message that after my more than three years overseas attached to the RAF, RCAF HQ, London was recalling me for return to Canada. I was to report first with all my gear to Mons HQ. It was with mixed feelings that I parted company with the members of our unit who had added so much to my fond memory bank of experiences. However, I came the closest of my overseas service to not making it when, on a very icy stretch of road just into Belgium, a convoy slowed down suddenly in front of us. My driver endeavoured to pass to the left to avoid

OBOE

tail-ending them but was confronted by a tank carrier, carrying a Sherman tank. He spun the wheel, putting us in the same direction as the tank carrier and thus avoided a head-on collision. Nevertheless, our vehicle was badly smashed and quite inoperable, but we were both able to hitch rides with all my equipment to keep my appointment in Mons HQ. My timing was just right because I was able to enjoy a party that evening with people in that City, which included a dance with polkas and other types of European dances. It was a great wind-up for my European stint of WWII. Next day it was off to Ostend, via Ghent, for the North Sea crossing to Tilberry Dock, London, and then home to Canada.

Will Robson, RCAF - 1999



(Fig. 9) THE BATTLE FOR THE SCHELDT

OBOE

ACROSS THE CHANNEL TO MUTZIG

A. Cassidy

Training.

Shortly after D-Day, I reported to the RAF Radar School, Yatesbury, for the Type 9000 Mk 11 course. The high level of secrecy related to 9K was immediately evident when we went to classes in a compound within a classified and restricted compound from which we were not allowed to take any notes or note books. At the end of the course, I was posted along with most of my classmates to RAF Renscombe Downs to join other RAF and RCAF personnel to form a new mobile OBOE unit designated AMES 1/9000. Here we learned to drive trucks, use small arms and other skills in order to move and operate as a mobile unit. When we had mastered these new skills, we traveled to RAF Cardington to pick up our radar vans, trucks, diesel generators, tents, workshops and all the other bits and pieces that made up a mobile unit.

We had just arrived at Cardington and settling in to our new quarters when the windows and doors vibrated quite noticeably and then stopped. Someone said, "that must have been a big truck passing by," knowing full well what it could be. A few moments passed and then there was a very solid thump! It was a buzz bomb! It wasn't close enough to injure anyone of our crew but close enough to remind us that the war was not yet over. We would hear and see many more V1s and V2s before it was.

Deployment.

It didn't take very many days for all the inventory holders to sign all the necessary forms for all the new gear and we were on our way again. We drove in convoy, our first experience in playing follow the leader in our new trucks, to the assembly area on Salisbury Plain. Somehow, we novice drivers managed to navigate the narrow roads and innumerable intersections and arrived at Old Sarum without mishap or losing our way. The assembly area was a memorable sight - rows and rows of RAF and Army trucks and other equipment waiting their turn to move across the Channel. Once again, we didn't have long to wait before we were on our way to Dover. This time though it was late at night and it would be our first experience in driving in the blackout. All we had to do was to follow the small light on the differential on the rear axle of the truck in front of us. Our headlights, like all the others, were just little slits in the blackout covers over the lights and not much help.

We arrived in Dover the following day and loaded aboard our assigned landing craft. These landing craft were not built with sleeping accommodation and we slept wherever we could find a spot to stretch out or curl up. Fortunately, the Channel was calm that night and the crossing was very smooth. When we woke at daylight the next morning, we were on the beach at Boulogne. From there, we moved on to Mons, Belgium, our Wing HQ. In a few days we were on our way to our first operational site, Laroche, in the Ardennes and not very far from a little place called Bastogne. Little did any of us know at the time how pivotal the area would become in just a few weeks.

OBOE

It did not take very long to set up the radar vans, diesel electric generators, workshops and operations office on one of the highest points in the Ardennes and very close to the German border. We soon had all the radar equipment all tuned up, tested and operational.

