# THE ROYAL ENGINEERS JOURNAL



APRIL 1995 VOL 109 NO 1

# Guidelines for Authors

***The Editor*** is always glad to consider articles for publication in the *Journal*. Guidelines for prospective authors are:

***Subject.*** Articles should have some military engineering connection but this can be fairly tenuous, specially if an article is well written and interesting.

***Length.*** Normally approximately 4500 words (ten A4 pages **double line**) + illustrations. Good blockbusters can sometimes be serialized.
Ideally text should be double space typed and include the author's pen picture, photo and captions for artwork.

***Clearance.*** The author must clear his/her article with his/her CO where applicable.

***Copyright.*** Any copyright existing on articles which have been published elsewhere, must be indicated when submitted. Any necessary copyright clearance should be obtained prior to submission including for photographs and maps.

***Computers.*** Articles saved as Wordperfect, (with a .WP extension after the file name and with all text LH justified), or as Microsoft 5 (with a .DOC extension and text LH justified), on a 3½in disc, are welcomed.

***Photographs*** should be black and white if possible. Coloured photographs should be of good quality with sharp definition.

***Rewards*** can be generous. The Publications Committee has about £250 in prize money to allot for each issue plus valuable annual prizes. All authors receive £10 to help cover costs.

***Pseudonyms*** may be used. They will not be revealed by the Editor under any circumstances.

Contributions should reach the Editor by:

*16 June for the August1995 issue*
*Early October for the December 1995 issue*
*Early February for the April 1996 issue*

**Submissions before the deadline will be particularly welcome.**

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# Editorial

"Words are like leaves; and where they most abound, much fruit of sense beneath is rarely found."
Alexander Pope

ONCE again we have a good range of articles in this issue but still with an emphasis on events of 50 years ago; and quite rightly too. Members of the Publication Committee, who sit in judgement to vote on the best articles in each issue, have a penchant for the historical: admiration for the exploits of our predecessors; a fascination for the insights into soldiers under stress; and wonderment at the great good humour which emerges to balance the fear and horror of war. In this year, in which we commemorate both VE and VJ days, the spotlight is on those who were there, who contributed so much to the final victory and brought to an end a world at war. We are fortunate to have some personal reminiscences from a few who were there, both in Europe and the Far East.

After the landings at Normandy and the breakout from the bridgehead, the next great engineering feat in Europe was the crossing of the Rhine, so vividly portrayed in *The Rhine Crossing 1945*. It says something of the Sappers then that their commanders expected nothing less than success; and what a commitment in material and men it took to achieve. Surely a lesson there for commanders today who expect no less from their Sappers, despite their lack of manpower.

*Bridging for the Nineties – a Bridge to the Future* shows how modern technology goes some way to help redress the present day shortages in men. This exciting new bridging development, funded in the face of swingeing cuts in the overall army budget, is shortly to be introduced into service. This article is a must for all serving Sapper officers.

We still need more articles from junior officers, though in this issue we have done comparatively well. We gain further insights into how Sappers operate in the very complex environment of Bosnia; and, least we forget, are reminded that Sapper units still deploy on a regular basis overseas to carry out engineer project work, this time to Canada on Exercise *Waterleap*.

Not to let the more senior officers off the hook, the Publications Committee has pondered for some time on how best to encourage more in-depth, thought-provoking articles on the major military engineering issues facing the Corps. We have seen in recent years how quickly the goal posts move, and there is no lack of challenges facing the Corps in the new world order of the 1990s. It was therefore encouraging to receive the article *Antipersonnel Mines – Military Utility, and Humanitarian Considerations*. It is a controversial subject in which the media has taken some interest in recent weeks. Clearly the issues here are complex, but perhaps the case for so called smart mines has to be a very convincing one if the objections of those who have witnessed the legacy of the indiscriminate use of mines, are to be overcome. Is a 1 in 1000 chance an acceptable level for something to go wrong? Traditionally, the British Army has sought much higher levels of assurance in the safety of its soldiers when operating mine and weapon systems. Is anything less than this acceptable for a mine to self-destruct?

# Bosnia Diary

MAJOR J D BEAUMONT BEng

*The following is a much edited version of the author's diary of events written during his sojourn in the former Yugoslavia. It gives some indication of the difficulties encountered when trying to complete even the most simple tasks.*

### Monday 14 March 1994

Today I have my first visit to BATGEN[1]. The briefing from a Belgian operations (ops) officer is mainly in French; I am able to follow most if it because he speaks slowly when addressing me though he speeds up considerably when talking to others. The highlight of the day for me is lunch; even though our hosts say it is not very good, I think it is excellent and a vast improvement over the fare we get in our HQ in Kiseljak.

I get back to learn that Route Skoda North in Sector North-East (Sector NE)[2] has been closed due to a bridge collapsing. The bridge was a through steel truss with overhead bracing originally estimated at Military Load Class (MLC) 50. With the top bracing in position, overhead clearance was too low for the passage of aid convoys carrying large containers, so they had to use Route Skoda South, which is in a much poorer state and often blocked with local traffic. One of our Dutch engineer officers calculated that removal of the top bracing would reduce the MLC to 30, the standard we were maintaining road surfaces to, so it had been agreed to remove the overhead bracing. The collapse has caused some embarrassment, but was brought about by the combined weight of a recovery vehicle towing another laden truck across, despite warning signs restricting the live load to one vehicle at a time. In my estimation the combination must have been at least MLC 40.

### Thursday 17 March 1994

This evening was called to the ops room to help sort a problem over a recce into Serb territory tomorrow. This task was passed to us by General Rose's personal staff: he had agreed with the Serbs that we would recce two bridges in their territory.

One of these, in the south, is on one of our existing UNHCR (UN High Commission for Refugees) routes, so gaining access is not a great problem.

The other is well to the north of our area and, as it is not a zone we normally venture into, it is necessary to get clearance to pass through the BiH (Bosnian (Muslim) Government Forces) and Serb confrontation lines (CL). We managed to get agreement from the Serbs tonight for the recce to be carried out tomorrow, but NORDBAT[3], whose area of responsibility that is, is not keen on going without confirmation from the BiH, which we haven't had yet. In the end, Chief G3 Ops did a bit of "arm twisting" to persuade them to talk their way through the BiH checkpoints.

### Friday 18 March 1994

Late morning, we hear from Sector NE that the bridge recce party has got stuck in no-man's-land between the CL. We smile about it at first and make some unkind remarks about the Swedish. Tonight we learn that, having passed through BiH lines, the armoured personnel carrier (APC) got stuck in an antitank ditch and came under heavy machine gun fire; the recce party abandoned the vehicle which was then subjected to deliberate mortar fire and eventually hit by an antitank missile. Fortunately no one was injured and they all got back safely, but it must have been very frightening for those concerned. Maj Tom van Nimwegen one of our Dutch engineer officers had been with them.

This pm I fixed up a trip to visit HQ Sector NE at Tuzla tomorrow. I am to travel with a BATGEN recce party which is going to look at demining Tuzla airfield so that it can be used by the UN.

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[1] *Battalion Genie* is a mixed French/Belgian engineer unit comprising a French HQ company, a French field company and a Belgian heavy plant company.

[2] Bosnia-Herzegovina Command, was divided into three sectors in March 1994; Sectors North-East, South-West and Sarajevo.

[3] The battalions from the various troop contributing nations are known by an acronym derived from their nationality, hence the British Battalion is known as BRITBAT, the Canadians as CANBAT, etc. In this particular case, NORDBAT is a "mixed" Nordic unit comprising Swedish and Danish troops.

The burnt out Swedish APC at HQ Sector NE at Tuzla.

### Saturday 19 March 1994

Leave Kiseljak at 0730hrs. We travelled to Tuzla in a French armoured recce vehicle and a wheeled APC. The trip normally takes 4-5 hours. For most of the journey I was able to stand up in the back hatch to see where we were going, and follow the route on the map. The first stretch between Visoko-Breza is a rough track through the hills, improved to take MLC 30 vehicles but which needs constant attention; we pass a detachment of BATGEN reshaping and grading a section of the route whilst enveloped in clouds of dust from passing convoys.

The countryside is very alpine-like and we speed through many small villages, the main streets of which are narrow, hard-packed earth roads; the driver seems to take little heed of the local population and I half expect some sort of accident to occur. Just north of Vares we pass through a roughly-hewn tunnel in the mountain. It is lit only by our headlights and flaming torches of rags burning in a combustible liquid. We leave a beautiful warm spring day and emerge to a totally different scene: winter in a forest, with large amounts of snow on the ground and decorating the trees. It reminds me of a scene from the children's novel "The Lion, The Witch and The Wardrobe."

There is UN traffic control along some stretches of the route because many of the narrow forest tracks are not two-way; unfortunately we have no authority to impose this control on the locals. Just before Kladanj, we came up against the back of a stationary UNHCR aid convoy; it turns out to be two or three convoys totalling about 30 vehicles, the front end of which had met a convoy of civilian vehicles coming the other way.

The French captain in charge of our party decides (correctly) that we would be delayed long enough to have some lunch so he broke out a stick of French bread, some cheese, sausage and a wine skin of red wine, on which we all feasted in tremendous style. The traffic jam took two hours to resolve, the other side managing to tuck their vehicles far enough into the side to let us through. Once past we soon rejoin metalled road and made good time to Tuzla.

Arrived at NORDBAT HQ just after 1600hrs and met up with Tom van Nimwegen and had a long chat about his experiences during the abortive bridge recce, and took a picture of him standing by the recovered burnt out vehicle. It must have been quite harrowing at the time but he seems to have come through it okay and is quite sanguine about the whole episode.

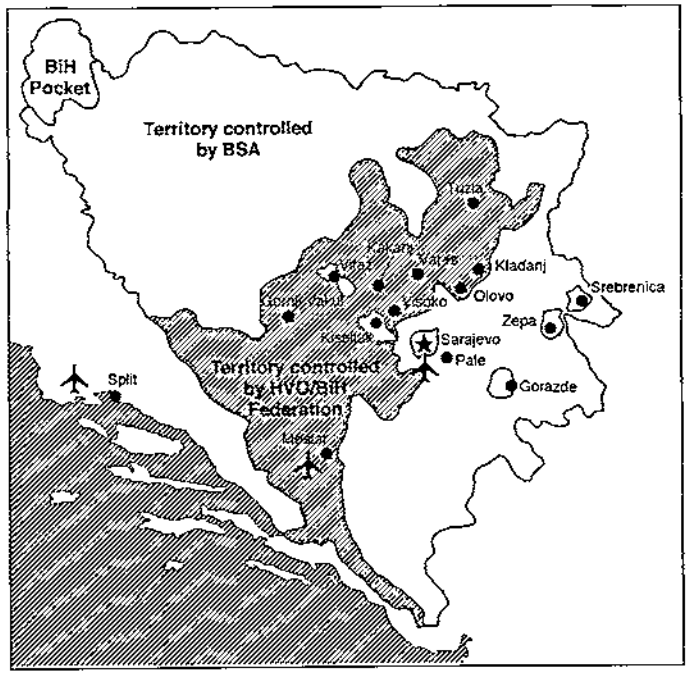
HQ Sector NE consists of three or four porta-cabin offices in a corner of the NORDBAT compound, plus a couple of 12x12s for accommodation. They have no commander yet and the place is being run by the chief of staff (COS), a very pleasant Dutch colonel (who also happens to be an engineer). They will move to Tuzla airfield once it has been sufficiently cleared of mines.