Our Move To Mutzig, France. In the first week in December, orders came through that a new mobile unit was to be formed and our trailer and crew were selected from Laroche. Three other trailers and crews were also selected from three different sites. We met up with them in Mons and deployed to a new site in the Voges Mountains near the town of Mutzig which was about 30 kms from Strasbourg (Fig. 10)). The site overlooked the Rhine Valley and the Rhine River could just barely be seen in the far distance. We had hardly become operational again at this new site when the Battle of the Bulge began. Our friends that we had left at Laroche, barely had time to move out with their radar trailers before the site was overtaken by the Germans. Most of the other vehicles at the site, such as workshops and diesels had to be burned because they became stuck in the mud and snow. When the American Army in our area moved out to support the forces in the north, our CO considered it prudent for us to make a withdrawal too. We deployed to Bacarrat until the military situation was stabilized. It wasn't long till we were back at our site in Mutzig and again operational. After many operations in February, March and April it was all over in Europe - VE Day, 8 May, 1945. There was no further need of OBOE in this theatre of operations.

Return to Canada. Although the war in Europe was over, the war in the Far East was not. Some personnel from our unit were posted to mobile LORAN units for the purpose of pushing the range of this important navigational aid further in that direction. Those of us who remained, waited patiently for our next orders. Perhaps we would be needed in the air offence against Japan. Perhaps those of us in the RCAF would be lucky and be repatriated to Canada for our discharge. We were soon advised that we had been assigned a repat number based upon our date of enlistment and how long we had been overseas. This number would determine the order in which we would return. My turn came in August. It was with great sadness that I said farewell to all my friends with whom I had shared many experiences in the past year. It would be many years until I had the pleasure to meet some of them again.

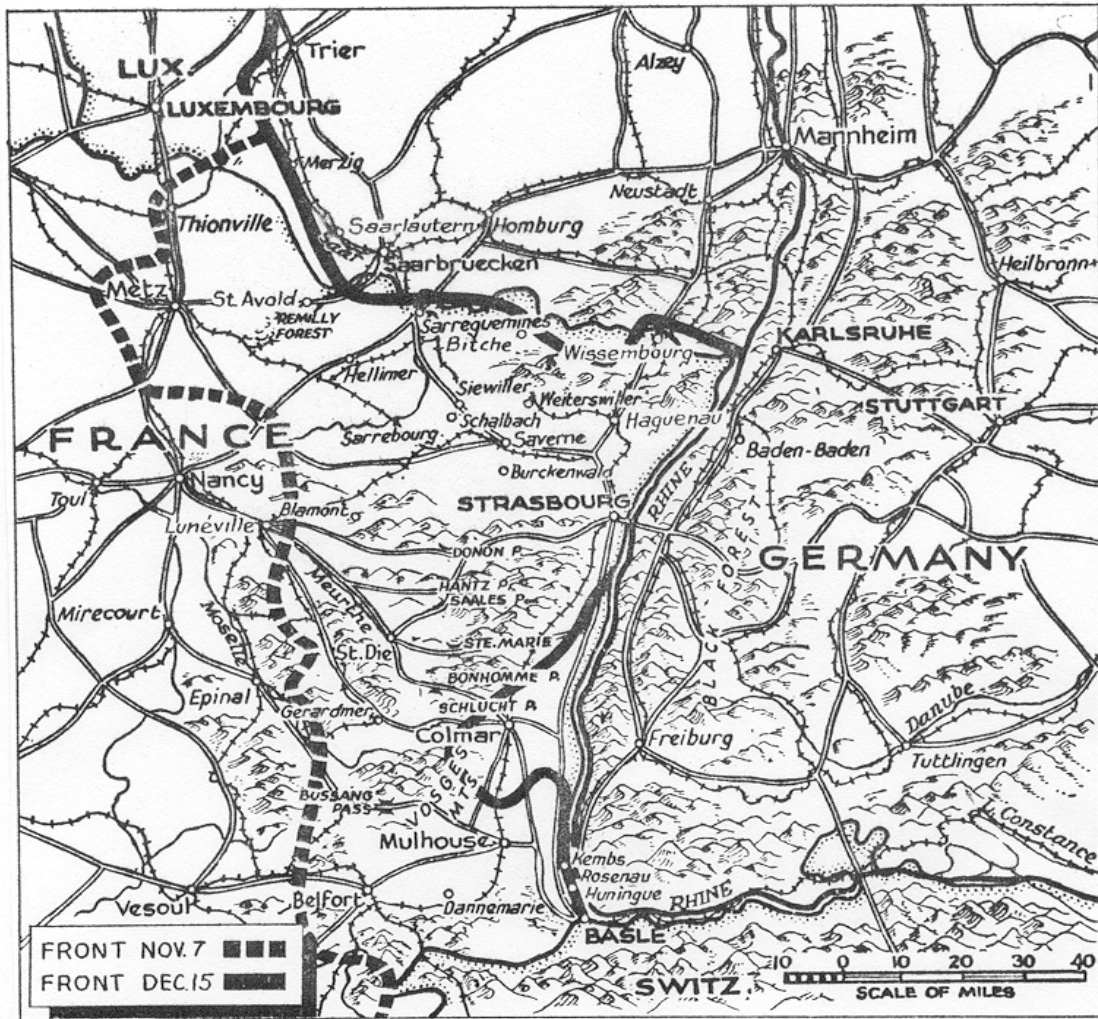
Reflections.

When I reflect back on my radar days, I am always amazed about how much was accomplished in radar in such a short time. The few early radar stations on the South Coast of England, which were instrumental in the summer of 1940 in changing the course of history, were soon an extensive defensive system all around England, Scotland, Wales and Northern Ireland and then in North Africa, the Middle East, India, Ceylon, New Zealand and Australia.

It also amazes me how quickly OBOE was invented to meet the need of Bomber Command and then tested and operationally deployed. OBOE was truly the beginning of push button warfare: for better or worse ?

Alfred Cassidy, Cpl. (R131532, RCAF - 1941-1945)

OBOE



(Courtesy New York Times)
 (Fig. 10) STRASBOURG FRONT, NOVEMBER - DECEMBER, 1944
 (Mutzig not shown)

OBOE

ACROSS THE RHINE AND INTO THE TREES

C.R. Eastwood

February, 1945. By February 1945, after the Battle of the Bulge, the site structure of OBOE Units on the Continent was similar to that of December 1944, with units in Florennes, Laroche, Rips, Commercy and Mutzig. At this time both the RAF and USAAF were increasing their use of OBOE in spite of the continuing enemy jamming through the special Luftwaffe Organisation set up to jam "Boomerang" (i.e. OBOE). The VHF control system used to link the OBOE Cat and Mouse stations, vital to their effectiveness, had provided the Germans with advance warning of OBOE raids.

March, 1945. The pattern of OBOE stations started to change in March as the Allied Armies penetrated the Reich more deeply. Convoy 3/9000 left Florennes on 20 March and became the first to arrive on German soil, operational at Kempenich on 24 March. On 10 April, it moved forward to Gotha from where operations began on 15 April. Convoy 6/9000 crossed the Rhine on 7 April at Wesel and became sited at Horstmar (Fig. 11). Convoy 2/9000, at Laroche to cover the Ruhr, moved forward to Rottingen for the special benefit of the USAAF on 16 April. Convoy 5/9000 was moved from Rips to Bamtrip where it became operational from 15 April.

CROSSING THE RHINE.

Convoy 4/9000 left Commercy on 2 April, crossed the Rhine at Worms after delays due to the pressure of military traffic of higher priority. Thus, on 5 April, 4/9000 became the first 72 Wing unit to cross the Rhine on a pontoon bridge. Traveling via Frankfurt (still smouldering), it arrived at Bad Homburg and settled into the village of Ober Reifenberg, parked its vehicles end to end in the main street and got down to a good night's sleep after three days on the road (apart from myself and six other weary airmen). We drew the short straws and had to stay up and awake all night guarding the convoy from the back of a 15-cwt Bedford truck. The village was under curfew but as soon as this was lifted, the village matrons left their homes with baskets of food and headed for the huge surrounding forest sheltering many German troops, all very keen to surrender to the British, who didn't want them and just pointed them homeward.