Tonight I hear about the death of Corporal Warburton, of my regiment, serving with the explosive ordnance disposal detachment at Vitez. There was an accident while he was destroying some homemade mines that had been handed in. I am very sad; I remember him well as one of our best junior NCOs.

### Sunday 20 March 1994

Last night I was warned off by COS Sector NE to go to a meeting that the BiH 2nd Corps had requested for today to discuss repairs to the Route Skoda bridge: I am to be present to demonstrate how seriously the UN view the situation, sending an engineer officer from Command HQ in Kiseljak! At 0930hrs Tom, myself, Captain Flach (NORDBAT liaison officer (LO)) plus an interpreter, set off to Tuzla to find the BiH HQ. It is a formal meeting with their chief engineer and his staff, each "team" sitting on opposite sides of a table. After the opening pleasantries, I suddenly find that, somehow, I have been elected as UN spokesman. In fact, it isn't difficult to do some fast talking – a triumph for staff college training – by explaining what we are doing to get another bridge. They are very keen to get it replaced and, although their apparent concern is the inconvenience to the local population, I start to get the feeling that the real

difficulty is the disruption to their own traffic, which is affecting their military operations. We go round the same buoy several times: them demanding that we get on and repair the bridge as quickly as possible, and me explaining that that was our intention, but that the UN didn't have any bridging equipment in Bosnia and that I had asked HQ UNPROFOR[4] (UN Protection Force) in Zagreb to find some for me.




Map of area covered by article.

### THURSDAY 24 MARCH 1994

FOUND out we have not been successful in our arguments to retain a strength of five staff officers in engineer branch; we must reduce to four as part of the "down-sizing" exercise accompanying the move to Sarajevo and the attendant build-up of Sector HQs. This means I will have to take on responsibility for civil infrastructure repairs in addition to my existing tasks.

Have a quick handover of current tasks from Maj Pierre Lara, departing on completion of his tour. Tomorrow I attend my first meeting between local civilian factions to discuss the infrastructure repair work programme. Am warned by Pierre that there will be some "flak" as several tasks the UN agreed to carry out have not been done, mainly because UN troops are too stretched to carry out the escort duties needed.

### FRIDAY 25 MARCH 1994

A HECTIC day. I attend the morning briefings, and have to deal with a short notice request from G3 Plans about contingency planning and withdrawal routes in case of a UN pull out. Main business is to attend the electricity meeting at Sarajevo in lieu of Maj Lara. I give a lift to Mr Shimo the Croat delegate to the meeting, who lives near Kiseljak. It is normal to wear flak jacket and helmet when travelling into Sarajevo, but I do not bother because Shimo does not have any protective garb and I feel it is better to demonstrate my confidence in the recent ceasefire in the city. The meetings are held on the neutral territory of Sarajevo airport controlled by the UN; it is late starting due to the Bosnian and Serb delegations having difficulties with their escorts. The chairman is the UN Civil Affairs Officer from Sector Sarajevo; he goes through the agenda with me before the meeting starts and clears the line on the points that I am to cover.

When everyone eventually turns up I am surprised by how cordial relations between the different factions appear to be, but they were all colleagues before the war. It is interesting being a spectator to the discussions; the three sides discuss things between themselves in their own language and then wait for the interpreter to put it into English for our benefit, and so that the Chairman can record the minutes. Occasionally there are references to "colleagues" but more often it is along the lines "... we have done such and such and would like to know what another side is doing to help in this matter ..." There seems to be a degree of willingness to work together on the technical front, and often the sticking point seems to be whether the military

[4]HQ UNPROFOR is a 4-star HQ (commanded by a 3-star officer), the superior HQ for Bosnia-Herzegovina Command, four 1-star sectors in Croatia (North, South, East and West), plus another 1-star command comprising a couple of battalions in the Former Yugoslav Republic of Macedonia, known as FYROM.

authorities (who are not present) will agree. After a few meetings I start to learn that this is just a way of deflecting criticism for not having done something.

On the way back we stop at a depot to pick up some electrical gear Shimo wants to take back with him, and drop it off at his house on the main road just inside the Kiseljak pocket[5]. He is extremely hospitable and offers me beer and/or slivovic. I decline the latter but accept a beer which is brought out to the table and bench in the garden. The wooden slats of the seat are dry and clean, though some are missing; even though I am in combat clothing a cloth is spread over the seat for me to sit on. Bottles of beer are brought by Mrs Shimo and daughter and I am offered food and coffee, which I decline, but which are produced anyway. The former is a plate of cold meats and bread similar to the German *schinken platte*, and the coffee is Turkish – thick and black with sugar but no milk. In time honoured tradition we converse with a great deal of hand waving and drawing of pictures, and the few words of English and French that Shimo speaks and the even fewer words of Serbo-Croat that I have. At one stage they think that I am cold and a coat is brought out to me (which I, of course, decline). Nevertheless, sitting in their garden, being entertained as an honoured guest by a local family whom I have not met before is a wonderful experience that I will treasure. It gives one a great deal of confidence in human nature. I am reluctant to take my leave but after two beers, feel I had better drive back to Kiseljak before I become incapable of doing so.

The recent ceasefire and improved cooperation between the HVO[6] and BiH, means that it is now possible to set about repairing the electricity distribution network passing between the areas controlled by these two factions. As a result, I have some work to do to get the projects up and running. I think that my new responsibilities for infrastructure will allow me to do something of practical use to help the people of this war-torn country, and thank the Lord that He has given me such an opportunity.

[5]The area immediately around Kiseljak is predominantly Croat, but is surrounded by area that is controlled by the Muslim BiH, such "pockets" were more or less besieged areas, with checkpoints set up by both sides controlling access in and out of their respective areas. In some areas, there were pockets within pockets.

[6]The HVO are the Bosnian Croat Militia.

**MONDAY 28 MARCH 1994**

A BUSY day making arrangements for a recce to a damaged high voltage pylon near Vitez. At 0945hrs I set off with Nada (our interpreter), Shimo, and Mr Zdansko, Shimo's boss, to Kakanj to pick up another of their team, and then on to Vitez to try and find our local contact there. In due course we find him along with the G5 officer from Sector SW, and the BRITBAT LO from Vitez. The combined parties redivide, with some going off to look at the Vitez substation and the rest of us, led by the LO in his Landrover, going up to the pylon site. Eventually we turn off the main road and within a few hundred metres come up against a HVO barricade.

Despite having clearances from the local HVO commander in Vitez, the chap in charge of the checkpoint first of all says that we will have to wait ten minutes while he telephones his superior, then won't let us through anyway; says that we won't be able to get through the BiH checkpoint further up the road and, to cap it all, he believes the route is mined. After arguing with him for a while we all turn round and go back to Vitez where the LO sees the HVO commander again, who agrees to telephone to the checkpoint with our clearance. Back we go and this time after a short delay (supposedly waiting for the call to come through) they start to clear the barricade; we assist by dragging aside the anti-sniper sight screen. As we set off to drive through, the LO shouts to watch out for the antitank mine that is on the ground; I don't see it but am careful to ensure that I follow as near as possible in the tracks of the Landrover in front.

We set off cautiously with the LO walking up the road in front of the vehicles to check for mines. Further up the hill, round a slight bend is the BiH checkpoint. There is a series of bunkers and trenches constructed here, and these have the advantage of being on the higher ground. The barricade consists of a "dry-stone" breeze block wall which they happily start to dismantle for us. We assist and are through very quickly with minimum fuss. They also provide a guide: an unshaven old man, probably in his 60s, wearing a German-style "hunting suit" very much the worse for wear (I imagine that this is his "uniform"), topped off with a blue woolly hat. We set off up the road – clearly it is not used very much by vehicles and I guess we must have been the first UN up there for a long while because our white vehicle becomes an object of curiosity for all who see us. After a mile

or so we turn off up a muddy track leading to the top of the hill, where we find our pylon. I am a little worried about getting up the track in a 2-wheel drive minibus, but we manage.

We are right on top of one of the hills overlooking Vitez and can see the whole town spread out below. It is no surprise to find a series of trenches up there, probably observation posts (OPs) and/or sniping positions. I pick up a couple of empty 0.5in cartridge cases as souvenirs.

The pylon has been demolished by placing small cutting charges on the legs where they entered the concrete foundations: it has been dropped back quite neatly behind the crest of the hill so that it doesn't impede the view from the trenches. There has been no power in the Vitez pocket for several months. Shimo and the others assess what replacement parts are required and what work needs to be done; the whole thing doesn't take very long. Our BiH guide says that he doesn't know if there are any mines around so we all tread gingerly. I feel that the BiH are unlikely to lay mines around their own trenches, and also take comfort from seeing a couple of local civilians wandering around who wouldn't be there if there had been any mines.

We make our way back to the vehicle. All in all a successful day. All I have to do now is arrange transport for delivery of the stores that are needed to Vitez. Unfortunately, the best source of angle-iron sections is in Sarajevo, and it is highly unlikely that the Serbs will agree to their passage through any of their checkpoints.

### Wednesday 30 March 1994

In my role as infrastructure officer, I send a couple of messages to the HQ of the Bosnian Serb Army at Pale, using the satellite link that is maintained so that we can "talk" to one another. One of the messages is about a repair job in the Lepenica Valley, just outside the Serb controlled area surrounding Sarajevo. The Serbs have declined to agree to the work in the past because it only benefits the BiH and HVO sides, so I have decided that I will tell them that we are going to do it, rather than asking their permission, pointing out that it is not in their territory anyway. I am aware that they have an OP on a nearby hilltop that can see nearly all of the valley where we will be working.

Go into Sarajevo again this afternoon with Shimo to meet Afan Mesic who knows just about everyone and everything to do with the prewar electricity generation and distribution system in Bosnia. I take an instant liking to him. He is short, middle-aged and balding, but is a real enthusiast for what he does and has the sort of personality that almost bubbles over. He likes to call himself "Mr Megawatt", and that describes him to a tee. He speaks very good English so we talk about a lot of the problems concerning the high voltage distribution network and how we are going to solve them; and he writes me out a list of priorities and what is required for each. That will be a great help in formulating a strategy of how to progress the wider plan. I am sure that I will be able to work well with him.