The technical site for 4/9000 was on top of Grosser Feldberg (880m), the highest peak of the Taunusgebirge, a superb radar site and one used by the Luftwaffe for jamming Gee, but successfully bombed by the RAF for its trouble. The weather at this time was, surprisingly, rain free which meant that it was very difficult on the mountain top to earth the equipment; anyone entering the OBOE trailers without thick socks and gumboots got quite a surprise. But the magnificent views compensated for this minor inconvenience.

April, 1945.

During April, 1945, OBOE units controlled 644 sorties with about 70% success rate, a surprising number in view of the unsettled state of the war situation. The variable results are demonstrated by the following three operations. A very successful attack targeted by 5/9000 (Bartrup) and 6/9000 (Horstmar) took place on 23 April against Bremen, the target being bombed by 40 aircraft with a high

OBOE

degree of accuracy. Convoys 4/9000 and 6/9000 joined in marking Berlin for the first (and the last) time by OBOE, with, according to the Air Ministry, "*reasonably satisfactory results*", which means in laymans' terms that it was something of a failure - and that's the way I remember it. Also an attempt to attack Berchtesgaden on 25 April by convoys at Mosheim and Gotha ended in complete failure, the target being well out of range.

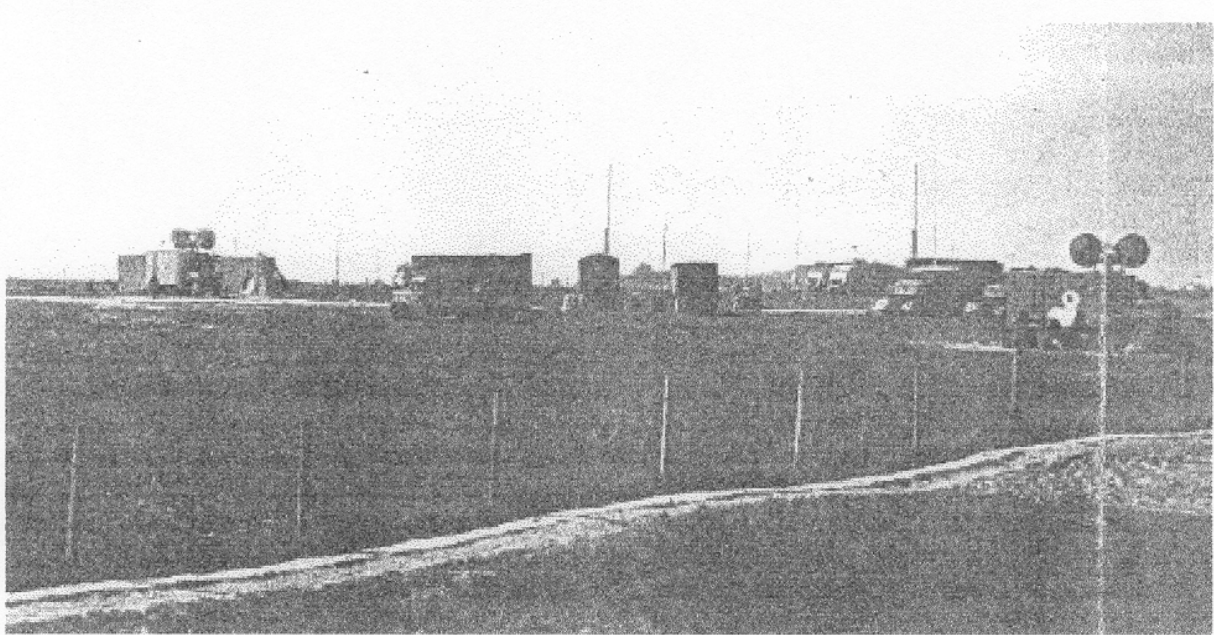
No doubt with the latter target in mind and the possibility, albeit remote, of a last stand in the Bavarian Alps, convoy 4/9000 was moved from Bad Homburg on the 26 April to travel via Aschaffenburg, Wurzburg, Bamberg and Bayreuth (in 3 days) to Erbendorf, near Weiden, on the Czech border, sited on the rolling uplands of the Fichtelgebirge, not as spectacular as the Taunus, but still some 550m high. This station was declared operational by 30 April but did not operate, as the war was effectively over by then.

It was just as well that 4/9000 was not needed at Erbendorf as its hardware had taken a battering on the journey from Bad Bomberg. Its advance party had routed it on a Third Army main military route where it met a railway bridge under which the OBOE trailers could not pass. Several hours were lost in bridging a ditch, crossing two railway lines, etc, by stripping a farm of every brick, stone and piece of timber to make a relatively smooth track for the trailers. They didn't like it and the delayed US troops didn't like it either. They got their own back the following day when a small US tank struck the rear of one of our two trailers and effectively broke every valve in it.

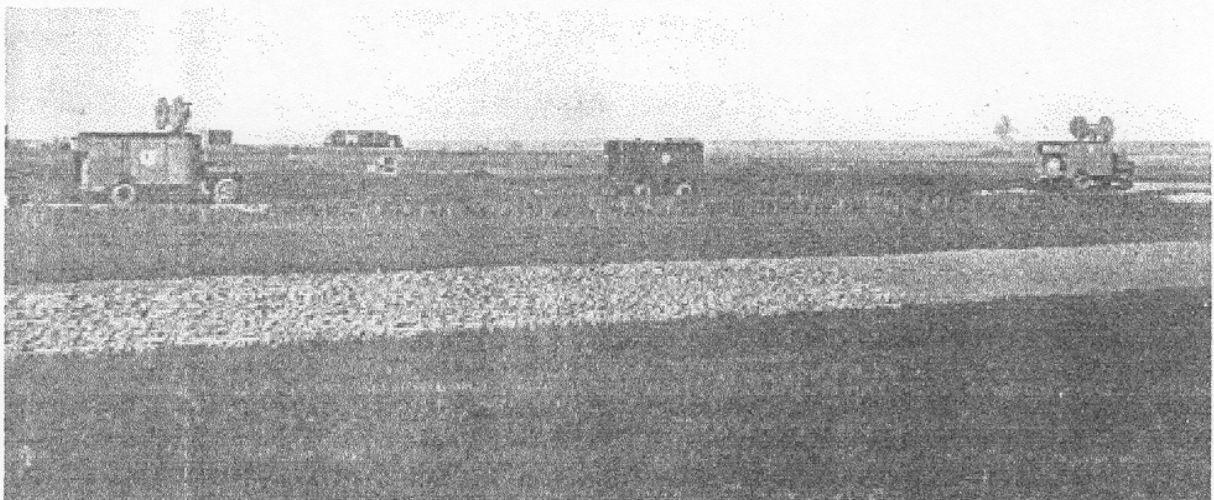
May, 1945. By VE Day, the OBOE crews at Mutzig (1/9000), Rottingen (2/9000), Gotha (3/9000), Erbendorf (4/9000), Bamtrup (5/9000) and Horstmar (6/9000) were rewarded by station orders seeking volunteers for radar service in the Far East.

C.R. Eastwood, RCAF.

OBOE



(Fig. 11) - CONVOY 6/9000 OBOE TRAILERS #1 and #2 at
HORSTMAR, GERMANY, 1945



(Fig. 12) OBOE TRAILERS #3 and #4 to the right of TRAILERS #1 and #2 at
HORSTMAR, GERMANY

Photos courtesy of A. Colonval

OBOE

TYPE 9000 AND GEE, TYPE 100

F/O. R.H. Carlyle C18820

Introduction to OBOE, Type 9000.