We also pick up Ivan (our other interpreter), who has been visiting his family in the city and give him a lift back to Kiseljak. On the way I detour to go and look at the Lepenica Valley site. Shimo and Ivan think that we will have problems at the HVO checkpoint because we haven't warned them we are coming. I decide to go anyway, and although they won't let us through it doesn't matter because the damage – a severed conductor – is near to the HVO side of the CL. With their agreement, and a guide to ensure we don't stray into any minefields, we walk up to the site and have a good look around. My conclusions from a map appreciation proved to be correct: the Serb OP does not have direct line of sight to the work site, so I feel that most of the repairs can be done with minimal interference. I task Sector SW to organize the repair mission for next week. This work has been outstanding for some months; if it comes off it will enable us to bring power up from the hydroelectric plants in the south, and will effectively double the available supply of electricity in central Bosnia.

### Thursday 31 March 1994

Down to Sarajevo again this pm with Nada, Shimo and Zdansko to a meeting about power supplies in central Bosnia. The Bosnian side rang up to ask if it could be held at the Kosevo substation in their part of Sarajevo. I have no objection but am expecting representatives from HQ Sector SW, already en route from Gornji Vakuf, and so need to head them off. I dash down to Sarajevo airport hoping to meet up with the Sector SW delegation but unfortunately by the time we arrive, they have been and gone, after having been told that the meeting was cancelled. Try to find them at the Sector Sarajevo HQ but no luck, so have meeting without them which is a pity because they will be tasked with organizing much of the work we discuss. However, manage to get quite a

bit done, and set some work priorities for the next few months.

This evening I book transport and put in clearances to get the Vitez pylon out of Sarajevo on Sunday. I will go down with it and see if we can get it through S1[7] without any trouble.

### Saturday 2 April 1994

THERE is an electrical repair mission on a 35kV line in the Kiseljak-Fojnica area organized by Pierre Lara before he handed over. I've tried to check up on the details in the past couple of days, to be told by both Sector SW and CANBAT, who are the task unit, that everything has been arranged. I have my doubts because Shimo is the Croat contact for CANBAT and he hasn't been contacted by anyone. I decide not to go to the site. I feel as though I am deliberately avoiding a potential problem when I make this decision, but I think it is the right one in view of later events. The mission did go awry, but because I am in the HQ, I am in a position to call up CANBAT and Sector HQs in order to salvage something from the day by turning it into just a recce, which had not been done (and that was part of the reason it went wrong). Had I been out on the ground, I would not have had the communications to do that. This afternoon I spend some time talking to various agencies to try and ensure that the Lepenica Valley task goes well next week. I will definitely go on that one, and I think I have managed to get all the details tied up.

Find out tonight that the Serbs have refused clearance for Vitez pylon materials to be taken out of Sarajevo tomorrow but I think that I will have a go anyway just to see if we can get through; I must admit to feeling a little apprehensive about it. I think that I might try another checkpoint using the principle that if they're not expecting us, we might stand a better chance. I hope that it won't be a completely wasted day!

### Sunday 3 April 1994

EASTER Sunday – after breakfast I go out onto the terrace by myself in the sunshine and have some moments of prayer. Part of that is for the day ahead, which I anticipate might be a difficult one. Meet up with Shimo, Ivan and the Danish soldiers who are going to drive the truck, and give them a military-style briefing on what I am aiming to do, and what actions to take if things start to go wrong. I reason that Serb coordination isn't so good that all checkpoints will have each other's clearances and refusals, so I plan to go via the newly opened Visoko checkpoint to see if we could bluff our way through there.

Using that route proves to be no problem. The sentry on the barrier is a great bear of a man with a large bushy beard who could easily be taken for a World War Two partisan; after looking at our UN identification he lifts the barrier and lets us through – so far, so good. The road down into Sarajevo is wide and in good repair, but when we reach the Serb checkpoint on the outskirts of the city, the "policeman" in charge is a bit concerned at us showing up because he hasn't been warned. He is also curious to know why we have come from Kiseljak via Visoko. We let him look in the empty truck and in conversation with Ivan, it turns out that they were near neighbours before the war (though they didn't know each other) and they start chatting. After a few minutes he lifts the barrier and waves us through. I am greatly relieved because I cannot think of a good reason why we are taking that particular route into the city. Just as we are leaving, and on the spur of the moment, I tell him we will be coming back out that way in a couple of hours with "a few metal bars" to which he replies, with great bonhomie, *nema problema* (no problem).

The no-man's-land between the Serb and the BiH checkpoints is pretty well devastated, with ruined and burnt out vehicles and houses on all sides. At the BiH checkpoint, we are again questioned and I again say we will be returning with some stores to take to Kakanj (a Muslim area which we do have to pass through) as they are likely to favour this. Once on our way again, we easily find our way to the depot where we collect the pylon parts. I note that the ground underneath the pylons in the compound has been turned into small allotments to grow vegetables. Also saw Afan; he has BiH written clearance for the Lepenica Valley task, and Shimo is getting the same from the HVO.

Loading the angle-iron sections of the pylon doesn't take too long, even though there must be four tons of material. As we set off they telephone to the BiH checkpoint to warn them that we are "friendly". At the Serb checkpoint the same man is on duty. We dutifully show him our "few iron bars" and when asked, I tell him that we are doing

[7]Pronounced "Sierra One". This is the Serb checkpoint on the only road that is normally open for UN traffic in and out of Sarajevo.

a construction task near Vitez. This tale is plausible because I am clearly a Brit and he will know that Vitez is the main British base. We are all very relieved, and more so when we get back to the Visoko checkpoint where the guard just raises the barrier without even stopping us.

Thereafter we have a good run to the substation where we are to dump the stores. Some locals should be available to unload the vehicle but there is only one man. He rings up to get more help – "in ten minutes" we are told. Meanwhile he entertains us with the inevitable – and welcome – cup of Turkish coffee. After ten Bosnian minutes (about half an hour) no one has turned up so we do the unloading ourselves.

When I get back to Kiseljak, the office is just about all packed up in boxes ready for the move to Sarajevo tomorrow.

### Monday 4 April 1994

Finish off packing my kit and lug it all down to be loaded on the truck with the rest of our gear. Just before we are due to leave for Sarajevo, I ring CANBAT about the Lepenica Valley task which is scheduled for tomorrow. They are planning to do a recce today so I decide to join them to make sure everything is tied up. I am picked up by the CANBAT squadron commander. This turns out to be a providential move. CANBAT's main role in this task is to provide protection and transport for the local civilian workers carrying out the repair. As the majority of the damage to the power lines is on the CL where one side or another has cut the line or demolished a pylon, the normal *modus operandi* is for a civilian repair team from each side to meet in no-man's-land and carry out the work together, under UN protection. This all takes quite a bit of coordination.

We have a good recce and meet both sides at their respective checkpoints; they stay on their own sides at this stage but we get another walk around the site on the HVO side as per last week. We also go to see the local battalion commanders of both the HVO and BiH – they are all quite happy about us doing the work. I am still content that the work site cannot be seen from the Serb OP on top of the mountain because it is in dead ground, but just in case have requested UN military observers (UNMOs) to be on the Serb positions so that they can give warning if the Serbs decide to try and shell us. As we are leaving, one HVO soldier apparently makes a comment to one of the Canadians about the possibility of there being mines in the area. When I telephone the squadron commander later I find that CANBAT had picked up on this comment about mines, are unwilling to do the job without a thorough mine clearance operation being done first, and have stood down from the task. This means that several days' preparatory work havve been lost and the best we can hope is for a recce to try and ascertain where these mines might be to see if they affect the work. I feel it was a wrong decision on CANBAT's part to stand everyone down without further consultation or investigation. I feel that they have over reacted and that we might be missing a trick by placing so much reliance on a single unconfirmed report. Well, we shall see tomorrow.

### Tuesday 5 April 1994

A wet and overcast day – just like the UK! I set off for Lepenica. I meet the HVO engineer officer who assures me he has records of all the mines and that his men are in the process of lifting them. I also come across the UNMOs who tell me that their colleagues are up on the Serb OP on Mount Ostrik. When the CANBAT troop leader, Lieutenant Decaluwe, turns up, I am glad to say that he agrees it is possible to do the task as originally planned; he calls up reinforcements on his radio. The Bosnian workers are already there, but only Shimo has come from the Croat side. I set off to fetch the rest of Shimo's team and their equipment. At their depot in Kiseljak we try to cram all their gear and tools into the back of my vehicle, but it is too small, so I race off and manage to find a bigger vehicle. When we get back, Lieutenant Decaluwe has got his APCs positioned to return fire towards the Serb lines on the hilltop if we come under attack. Technically, the repair to the line is straightforward; the local workers know what they are about and get on with it. There is nothing more that I can do except hope the Serbs don't try and stop us. A couple of hours later, as the repaired conductors are winched back up onto the top of the pylon by one of the APCs, I feel tremendously happy that we have been able to complete the task.

Must admit that I was rather pleased with myself when I got back, but pride came literally before a fall; I missed my footing on the small flight of stone steps outside the ops room, and slipped and did a nasty bit of damage to my shin. That serves me right!

# "Bridging for the Nineties" – a Bridge to the Future

COLONEL T H E FOULKES BSc(ENG)

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*A third generation Sapper, his grandfather having been commissioned into the Corps in 1894, Colonel Foulkes is married, with two daughters. He enjoys photography, history and gardening. He is also President of Corps football and a keen triathlon supporter.*

## INTRODUCTION

ON 3 August 1994 the Close Support Bridge (CSB) and General Support Bridge (GSB) systems of the "Bridging for the Nineties" (BR90) project were finally accepted by the Ministry of Defence (MOD) as fit for service with the British Army. After years of painstaking technical development, political uncertainty and deep defence cuts following *Options for Change*, achieving acceptance was a major milestone marking the end of an acutely uncertain but ultimately successful phase of this important project's long history.

Only when the full background and complexity of BR90 are appreciated does the true magnitude of the achievement become clear. Its roots run back to the Second World War when brilliant work in 1940 under (Sir) Donald Bailey at the Experimental Bridging Establishment (EBE) led to the now-famous "Bailey bridge" and established the reputation of Christchurch in military bridge design. The fact that no fewer than 1400 Bailey bridges were built by British Sappers in France and Germany, between June 1944 and May 1945 alone, conveys some idea of Bailey's decisive impact on operational mobility. And 50 years on, the Bailey bridge remains in service with many armies around the world.

After the war, the bridging team at the EBE Christchurch (renamed MEXE – Military Engineering Experimental Establishment in 1946) started work on new concepts. Spurred on by heavier tanks and advances in metallurgy, MEXE produced a new generation of military bridges including the highly acclaimed aluminium alloy Medium Girder Bridge (MGB) (now in use with more than 30 countries) as well as several innovative steel tank-launched bridges.

## THE NEW CONCEPT

BUT relentless demands for greater speed and span soon obliged Christchurch to start exploring more radical approaches, and by the 1960s their attention had begun to turn towards mechanical, rather than hand, launch and construction methods. Further work in the 1970s and '80s evaluated a fully mechanized launch system and demonstrated the technology involved. What then became the short-lived trilateral "Bridging for the Eighties" (BR80) collaborative programme with Germany and the United States was later resuscitated as the UK-only "Bridging for the Nineties" project (or BR90, as it is commonly known) in the early '80s. Finally, in 1985 the project completed its research phase and was passed under contract to British industry for full engineering and development.