I was transferred as an airman from CHL Station, Prestatyn, North Wales, to Telecommunications Research Establishment (TRE), Malvern, in March, 1943, to a course in Type 9000. From there, I was posted to Hawkshill Downs, Deal, Kent. I boarded out with a delightful old couple who lived adjacent to an air raid siren. Although there was very active bombing and anti-aircraft fire, I slept well after long days of working on the delicate OBOE equipment. I was interviewed for a commission at Ad Astral House in London, and was transferred to Yatesbury and Cosford for officer training. Graduation followed in November, 1943.

My postings followed rapidly- Sennen, Lands End, and to Swingate, Dover, where we were very active and were shelled from across the Channel when our own artillery shelled shipping along the French coast. The station was heavily sand-bagged. The hits created a lot of dust and would cause the clock to fall off the wall. One hit on the NAAFI and killed two air-women. Another blew up the adjacent CHL Nissen hut, but no one was hurt and the equipment kept running in the open air.

After a brief period, I was transferred to Winterton, Norfolk, and recall a Mouse operation in which the high voltage rectifier failed, removing the range control on the cathode ray tube. To shut off the power would have eliminated contact with the Pathfinder navigator, so I removed the side panel of the receiver and, with rubber gloves, changed the rectifier under full power. The operation was successful!

I was transferred to Matron, Yorkshire, Christmas Day, 1943, en route to Cleadon, South Shields. The only reason I can conclude for this timing was to serve Christmas dinner to airmen and air-women, as per tradition. Cleadon was a station under construction for a multi-channel operation.

After a short period, I was transferred to Sennen, Lands End, to a station at Treen, which was under construction jointly with TRE (George Reeves). Sennen was about ten miles by road from Treen, so I arranged a private billet and was able to be at the station all hours of the day. We designed operations room equipment and had it made locally. We had to set up the two sequenced transmitters. In doing so, we were in the process of setting up one of the transmitters and grounded the high voltage capacitor according to proper technique with George Reeves. Unfortunately, the proper ground had been removed, and when I touched the proper ground I was thrown against the wall of the Nissen hut and suffered a middle finger paralysis for several months.

The station became fully operational and was extremely busy prior to and after D-day, June 6, 1944, such that I lived there, leaving only for meals, for about three weeks. We had a tremendous crew of mechanics. In the workshop one morning was a sign that read, "The impossible we do at once. Miracles take a little longer." Our longest range and latest assignment was 300 miles approximately;

OBOE

bombing of the U-boat pens at Brest. In 1982, I met the navigator of this operation, F/L Andrew Denholm, who had pictures of this successful operation.

Treen was, in late summer, 1944, out of range with the successful Normandy operations. The station was closed, and the airmen were transferred to a mobile station at Bawdsey, Suffolk. The station was on a cliff outside the gates of the famous Bawdsey Manor. We were very busy and had an American SCR584 transmitter (Fig. 13) which was very effective.

Our arrival was coincidental with two events: 1) The CH. transmitter towers at Bawdsey were lit with red lights for the safety of our returning aircraft. 2) The arrival of the V-2 buzz bombs and an anti-aircraft battery behind us to shoot down the buzz bombs. Our station was thus in a very precarious position. The locals blamed the whole scenario on us and we were unwelcome, particularly in the local pub. Since we were now to be mobile, our crew had to learn to drive, and the British School of Motoring was engaged to train them. As a consequence, one of our airmen, while under instruction in a three-ton Bedford van, managed to knock down the pillared gates of Bawdsey Manor, whereupon F/O Carlyle was reprimanded and informed that in some eight years every conceivable RAF vehicle had entered the gates and in two weeks we had managed to knock them down!

The crew was shortly transferred to Cardington (Balloon Command) to be totally mobilized for foreign service. After a few days, we left at 05:00, I leading the convoy in a three-ton Bedford, for Old Sarum on Salisbury Plain. We arrived about 18:00, whereupon I was ordered to take the heavy equipment at 20:00 to Dover for an LCT (Landing Craft Tank) crossing to Boulogne. My associate in the van was the adjutant who could not drive. With the help of motorcycle escort, we arrived at Dover about 16:00 next day. We then boarded the LCT and overnighted. I am not a sailor. With a storm, and being tied to another LCT and waves through the harbour gates and trying to sleep in the seat of the van, I was unwell. Our LCT was under command of two officious ensigns of the Royal Navy who, during the course of the evening, were required to provide reasons in writing as to why they had ignored the Admiral at Dover Castle's orders to assist a grounded ship on Goodwin Sands. The reasons were that no one knew the Morse code.

In the morning, we followed in convoy to Boulogne and landed on the beach. We spent the night in a rat-infested castle. The following morning, I was given the list of several towns to go through to Mons, Belgium (Wing Headquarters). After some difficulty, through lack of any road signs, we made it to Mons and, subsequently to Rosee, Belgium, where we set up four units which were there over the winter. We had a very anxious period when the Battle of the Bulge was within a short distance from our station, the Germans were out of gas and our station was frozen in with thousands of gallons of gas.

Christmas again and time to serve the troops in the mess hall - a school house in Rosee. The kitchen was in one room and the dining room was found through a narrow dark corridor. I brightened up the occasion, which was darkened by the Battle of the Bulge, by being run into by another officer and

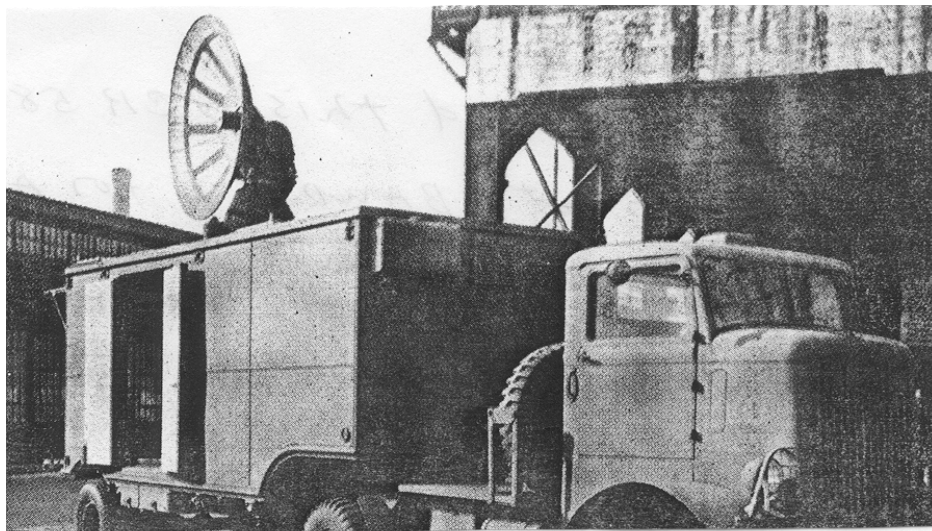
OBOE

having a plate of Christmas dinner dumped down the front of my dress uniform. In the early New Year, when General Patton's troops had pushed the Germans back, we moved to the bank of the Rhine, near Koblenz, for a period of operations. When a bridge was built across the Rhine, and troops had advanced to eastern Germany, we moved and set up at Gotha, where we were very active in the operations against Berlin, until V.E. Day, May 8, 1945.

During this period, many displaced persons were in the area. On one occasion, when returning from lunch in Gotha to the station on the mountain in convoy, a group of displaced persons stopped us and said, "Deutsche Soldaten", heading toward the station. We spread out. I, being uphill, saw a group of six soldiers in a small clearing having a smoke. I waved to the other officers and then realized I had to act. So I ran in shouting and, with my trusty revolver, captured the six while the others came. We disarmed them and returned them via RAF Regiment to internment. I was subsequently criticized for allowing them a smoke.