From the start, the BR90 concept was nothing short of revolutionary. It advanced the notion that the entire range of existing UK military bridges



Col T H E Foulkes
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could be replaced by a single "family" of new bridges built from common components based on a small number of interchangeable modules. This, it was argued, would bring advantages in manpower, operational flexibility and logistic support and would end the restriction of bridges to separate, single-purpose categories. In short, BR90 proposed meeting every bridging demand of the battlefield, from short tank-launched tactical bridges to long multi-span semi-permanent constructions, with a single "tool kit" of no more than eight basic components. Speed would be achieved with long panels and mechanical launch, and the whole system would be deployed on specially designed, all-terrain vehicles.

The fundamental design concept of BR90 was therefore always far more extensive than the mere replacement of MGB. It amounted, in fact, to a radically new approach to the entire science of military bridge design starting from first principles. Consequently, the full scope of the BR90 project actually embraces no less than six totally new MLC70(T) (military load classification) bridge structures, a revolutionary launch and recovery system, and three entirely new high performance specialist vehicles. The concept may sound obvious today, but in 1980 it was totally unprecedented. Nothing like it had ever been attempted before and, indeed, many considered it wildly over-ambitious or frankly impossible.

Nevertheless, the Christchurch team remained confident, and in late 1987 N E I Thompson (later to become Thompson Defence Projects (TDP) Ltd under the control of Rolls Royce plc) of Ettingshall won the prime contractor-ship for full development with Haulamatic Ltd (subsequently Unipower of Watford, a subsidiary of Alvis) engaged as principal sub-contractor for vehicle design.

Now, after seven tortuous years of development encompassing numerous changes of ownership amongst contractors, *Options for Change*, the Defence Costs Study and some of the most turbulent reforms in MOD since World War Two, BR90 has eventually confounded its critics and delivered the goods. Very soon the two most important elements will be launched into service with the Royal Engineers and onto the world market: in both spheres they are bound to have a profound impact.

### The Family of BR90 Systems

Precisely as originally envisioned by its inventors at Christchurch, the fully developed system will consist of eight individual bridge panels and three special purpose vehicles. The longest bridge is 56m long, and all BR90 components have been designed for Challenger tanks at MLC70(T) and laden transporters at MLC100(W). Furthermore, the bridges also possess a fair degree of built-in stretch potential in case of future load increases during the equipment's 30-year life.

The complete family is organized into four sub-systems:

- CSB. The first element is known as the CSB system which consists of three types of bridge, all launched from the existing Chieftain armoured vehicle launched bridge (AVLB), and a special transporter vehicle. These bridges are the 13.5m long No 12, the 16m No 11 and the 26m (scissors) No 10. An important innovation of the BR90 CSB system is that all its bridges (and some of those in service today) will be carried forward for reloading the AVLBs on the new, all-terrain tank bridge transporter (TBT) vehicle. The new CSB bridges take about three minutes to launch and can be laid in combination, one from another, to span longer gaps up to 60m. A special feature of this part of the BR90 system is the ability of a single AVLB to carry and lay 2 x No 12 (13.5m) bridges without reloading. Other advantages are the commonality and inter-changeability of the bridge panels and the ability of automotive bridge launch equipment (ABLE) (see below) to recover tank-launched bridges. The No 10 scissors bridge can also be used as an overbridge. First deliveries of CSB will commence in late 1995 and continue until mid-1998.
- GSB. The second, and by far the most innovative, part of the family is the 32m GSB system. This is really the

ABLE in its road configuration.

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A No 10 Bridge combination CSB.

technological heart of BR90 and sets astonishing new standards for manning, construction time and operational versatility. The GSB system consists of the launcher-vehicle known as "ABLE" and two flat-bed bridging vehicles (BV) carrying a 32m bridge set. ABLE works by pushing a slender launch rail across the gap and then winching bridge panels along it. Before decking-down, the launch rail is recovered onto ABLE for reuse on the next task. Build times achieved during development were exceptionally low (well within the 30 minutes required) and surpassed even the most optimistic Christchurch predictions. In fact, on user trials the average 32m build time recorded by 21 Engineer Regiment (21 Engr Regt) was approximately 20 minutes with just ten men. This compares favourably with MGB which requires 30 men and takes about 90 minutes for the same span. GSB will be the first part of BR90 to enter service with deliveries commencing in autumn 1995.

- Long Span Bridge (LSB) and Two Span Bridge (TSB). The remaining third and fourth components of the BR90 family are perhaps best regarded as highly specialized ancillaries for the basic GSB system. They are the LSB and the TSB, both of which use the same standard bridge panels and ABLE launcher as the 32m GSB. The additional components for a 44m LSB set are carried on a single BV and include extra bridge panels (for the longer span), high strength launch rail sections for ABLE, king-post panels and the ramp-mounted, under-slung post-tensioning system for bracing the bridge structure. The TSB set includes hydraulically controlled 2m articulator panels and an anchorage system to enable multiple GSB/LSB sets to be used together over pontoons or piers as multi-span bridges across longer gaps. The anchorage mechanisms, hydraulics and launching procedures for LSB and TSB are still under development by TDP and deliveries are currently planned for 1997.

The basic building block of all these bridges is the standard 8m bridge panel. Designed according to the Trilateral Design and Test Code (TDTC) in aluminium/zinc/magnesium alloy DGFVE 232B as a braced and ribbed box section with bolted-on stainless steel jaws, this panel is 8m long, 1m deep and 1.5m wide. Shorter 2m and 4m long panels have also been developed (to allow building in 2m increments) as well as tapered 8m ramp sections. Finite element analysis and sophisticated computer modelling techniques have enabled BR90's designers at TDP to design BR90 for the severest load conditions at a previously unimaginable degree of accuracy. To ensure that MOD's rigorous structural requirements were fully met TDP incorporated an extensive test programme throughout the development process which included: material mechanical properties, stress corrosion, fatigue, static and dynamic loads, trafficking, overloads, reliability, performance and use.

2 x No 12 bridges (13.5m long) on an AVLB.

### Design Philosophy

BR90's overall design philosophy (as specified by MOD in the development contract) has been the TDTC for military bridge design. TDTC was one of the few valuable results salvaged from the ill-fated trilateral "BR80" programme and it embodies all three nations' accumulated experience of bridge design, testing and in-service management since the introduction of the Bailey bridge. It covers dimensional criteria, load configurations, cross and lateral slope conditions, materials, fatigue,

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trafficking and repair. For example, TDTC places a high priority on damage tolerance by specifying material tests for fracture toughness in order to improve resilience and reduce inspection intervals. And on fatigue life, where the BR90 specification requires at least 10,000 full load crossings, TDP has not only demonstrated the capability but in the spirit of TDTC its results have provided a useful insight into crack growth rates and hence inspection intervals during service. From experience gained on MGB and the No 8 tank bridge, a stress corrosion cracking-free life of 30 years was demanded for all BR90 bridge components and this has been established during development by means of accelerated environmental chamber tests. Another interesting aspect of design philosophy is the importance attached to reducing radar signature by minimizing dihederals and trihederals on all external surfaces. This may be less obvious on the bridges but can be seen clearly in the non-orthogonal cab surfaces of the BR90 vehicle and its side storage bins.

A tank crossing the MLC 70(T) 56m long LSB during testing.

### Manufacture

All BR90's bridges will be manufactured at TDP's brand new, purpose-built production plant at Ettingshall (near Wolverhampton) which is being equipped with an impressive array of computerized production control systems, machining centres and robot welding equipment. Most of the aluminium panel fabrication involves butt and fillet welds to very fine tolerances which will be performed on 16-axis inverted welding robots using argon shielded metal inert gas techniques. The DGFVE 232B materials present particular problems during fabrication as great care has to be taken to control temperature gradients around the weld zone. Another factor demanding close attention is the danger of distortion due to heat build up during the longer weld runs. This has been overcome in development by carefully distributing the sequence of welds around the panel structure.

### The BR90 Vehicles

Bridge design, however, is but one dimension of the complete BR90 picture and would be of limited value without an effective vehicle for deployment and tactical mobility. The process of vehicle design, however, has been complicated by the conflicting demands of maximizing carrying capacity on the one hand, and minimizing wheel loads on the other. After a discouraging start followed by a fundamental engineering review, the BR90 vehicle design work was taken over by Unipower Ltd of Watford in 1991 and totally revised. Unipower's final results proved excellent and the BR90 vehicle is a worthy partner for the new bridges and represents a major automotive engineering achievement in its own right.

This all-new, purpose-designed Unipower vehicle is a powerful, special-to-role, high mobility truck with drive to all eight wheels and a load-carrying capacity of about 20 tonnes. Its complex steel chassis is welded for additional stiffness and rigidity, and each vehicle is equipped with a 20 tonne metre chassis-mounted Atlas crane, a Perkins "Eagle" engine, power steering and a fully automatic ZF gearbox. High performance, ease of operation and impressive cross-country mobility have already earned it wide acclaim with Sapper units throughout the trials in Germany during 1992 and 1993. Despite frequent attempts to explore its limits of mobility, it proved impossible to get the Unipower vehicle seriously bogged during trials. Technically defined as "Improved Medium Mobility" (IMM), its long wheelbase, enormous low pressure tyres, 8 x 8 traction and massive torque were simply more than a match for any ground conditions encountered. This augurs well for accessing difficult bridge sites under adverse conditions.

### Tests and Trials

CSB and GSB have now reached the stage at which engineering development is complete and

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2 x No 12 Bridges on a tank bridge transporter (TBT).

the last remaining design details are being resolved in parallel with preparations for full production.

Throughout the programme TDP's test regime has been extremely rigorous with considerable emphasis being placed on structural integrity, reliability and safety. Before any component was submitted for user trials months, and sometimes even years, were spent testing every aspect of its performance at TDP's headquarters in Ettingshall. Production overload tests (POT) were then conducted in TDP's own test rig on every bridge before gauging and release for further tests. Full system testing was conducted at the company's development and trials site at Hurn near Christchurch. TDP's own work has been supported at Hurn by expert Sapper assistance in the form of the "BR90 Trials Team" of a trials officer, a quartermaster-sergeant instructor and a varying number of combat engineers, tank drivers, AVLB crews, fitters etc. Without this support TDP would be the first to admit that their task in development would have proved infinitely more difficult.

Not surprisingly, perhaps, hard experience has shown that designing for the military engineering environment is less straightforward than TDP might first have assumed. Dirt, damage and darkness were the design engineer's worst enemies, and in practice TDP eventually discovered that making the equipment sufficiently rugged and "soldierproof" sometimes took considerably longer than expected. It also often needed the helping hand of an experienced Sapper. In order to convince MOD that TDP's results were totally satisfactory, user trials were designed to be remorselessly tough. Trials officers were directed to identify anything which seemed likely to fall short of the required standard in terms of either performance, safety or reliability. Fortunately, such problems were rare and once the inevitable teething problems on CSB and GSB had been ironed out both systems earned glowing reports from all sides.