Short Posting to GEE, Type 100. After VEDay, I was transferred to a Type 100 station (GEE) on the Rhine. The station was subsequently moved to Prades, in south France, in the Pyrenees Mountains, near the Spanish border, at the western end of the Rhone-Carcassonne GEE Chain, which provided coverage of the Mediterranean for the war against Japan. Our assignment was to build a permanent station and move the mobile equipment into it. I commandeered local help and had a stone building half-built when I was told to return to England for repatriation. I pleaded to stay until completion but was informed my number was up and F/L L.R. McNarry and I returned, via Mons, to Torquay, Devon, for return to Canada. I returned from Liverpool on the Empress of Scotland, renamed from its previous name, Empress of Japan, which allowed me my sixth seasick trip in the RCAF, and retired January 6, 1946.

R.H.Carlyle , November, 1999.



(Courtesy J. Savigny)
(Fig. 13) RADAR TRAILER TYPE SCR-584

OBOE

BUCHENWALD

David Pollock

A Challenge. My most challenging wartime assignment occurred shortly after D-Day when I was asked to lead a mobile radar unit across the Channel and into Germany. The Russians were attacking Berlin from the east and the Allies were moving towards it from the west. My job was to get our radar unit close to Berlin so that we could accurately control the Allied bombing of that city.

Buchenwald. Perhaps the single most significant incident of my young life (I was 23 then) took place as my convoy was rolling down the autobahn towards Berlin. Suddenly, a US military policeman roared up on his motorcycle to ask who we were. He then asked "have you guys ever seen a concentration camp? There's one about 30 miles from here." It was the infamous Buchenwald camp. We entered it only a day or so after its liberation by the American Army and my Flight Sergeant and I spent two horrible hours going through that ghastly house of horrors. I will never forget the wasted bodies of the dead inmates whose thighs were so thin you could circle them with one hand and whose faces looked like wax death-masks. There were rooms with instruments of torture containing bits of bone, hair and blood still stuck on them. There were lamp shades and book ends made of human skin with tattoo marks prominently displayed on them (this was a hobby of Ilsa Koch, wife of the camp commander and known as the "Bitch of Buchenwald"). Most macabre of all were the furnaces still warm to the touch, with some bodies still inside them. Dead bodies were stacked up all over the grounds, with the head of one person stuck into the crotch of another, the way you stack beer bottles in the fridge so they won't fall over.

Photographs. I took several photographs inside the camp, which I've now donated to the US Holocaust Memorial Museum. And, with the help of an inmate who spoke several languages, I wrote down the names and addresses of about a dozen people around the world whom certain inmates wanted to contact urgently for medical, financial, visa or other types of assistance. I put my own address ("F/0 D. H. Pollock, C29272, RCAF Overseas") on the bottom of each airgram I sent out, asking the recipient to let me know whether they were able to contact their friend or relative. During the course of the following decade, I received a number of replies from England, France, Turkey, USA, Canada and Israel thanking me for sending those airgrams. I will never forget the horror of that terrible concentration camp as long as I live. What a revolting but powerful impression it made on the mind of a young Canadian officer from the Prairies.

Return to Canada. Soon after VE-Day, I was back in England and, like many others, waiting for my repatriation number to come up so that I could get on a ship and go home. I left Bournemouth for Halifax in November, 1945. I was soon mustered out of the RCAF after 38 months of service and, at the age of 23, ready to complete the university studies previously interrupted by the war.

Retrospect. I often think about the following. If WWII had not occurred, I probably would have

OBOE

obtained my undergraduate degree at the University of Saskatchewan and spent the rest of my life working in my father's tiny general store in the small northern Saskatchewan hamlet of Kinistino. As things worked out, however, the war whetted my curiosity about the rest of the world and with the help of the Wartime Service Benefits provided by the Canadian Government, I received a scholarship at the University of Chicago for graduate and post-graduate studies. My subsequent career spanned 30 years in the United Nations and 13 years at Carleton University in Ottawa. I've traveled all around the world, working for and teaching international development rather than international destruction. I have no desire to remember Adolph Schickelgrubber for anything. But the paradox is that, if he had not existed, not one line of the above account would have taken place!

David H. Pollock, RCAF, C29272.

OBOE