The most intensive phase of user trialling was undertaken by the BR90 Trials Team of 21 Engr Regt in Nienburg during April to October 1993. The trials officer's modest team of about 15 Sappers and two Corps of Royal Electrical & Mechanical Engineers' fitters put the GSB system through its paces in an exhaustive series of tests, including every conceivable type of restricted bridge site, under the worst conditions available. They also completed hundreds of "battlefield day" cycles and drove tens of thousands of miles to test the system's reliability and durability. At the same time, the Trials Team also developed and refined standard operating procedures for GSB deployment, launch and recovery.

Interestingly, their results produced several surprises for the designers and confirmed that theoretical calculations and computer simulations are all very well up to a point, but achieving ultimate performance in the field requires the inspiration born of practical military experience! A good example was 21 Engr Regt's GSB decking down drill which slashed almost ten minutes from the total build time. Other revelations included the degree to which dirt and dust managed to penetrate "sealed" components and an alarming tendency, under certain circumstances, for a 32m bridge to creep towards the gap whilst being trafficked by heavy loads. TDP's subsequent investigation of this latter phenomenon concluded that it was caused by "deep-beam bending" and measures are now in hand to overcome it.

### New International Benchmark

However, the highlight of GSB and CSB development came on the last day of September 1993 with an international VIP demonstration at Munsterlager in front of a specially invited audience from the British MOD and foreign armies around the world. Senior representatives of the UK, USA, France, Germany, Switzerland and Italy gathered at Munsterlager to see the first public demonstration of the whole family of BR90 vehicles and bridges up to 32m. It was a most

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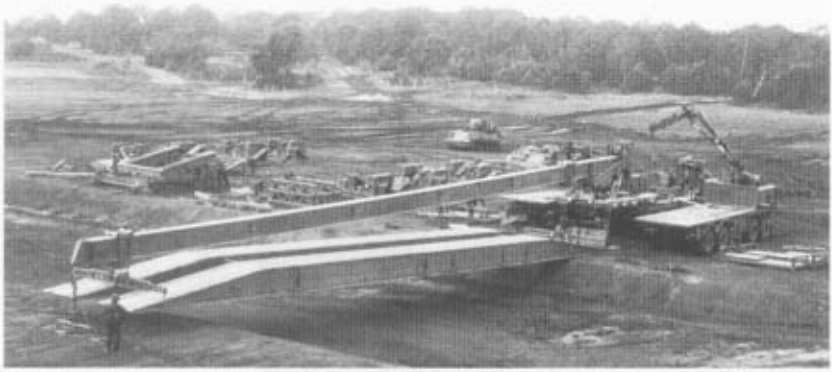

GSB vs MGB. 32m GSB almost complete after approximately 16 minutes. MGB still has some way to go!

impressive show in which the 21 Engr Regt's Trials Team rose to the occasion by producing their best performance ever with a 32m bridge build of just 18 minutes 46 seconds! A few moments later, the assembled VIPs also witnessed a Commander tank transporter laden with a Challenger tank traversing a 26m tank-launched No 10 bridge, a feat which most experts would have discounted as totally impossible. There was no mistaking the impression it made on the foreign visitors and it convincingly established BR90 as new international benchmark for military bridging. As a result, TDP's prospects for foreign sales are looking increasingly good and worldwide interest is growing fast.

## Conclusion

So today, some 30 years after the first seeds were sown, BR90 is approaching the end of its long gestation period and is about to bear fruit. It may have been a long wait, but it was worth it. Work continues on the development of the long span and two-span systems which still present significant technical challenges to be overcome before User Trials can commence. At the same time, further studies will investigate the use of CSB combination bridges in flowing water, and separate contracts should soon be placed for the development of supplementary equipment including a light trestle for the No 10 combination bridge, a universal bridging pontoon for multi-span wet bridges and an alternative non-ABLE launching system. All this continuing work confirms that the project is far from over, but it is fair to conclude from the results so far that the CBS and GSB will be an outstanding success.

Despite being conceived so long ago, BR90's perennial advantages of manpower, logistics, speed and flexibility remain as important today as they ever were. The nature of the threat may have changed but the demand for military bridging has not. Emergencies arise; rivers abound; and there are never enough Sappers. In fact, the combined impact of *Options for Change* and *Front Line First* has actually accentuated the need for greater performance at less logistic and manpower cost. The speed and flexibility of BR90 will achieve precisely that result and are likely to make it the most significant "force multiplier" to enter service with the Corps for a generation or more.

That BR90 is setting new international standards for military bridging is now beyond doubt. Clearly, this is good news for TDP and their export sales, but it is even better news for the Army. The success of BR90 means that no matter what the next 30 years may bring, Sappers can be confident of guaranteeing tactical mobility whatever the scenario. And for a small but flexible Army in an unstable world, that is what really matters.

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# The Rhine Crossing 1945

*This article by Major General J C Woollett CBE MC (OC 16 Assault Squadron) also includes personal accounts by Major General A E Younger DSO OBE (OC 77 Assault Squadron) and Major P E G Carter MBE (Platoon Commander 101 Field Squadron Royal Monmouthshire Royal Engineers (Militia).*

The photograph left was taken on the banks of the Rhine, near the crossing site during the battlefield tour in April 1984.
(Left to right: Major General Tony Younger, Major General John Woollett, Major Peter Carter.)

## Introduction

The attack across the Rhine by 21 Army Group (AG) in March 1945 was the last major operation of the war in Europe. It took place between Orsoy and Emmerich, with 9th US Army on the right and 2nd British Army on the left. This account covers early preparations and planning, the crossing on the XII Corps front in some detail and finally some individual stories and lessons.

## Early Considerations

The problems of a major river crossing had been considered early in the war, and studies on the behaviour of wide rivers began in late 1941 at the School of Military Engineering. It was important to know the incidence of flooding and the extent to which it could be made worse by enemy control of dams upstream, or by the melting of snow. The period when floating ice could be expected also needed to be known, because of the danger to floating bridging – on the Rhine this threat can continue into late March, although flooding from melting mountain snow is unlikely until later in the spring.

## Equipment

The growing weight of military traffic was also a problem. It was not until 1941 that the Bailey bridge began to become available, and the growing weight of tanks meant that the capacity of bridges and rafts had to be continually improved. A training centre for the crossing of wide rivers was set up at Goole on the Humber estuary in 1943. By then the equipment available consisted of assault and storm boats with outboard engines for the initial crossing, Class 9 rafts, Class 50/60 rafts, Class 9 folding boat bridging and Class 12 and Class 40 Bailey pontoon bridges. In addition there were Buffaloes (LVT – landing vehicle tracked) developed by the US Marine Corps for assault landings on beaches.

## Final Planning

The clearance of the Rhineland began on 8 February 1945 by 1st Canadian Army from the north and 9th US Army from the south. The divisions normally under command of XII Corps were transferred to XXX Corps and XII Corps HQ concentrated on detailed arrangements for the Rhine crossing. These needed to be very precise because of the large concentration of troops and equipment in a relatively small area with such poor roads and wet and muddy soil.

As soon as the east bank of the Maas began to be cleared, bridges for support of the Rhine crossing



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could be constructed. Three Class 70 and nine Class 40 bridges were built, together with railway bridges at Ravenstein and at Mook (16 February). A railhead and stores depot was opened near Goch, and the build-up of stores began on 8 March – in all some 118,000 tons were needed, including 30,000 tons of engineer stores and bridging.

The east bank of the Rhine was finally cleared by 11 March, and then XII Corps took back its divisions which had been under XXX Corps and the latter adopted the XII Corps HQ detailed plans. Each Corps was to cross on a front of one division, between Wesel and Emmerich, with XII Corps on the right in the Xanten area, and XXX Corps on the left near Rees.

### XII Corps Plan

15 (Scottish) Division RE (15 Div) was to cross two brigades up, with 52(Lowland) Division (52 Div) holding the west bank. 53 (Welsh) Division (53 Div) was to cross and enlarge the bridgehead and 7 Armoured Division to exploit. On the right the town of Wesel was to be taken by 1 Commando Brigade (1 Cdo Bde), to be ferried over by 77 Assault Squadron (77 Sqn) at 2200hrs on 23 March. The main assault was to begin at 0200hrs on 24 March, preceded by four hours of heavy bombardment. The XVIII Airborne Corps (6 British and 17th US Airborne Divisions) were to land north of Wesel at 1000hrs on 24 March and capture the bridges over the IJssel river.

### Engineer Tasks (XII Corps Front)

| | |
|---|---|
| 2 LVT (Buffalo) Ferries | |
| 2 Storm Boat Ferries } | 15 GHQ Tps RE (RH brigade) |
| 8 Class 9 Rafts } | 4 GHQ Tps RE (LH brigade) |
| 4 Class 50/60 Rafts | 42 Asslt Regt RE (16 & 222 Asslt Sqns) |
| 1 Class 9 FBE bridge | VIII Corps Tps RE |
| 1 Class 12 Bailey pontoon bridge | XII Corps Tps RE |
| 1 Class 40 Tactical Bailey pontoon bridge | 7 Army Tps RE |

### RE Command and Control

15 Div had no role in the crossing and were wholly available for support in the bridgehead. Commander 11 Army Group RE (11 AGRE) was responsible for the execution and control of the crossing and under him was a CRE with each forward brigade, as well as other RE units. This amounted to the astonishing total of the equivalent of nine RE regiments for crossing on a one division front, together with a bridging company Royal Army Service Corps, four pioneer companies and a RN detachment for boom construction.

### The Operations

The town of Wesel was bombed on the night of 23/24 March and shortly afterwards taken by 1 Cdo Bde, brought over by 77 Sqn in Buffaloes. The right hand crossing encountered patchy resistance, but by 0400hrs the whole brigade was across. Rafting then began, and surfacing materials were brought across to form exits for DD (Duplex drive) tanks.

On the left things did not go so well. The infantry had difficulty in clearing the far bank, and when dawn broke the storm boats attracted heavy small arms fire and had to transfer their crossings downstream. However, enemy opposition died down after the airborne landings north of Wesel and by evening the whole of 15 Div was across.

XXX Corps had a more difficult time because the town of Rees was not captured for two days and crossing sites had to be moved further downstream.

## PERSONAL ACCOUNTS

### The Capture of Wesel

Tony Younger

It must have been on or about Thursday 15 March that my CO, Lt Col Ernest Hall, said that he was putting me in command of 77 Sqn for the Rhine crossing operation. He said that I would still retain responsibility for 26 Assault Squadron (26 Sqn), my normal command, but that as the present OC 77 Sqn was in England and would not be back in time, I was to take charge for the battle. 26 Sqn had a reserve role in the crossing, one that my 2IC, Bob Butterworth, could well handle in my absence.

77 Sqn was equipped with Buffaloes. I had had plenty of experience with these as 26 Sqn had been equipped with them all through the late autumn and winter operations in the Schelde Estuary on the Dutch coast, and more recently, to take infantry parties to the forward defences across the flooded area west of the Rhine near Nijmegen.

Having tied up loose ends in 26 Sqn, I left and reached 77 Sqn, located, if my memory is correct, in the village of Gennep on the banks of the River Maas. I was met by the 2IC, Bill Carruthers. His opening remark as I arrived was worrying "Thank God you've come" he said, "This is all getting too much for us." Bill's outstanding quality was his complete honesty. If he had a problem he would never cover it up but would bring it out into the open to ask for advice or for whatever help he

needed. He was doing all the administrative tasks of the 2IC, a full-time job in itself, and in addition was trying to command the squadron in the run-up to a major operation.

The moment I arrived, I arranged for a night exercise involving a simulated assault across the Maas. Disappointingly, it was an utter failure. Everything went wrong. Buffaloes turned up in the wrong order, got tangled up with each other, missed the designated exits from the river, or just got lost. It was after 2am before the dispirited troops returned to camp. So we did it again next night and the night after, introducing all kinds of route marking measures to make our moves (which were without lights and in radio silence) as foolproof as possible.

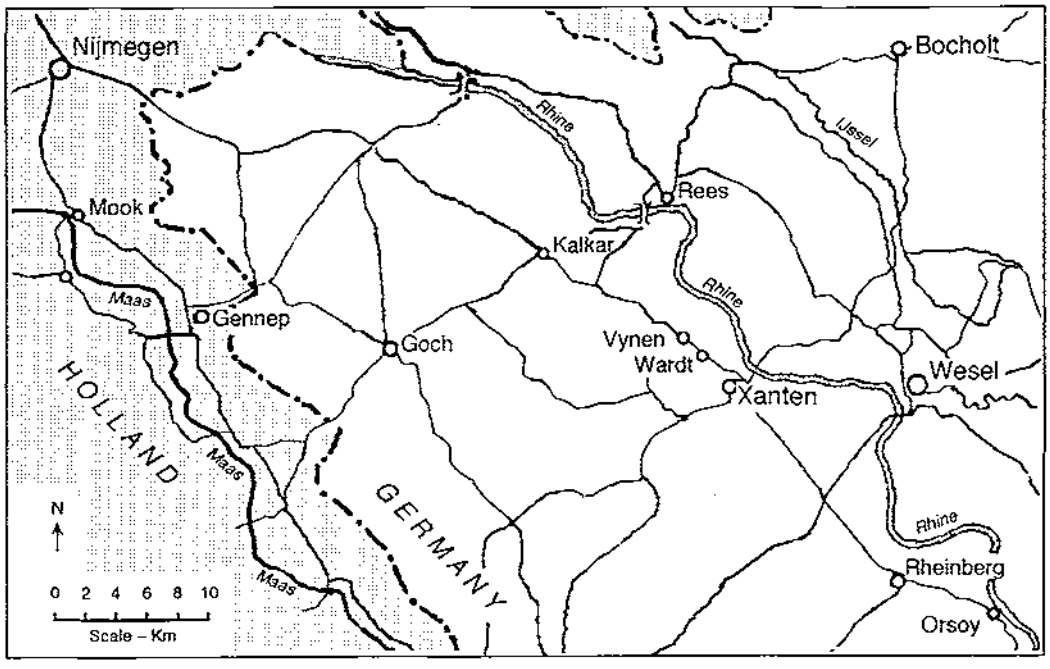
After the third night, feeling a bit tired but more confident, I was summoned to HQ 1st Special Services Bde. Here I met for the first time the man who was to be my co mmander for the coming operation, a slight, da er ex-Guardsman, who commanded two army and two marine commandos. He gave out his orders for the crossing, and it was a surprise to hear that the planned date was 23 March, much earlier than I had been expecting. In outline, the plan was for 77 Sqn to carry the commandos over as quickly as possible, starting at 2200hrs after an artillery bombardment of the far bank. The artillery would lift to targets farther inland when the first wave of Buffaloes was safely in the water, and I agreed to signal this moment by passing back the codeword "splash" over the brigade radio net. After landing, the commandos would move as quickly as possible through the German defences, wheel to the east and attack Wesel from the rear to form a bridgehead. 77 Sqn would lie low after the crossing and next morning would move upstream to a point opposite this bridgehead to ferry over the rest of the brigade. 17 (US) Airborne Div (17 AB Div) would drop that morning on the high ground further inland and we would ferry over their non-airportable elements. After the orders, I contacted the CO of the leading commando to arrange details of the numbers we would take over in each wave and where we should meet up. I should explain that 77 Sqn had four troops, each with six Buffaloes, plus two Buffaloes in squadron HQ. There were two types of Buffalo, the Mark II and the Mark IV, the difference being that the Mark IV had a ramp at the rear which could be lowered to take on board a jeep or a small piece of artillery. Each would hold about 20 men for an attack or 30 for follow-up trips. I decided to cross my command craft on the right flank of the leading troop, the troop commander going on the left flank.

Later that day I recced a small village, Ginderich, which we had been allocated as our assembly area and ordered the squadron to move up there.

It all seemed fairly straightforward. We would wait till dark and then move to the forming up position (FUP) just behind the main bund on the south bank of the Rhine, load up, cross the bund, cross the flat flood plain beyond and then into the river to make our best time to the enemy shore, unload and come back for more. However, nobody had been over the bund to see what the flood plain was really like. The Germans had registered the top of the bund very accurately with machine guns and mortars, and a number of casualties had been sustained by our infantry when they attempted to look over the top. I arranged for an infantry patrol to escort me that night down to the water's edge to ensure that no hazards awaited us over there.

I carried out a preliminary reconnaissance up to the bund with our officers and the HQ sergeant, who would be responsible for marking the route from the assembly area to the FUP. Since we had to do this in daylight and would be under observation from some high buildings on the German side, we dressed ourselves up as a relief party of infantry, carrying rifles and packs, with me as the corporal in charge. We looked a pretty motley crew in our ill-fitting uniforms as we slouched up to the front line, and the Germans left us alone. We completed our trip, and the HQ sergeant finished up with a neat sketch of the exact route we had decided on, which he was to mark clearly with torches screened from enemy view.

That night I did my recce in front of the bund with a fighting patrol led by a young officer of the Seaforth Highlanders. It was just as well I did this as, having rolled quickly over the top of the bund without incident, we found a deep rivulet about 5yds across, and with impossibly steep banks. This would have caused nothing less than a disaster, so we recced a new route, right down to the water's edge. The patrol rested about 20yds from the water, whilst I went to the bank and watched that enormous river gliding past in the eerie silence that can occur on a battlefield. For many months the Rhine had seemed to be an objective infinitely far away, and now here it was at my feet. I am not prone to making dramatic gestures, but suddenly I felt an urge to pee into it; I thought it




Map of the Rhine crossing area.

would be fun to tell the boys back at the squadron that I had done this. When I started, it seemed to make an awful noise, but I could not believe it could be heard on the far bank. Suddenly a German machine gun opened up, its bullets passing quite close. I flung myself down and edged my way back to the rest of the patrol, whilst our machine guns opened up in reply, followed by mortars from both sides and then artillery. We all lay there, glued to the ground for what seemed ages, but was probably only a few minutes. Gradually all quietened and we did not waste time in returning to safety. I did not even mention this incident when I got back to 77 Sqn.

Next morning I went to brigade to obtain agreement to the change to where we would enter the river. This done, I became involved in a rather heated discussion with the staff on whether or not explosive charges should be used to blow gaps in the bund for our Buffaloes to pass through. I had looked at the bund carefully. It was about 15ft high, with slopes of 45 degrees on each side. It was a formidable looking obstacle but I knew that a loaded LVT could manage it as long as the driver knew what he was about, and our drivers were very experienced. I also knew how accurate the German artillery fire was, and the last thing I wanted was that our exact crossing places should be advertised by gaps in the bund. So I refused to agree to the idea, in spite of the fact that the staff said that all the Buffalo regiments further downstream were insisting that it should be done.

One other piece of experience had come out of the previous night's patrol: the possibility of sound being heard over calm water. I therefore asked that an aircraft should patrol over the enemy lines during the period of our approach march, and I am eternally grateful to the pilot, who could be heard all through that tense time. I am certain he saved us endless trouble.

The brigadier summoned all his commanders and gave out his final orders for the assault, incorporating the new crossing place. At the end he asked for any questions and, on receiving none, turned to me in front of all the others and said, "I hope you realize that the entire success of this operation depends on you." I was a bit taken aback and wondered if I had somehow given the impression that I was a bit casual, which I felt to be unfair as I was, in fact, being stretched to the limit. I replied, "I'll get you over there if it's the last thing I do," which was a pretty meaningless response, but all I could think of. Looking back now, I think that perhaps this brigadier was a rather unfeeling character. We delivered him and his men across the great obstacle on time and as

LVT (landing vehicle tracked), codename "Buffalo".

promised, but when it was all finished he never even said thank you to me.

Back at the squadron, I, in my turn, gave out final orders. I included in these a special job for the sergeant major. He was to take under his wing all those not in LVTs, cooks, drivers, storemen, etc, and march them up to an area just south of the bund to dig slit trenches for all the LVT crews to rest in. I also arranged for two bulldozers from 84 Coy RE, to scoop out pits so that the Buffaloes would have some protection against shellfire.

I do not remember much about the day before the attack. It would have been a period of intense activity making the 101 final preparations. Sometime in the late afternoon we received the single codeword to confirm that the operation would go on as planned that night.

### Night of 23/24 March

There was a final glimmer of light in the sky as I took my Buffalo out of Ginderich at the head of the squadron and followed the track marked across the fields towards the river. By the time we reached the vicinity of Perrich, behind the bund, we could hear the friendly drone of our aircraft.

We had about half an hour to spend in the FUP. During this time the leading commando arrived and sorted itself into LVT loads. We did not have to be particularly quiet as the artillery barrage opened up. We could use no lights, but this was no problem as searchlights were reflecting light from clouds overhead. We had mugs of hot tea with a shot of rum in for those that wanted it. I certainly did. Time passes dreadfully slowly when waiting to start an attack, so, more to pass the time than anything else, I set out to have a last chat with the other crews who would be in the first wave.

I was doing just this when the troop commander came up to tell me that "Hobo" had arrived and was talking to some of his men. My heart sank because Major General Sir Percy Hobart, our divisional commander, was a very strong personality, who could reduce strong men to tears with his persistent, probing questions. I saw his black beret in the middle of a group of our men. I walked over quickly, determined to persuade him to leave, even if this involved a stand-up confrontation. I could not afford to have men going into enemy fire with their morale at rock bottom after "Hobo" had given them the rough edge of his tongue.

I need not have worried. He knew far too much about war to do what I had feared. As I approached there was a burst of laughter. He saw me and beckoned me over. "Have you had your rum, Tony?" he asked. "Yes, General, I have," I replied. "Good lad," he said, and, turning to a sapper, who he had discovered had refused his rum ration, "Your commander has had his, and I can tell you that the only thing that got me over the top in the last war was a good shot of rum!"

In high good humour, he moved down the line, transmitting his enthusiasm to all those he met. When I had to leave him as H-hour approached, he shook my hand warmly, wishing us well and saying how pleased he was with all he had seen. I thanked him for coming, with real sincerity.

Back in the Buffalo, now filled with commandos, I held up my hand to give the prearranged signal to move. The second hand of my watch took an age in crawling to the exact time of 9.57pm, but finally it did so. I brought my hand down smartly, and we were off.

A quick check showed that the other six Buffaloes had moved off with us, and slowly we all climbed the steep bank of the bund, teetered a bit on the top, then dropped down the other side. Bursting artillery shells lit up the far bank.

In no time we had crossed grass leading down to the river, then in we went, turning upstream at once to counter the current. I opened up my radio and sent the agreed codeword "splash". There was

no acknowledgement, only some hideous interference. I repeated my message, "Splash; I say again, splash over." Still no acknowledgement. Only after that did I realize that we were being deliberately jammed, something I had heard about but never experienced in operations. With a heavy heart I faced up to the probability that we would run into our own barrage, which was now making a spectacular mess of the far bank.

Another difficulty occurred. A new infrared vision apparatus, which looked like a pair of heavy binoculars, had been mounted on my LVT. The corporal was peering through this instrument and giving instructions to the driver, through the intercom. He kept saying "Driver, right; driver right", and consequently we steered more and more upstream, till we were not moving towards the far bank at all. I realized that something was wrong, switched my own microphone to intercom and overrode the corporal's orders. I guided the driver to the far bank, still bubbling with shell fire.

The commandos were crouching low in the craft. Their officer was near my feet and I doubt that he realized what dramas were going on. It only took four minutes to cross and soon we nudged into the far bank. The corporal and I jumped onto the roof of the driving compartment to help the commandos up. The noise of bursting shells was unbelievable, but mercifully the barrage suddenly lifted farther inland and I felt a welcomed relaxation of tension. One after the other the commandos clambered out and we backed away. The other LVTs could be seen doing the same, but two did not move; one was on fire and the other abandoned.

Luckily we had an excellent young gunner captain in the forward observation post (OP) in a farmhouse near the bund. He had been waiting to hear the codeword "splash" over the radio. When he did not hear it, he realized that something was wrong and, quite soon, ordered the guns to fire further inland on his own initiative, thus undoubtedly saving us and the leading commando many casualties. His name was Denis O'Flaherty. The fact that the barrage continued for so long, on the forward defences at least, meant that the Germans kept their heads down and did not meet us with the murderous machine gun fire, which we knew they possessed.

Back on the home bank, with the three other waves of LVTs still crossing, I left the corporal in charge of my command Buffalo to continue ferrying commandos. I moved to my scout car to control the rest of the operation from its radio. Crossing the FUP area, I saw that Bill Carruthers was well in charge. He had organized the commandos into groups of 30, and these were lying down (to avoid the shellfire that was starting to come in) waiting for him to tell them to double into each Buffalo as it became available. I was kept busy by a host of messages coming over the radio net, but where there were problems they were not insurmountable. One good thing was that the second "abandoned" LVT from the first wave came back safely. When I thought it to be abandoned, its crew had been attending to some wounded from the one that was on fire.

46 Royal Marine Commando had crossed first, followed by 6 Commando, then 45 Royal Marine Commando and lastly 3 Commando. Apart from those in the Buffalo hit by our own fire in the first wave, there were no other casualties.

There was a bombing raid on Wesel whilst our crossings were taking place. The whole area was lit by bursting bombs and by the fires they caused. Some unpleasant large waves came rushing down the river, but these caused no serious difficulty.

Finally, the last group was safely delivered and I told the commanders to take their Buffaloes to the pits that had now been dug for them. I closed down the radio net and set out for a check round the troops to see if there were any final problems and to congratulate them on a magnificent performance. As luck would have it, a shell burst uncomfortably close as I started off and I rapidly decided to postpone congratulations till the morning and made a quick dash to the farmhouse in the centre of our area, where I knew a hot cup of tea awaited. In the cellar there, I settled onto a large pile of potatoes to get some rest in what was left of the night. Incidentally, I do not recommend potatoes as a bed, they are like sleeping on cannon balls.

By dawn the shelling ceased. Our men emerged from trenches looking tired and dirty, but it was clear that morale was high. There was only one casualty from the shelling overnight; one unfortunate man received a splinter in his behind whilst out of his trench answering a call of nature. Our sentries on the bund started to receive some attention from German machine guns, but we silenced these with LVT Bofors guns. After a quick breakfast, I drove off to reconnoitre a fresh crossing site opposite the town of Wesel, which hopefully was in the hands of the commandos. The area we had agreed on was next to the huge demolished railway bridge. This was at the end of a salient pointing into enemy lines, which had been impossible even for night patrols to visit before the attack

Class 50/60 raft.

started. We had arranged for 84 Field Company to check the area for mines and when I reached it they told me that no mines had been found. On this trip I had a grandstand view of 17 AB Div dropping on the hills a mile or so further east. A spectacular sight, although German anti-aircraft fire looked persistent, but I heard later that casualties had been comparatively light.

Down at the bridge, I could see a concrete ramp on the far bank which looked to be just what we wanted for Buffaloes. This site suited brigade HQ so I ordered the squadron up and soon after midday sent two Buffaloes over to test the route. They came under fire and the troop commander's craft was badly holed and started to sink. It just succeeded in reaching the ramp, where it had to be abandoned, half in and half out of the water, but effectively blocking the ramp. We succeeded in silencing the enemy machine gun.

A new exit was found just downstream, and for the rest of the day we ferried over all manner of groups who arrived at our assembly area. First came 1 Cheshire Battalion, attached to the commando brigade, then quite a number of airborne troops dropped the wrong side of the river, and groups such as Sapper mine-clearing parties, gunner OPs and medical units. A total of 207 loads were taken over, whilst some wounded and about 400 German POW were brought back.

By the end of the day I felt that my task of seeing 77 Sqn through the assault crossing was done, and I knew that 26 Sqn would be on the move. The last incident of this memorable period for me occurred back at Ginderich, where I found an invitation from "Hobo" to have dinner at his advanced HQ that evening. After a shave and a rudimentary bath I went to obey this royal command, to find that the great man was as good a host as he had proved to be as an operational commander on the banks of the River Rhine.

### The 50/60 Ferries Near Wardt

John Woollett

16 Assault Squadron was originally a TA field company from Manchester which became a field squadron in 1942, when I joined it, and then converted to an assault squadron equipped with Churchill AVRE (armoured vehicle/s RE) in October 1943. In early 1944 we had practised rafting over the River Deben and, before the operation on 23 March, had one more opportunity to train on the Maas in February.

Two days before the operation we moved into the southwest corner of the Hochwald and bivouacked, and the equipment for the two rafts we were to operate was collected, checked and hidden. We had a detachment of a RAF balloon winch unit to operate raft winches, since squadron manpower did not stretch to doing this. In broad terms, it took the best part of a troop to operate each raft, or two to each raft for continuous working, so we were also assisted by a troop from 284 Squadron.

The first task after checking the equipment was to sort out a cross-country route to the marshalling area to avoid using the roads, and to prepare to have it marked. After dark, I went to reconnoitre the site. There were elaborate controls on this, because there were so many nearby sites. The first thing was to get permission from HQ 52 Div, holding the west bank, and agree with them a time and route. The forward positions were generally in the area of the floodbanks and I duly reported to the checkpoint allotted, learnt the password and countersign, described my intentions, proposed route and timings and went out accompanied and covered by my batman. We got down to the riverbank, encountering various other shadowy groups on the way, and found no unexpected snags. I was particularly glad to find the ground reasonably firm after the very wet winter weather.

During the night 23/24 March we moved forward. I had selected a marshalling area just west of Wardt, well behind the winter floodbank, completely in the open and not near anything marked

on the map. We of course had air superiority. During the night, fire came down on nearby woods and houses, and when dawn came and the gaps bulldozed through the floodbanks could be seen, they attracted heavy shellfire. Meanwhile we sat in our field and breakfasted. There was no point in risking damage to the large and vulnerable wooden pontoons which made up the class 50/60 raft, as there was little spare equipment available, so our CRE decided to wait until the situation on the east bank had been cleared up, which was not till 1300hrs. Even so, the advance party of three airborne dozers carried in LVTs came under fire from an enemy post only 50yds away after landing, but they lowered their blades and charged and the post surrendered.

FBE Bridge.

The next stage was to get the ferrying cable across the river, a 3in steel wire rope wound on a drum, mounted on a sledge and towed by an AVRE which also acted as an anchorage. We used two balloon winches, one of which was mounted on a LVT. The wire was paid out over the stern, attached to the cable of another balloon winch on the home bank, which was also mounted in a sledge towed down by an AVRE. The LVT swam across whilst the winch operators paid out, requiring a lot of skill from both operators and the driver to ensure that the LVT got to the right place on the far bank and in an attitude which would enable it to climb out. The junction point was then wound back to the home bank, the ferrying cable attached and wound across to the far bank and anchored. In the meantime the pontoons were towed down on their trailers by AVRE, backed into the river and launched, and the rafts constructed. The winches were then used to tow the ferry back and forth.

Ferrying began at 1830hrs, with the squadron working in two shifts of six hours each. The cooks were installed in the farm named Gut Grindt, and the six hours enabled men to have a meal, four hours sleep, another meal on waking and then return to the site with a haversack ration. The weather remained fine and by this time things had quietened down and the river was a hive of activity. Just upstream, the Class 9 FBE (folding boat equipment) construction was in full swing, whilst Class 9 ferries, storm boats and LVT ferries were still operating. One problem we had with the rafting was the nervousness and inexperience of tank drivers who had not driven onto a raft before. The balloon winches also caused problems. They were designed to pull cables up and down in the air, not to drag them through mud and sand, and they broke down frequently. We had two spare winches for each one at work, but even so, and with our Royal Electrical and Mechanical Engineer Corps section working flat out, we had difficulty in keeping going.

After 48 hours, the Class 40 bridge was complete and there was no further need for heavy rafts. In that time 42 Assault Regiment had got some 300 vehicles across, including 250 tanks. Orders then came for us to move north, cross at Rees and support 43 Infantry Division in their advance towards Bremen.

### The Draghunt Bridge
### Class 9 FBE Bridge
Peter Graham Carter

This was built across the River Rhine at the village of Wardt, just north of Xanten, on 24 March. It was the longest FBE bridge built in Europe, at 1500ft, and consisted of 4 trestle bays (80ft), 2 half-floating bays (40ft) and 69 floating bays (1380ft). It was the first bridge to be completed across the Rhine during Operation *Plunder*. Bridge construction started at 1100hrs after a hold-up due to enemy action, and the first vehicles crossed at 2300hrs, 12 hours later.

#### Background

The bridge was constructed by 8 Corps Troops RE, under the command of 11 AGRE. The formation consisted of HQRE and three territorial field companies, 100 Field Company Royal Monmouthshire RE (Militia) (100 Fd Coy), 101 Field Company Royal Monmouthshire RE

Close support raft.

(Militia) (101 Fd Coy), and 224 Field Company (224 Fd Coy), which was the Bristol TA company. 508 Corps Field Park Company (508 Corps Fd Pk Coy) was a wartime unit. By this time in the war, the formation was very experienced in bridging, both with Bailey and Bailey pontoon equipment and with FBE. On 2 March, we had built a 400ft FBE bridge across the River Maas at Venlo in support of the thrust to capture the west bank of the Rhine, and, as part of the rehearsal for the Rhine crossing, we built another FBE bridge lower down the River Maas at Bergen. During the building of this bridge we designed a method of casting anchors from a raft running on a cable across the river, and, because of the flow of the Rhine, estimated at 4 knots, we decided to use Bailey anchors instead of the smaller FBE ones.

### Assembly and Recces

508 Corps Fd Pk Coy had established a concentration area near Weeze, several miles from the Rhine. Together with a Canadian bridge company RCASC (Royal Canadian Army Service Corps), they unloaded, checked, repaired, cleaned and reloaded the bridging equipment (most of which had been used before on previous river crossings), the Sommerfeld track needed for the approaches, and the special loads of anchors and anchor cables. There were 167 lorries in all; the special FBE lorries carrying one and a half bays of bridge.

Meanwhile, the approximate position of the bridge had been determined by air photographs, and following the capture of the west bank, the recce officers from HQRE accompanied infantry night patrols to recce the river bank. The single track road into Wardt ended in a farm about 300yds from the floodbank. Forward of this, track would have to be laid. Beyond the floodbank a further 100yds led to the shingle bank of the river. This was selected because air photographs showed that opposite there appeared to be a ramp to a gate up onto the east floodbank, and a track leading away from this.

### Organization

The whole operation was of course controlled by HQRE, which under the CRE, Lieutenant Colonel John Marsh, was established at the farm. Together with the RMP (Royal Military Police), they also controlled the call forward of the bridging lorries and the return of empty ones along the single track road. 100 Fd Coy was responsible for laying the approaches on the near bank and the exit track on the far bank. 224 Fd Coy was responsible for getting the balloon cable across the river, and laying the upstream anchors from a FBE raft powered by two propulsion units attached to the cable by two snatch blocks used as travellers. The downstream anchors were laid from a storm boat. There was an upstream anchor on every folding boat, and a downstream anchor on each raft.

### The Operation

H-hour was at 0200hrs, 24 March. Following the initial infantry assault by units of 15 Div in assault boats and in Buffaloes, upstream of Wardt, the field companies moved forward to their FMAs behind the floodbank, and recce parties went forward. Work on approaches and the near bank bridging site started one hour before first light, under sporadic enemy mortar and shellfire. However, after first light we came under aimed machine-gun fire, and work had to stop until the far bank had been cleared. This occurred shortly after the heartening sight of the airborne assault by 6 AB Div and 17 US AB Div which came in punctually at 1000hrs.

I was at that time OC 2 Platoon, 101 Fd Coy and my task was to construct the exit track on the far bank. So, at about 1100hrs we crossed the river in a Buffalo, together with the CRE who wished to select the landing site and set up the centre line of the bridge himself. The stores for the far bank

were ferried over in DUKWs. Our first task was minefield clearance and fortunately no mines were found. There was a lot of pick and shovel work to do, to level the ground and to improve the earth ramp up onto the floodbank, as we could not ferry any mechanical equipment across. Then we laid the track as a "Sommerfeld Sandwich" – a layer of chespale between two layers of Sommerfeld track. There was about 200yds to lay in the form of a "dog leg," and at the elbow we laid solid duckboards over the track to prevent bren carriers and other tracked vehicles tearing the Sommerfeld as they turned.

The first bridging lorries arrived about 1100hrs and construction went ahead smoothly. 224 Fd Coy got their balloon cable across the river and the system for laying the anchors worked well. However, the current was much faster than anticipated and was nearer 7 knots in midsteam, so manoeuvring the rafts into bridge was not easy. Moreover, the construction was held up twice by out of control Buffaloes from other crossings upsteam drifting down onto the bridge. After this construction went ahead steadily, with balloon cables stretched from the river bank attached to the 10th and 20th raft from each bank for additional security. The bridge was finally completed and opened for traffic at 2300hrs.

DUKW.

### The Collapse

Traffic started crossing smoothly under control of the RMP. The exit beyond the east floodbank was direct down a lane towards Mehr, but unfortunately this village came under enemy fire about 0100hrs on 25 March, and traffic was diverted south along the floodbank. This involved a hairpin turn onto the bank, and vehicles with trailers had to unhitch to manoeuvre round. This caused a hold-up on the far bank and vehicles started to close upon the bridge. Then a carrier hit one of the far bank trestles which collapsed, and the bridge broke at the half-floating bay. The end of the bridge swung downsteam dragging its anchors, and eventually 400ft broke off before the anchors held. Several vehicles were isolated on this section, with some very worried men on board, but they were safely rescued.

Work started immediately to restore the bridge. The broken section was abandoned, and fresh bridging lorries called forward. All trestles were given additional strutting and bracing. It took a further 12 hours to restore the bridge, which was opened again at 1500hrs on 25 March.

On 26 March we were privileged to receive a visit from the Prime Minister, Mr Winston Churchill, accompanied by Field Marshal Montgomery and the Army and Corps commanders. This tour gave rise to the celebrated newspaper report: "The prime minister, after inspecting bridges built by the Sappers over the Rhine, crossed in a DUKW."

## Conclusion

The Class 9 FBE bridge, though simply constructed and easy and rapid to build, was not really strong enough for a wide and rapidly flowing river like the Rhine. The trestle design was weak and was always liable to collapse on impact. It was found that guns towed by 3t lorries were an awkward load, as one of the leading wheels of the Bofors light anti-aircraft gun had to run on a centre roadbearer. The 2½t US Army trucks and trailers were too heavy. In spite of canvas dodgers being fitted to the upstream bow of the folding boat, freeboard was reduced to nil and water was shipped as these lorries passed over the raft, and they had to be diverted to a Bailey bridge further downstream.

The bridge lasted for eight days, during which time 1767 vehicles passed over it. Finally, on 2 April, the wind and current having increased, the boats were swamped and the bridge sank at 1030hrs.

## All Weather Bridges

John Woollett

Plans had been prepared for the construction of bridges that could survive flood conditions on all major rivers from the beginning of the campaign onwards. A deputy chief engineer (DCE) permanent bridges, under CE 21 AG, was charged with the design work. Initially there was to be one all weather Class 40 Bailey on each corps front. For XII Corps this was built by 15(Kent) GHQ Troops RE at Xanten and was designed for a variation in water level of 6m, was 1713ft long with 300ft approaches. The fixed spans were built on crib piers and the central spans on floating piers. The bows of the wooden pontoons of the latter were fitted with steel protectors against ice damage. Work began on 27 March and the bridge was opened six days later.

Finally, semipermanent bridges were built to enable normal life and trade to be resumed including passage of river traffic. They were designed by RE, built by German contractors, and remained in use for two or three years.

## Lessons

The importance of being able to attack in sufficient depth to maintain the momentum of advance is vital. This was illustrated by the success of the Seine and Rhine crossings, and the failure at Arnhem, where sufficient back up was not available when things began to go wrong.

To launch 21 AG across the Maas, the sodden Rhineland and the Rhine required:

| | |
|---|---|
| RE, Royal Canadian Engineers & Royal Pioneer Corps | 37,000 |
| US Army Engineers | 22,000 |
| Engineer Stores | 30,000 tons |
| Road Material | 203,000 tons |

On the left of XII Corps things went wrong initially, and on the XXX Corps front there were severe difficulties, but because sufficient reserves were available plans could be adjusted, and success was achieved.

The flexibility required by RE units was also shown. For example, the assault RE units over a period of 18 months had taken part in field engineering, breaching defences, operating Buffaloes and heavy rafting.

The GHQ Troops RE, after operating storm boats and Class 9 rafts for the first two days, switched to constructing the all-weather Class 40 Bailey pontoon bridges on the main supply routes. These involved quite sophisticated engineering.

Finally there is the question of engineer command and control. It is important to note that this was centralized so that the best use could be made of skills and resources as the operation progressed – something that cannot be done through the normal chain of command. Nor must long-term planning for provision of suitable equipment, and appropriate training, be forgotten, and the consequent input into operational planning for the campaign from 1941 onwards. It is to be hoped that these lessons will be remembered today.

We should also remember the distinguished Sappers in 21 AG who contributed so much to the success of the operation, such as Major General Sir Drummond Inglis, who as CE was involved in professional preparations from 1941 onwards, and Brigadier Richardson (later General Sir Charles) who as Brigadier General Staff (Plans) in 21 AG developed the final overall plan. Many leading members of the RE Yacht Club were also involved in the waterborne activities, including Brigadier Watkinson (Commander 1 Assault Brigade RE then CE XXX Corps), Lieutenant Colonel L R E Fayle (CRE 15 GHQ Troops RE) and Lieutenant Colonel R E Lloyd (59 GHQ Troops RE), all of whom went on to senior positions in the Corps and Army.

# China War Mess Plate

Readers may be interested to learn that the upper pedestal for the China War centrepiece has been found (in a distressed state) in the cellars of the Royal Engineers Headquarter Mess.
The pedestal had been missing for at least 35 years.
It will be restored, and used with the dragon and the lower pedestal on "high days" in the Mess.

Chinese War Mess Plate p29

# Instant Tradition

MAJOR J T HANCOCK

SOME years ago, new American universities were plagued by student vandalism. Since this was not a problem in the older establishments, psychologists decided that the solution lay in introducing "instant tradition". Naturally British newspapers grabbed at this chance of another bit of America bashing and no doubt there were a few subdued snorts and chuckles over breakfast in the Mess that morning – but there should not have been, since the Corps did something similar back in 1910.

In that year an Army Order was published directing units to submit an annual historical record, which continues to this day. For the first return, units also had to produce a summary of their history to that date. This was a problem for RE companies numbered 1 to 12 since nobody knew the links between the old named companies, (formed between 1772 and 1806 and numbered 1 to 12 in 1806) and the current numbering, which started in 1819. The difficulty lay in the period from 1811 to 1819, when the Corps expanded from 12 to 32 companies for the Peninsular War and afterwards contracted back to 12 companies.

Previously units took their titles from the areas in which they operated eg the Dover Company, but in 1811 this no longer applied because many of the companies would be engaged in mobile warfare, so were divided into four battalions of eight companies each. Titles then became, for example, the 4th Company of the 2nd Battalion or 4/2 Company if abbreviated.

Loath to lose the early company histories from 1787 and unable to discover the links with the battalion organization, Colonel B R Ward, a keen Corps historian, suggested that the histories of the named companies should be allotted to the first nine numbers. In the case of the six companies raised on the same date in 1787, when the Corps of Royal Military Artificers was first authorized, the Warrant did not list them in alphabetical order so Colonel Ward assumed they were in order of precedence and allotted them, in the listed order, to numbers 3 to 8. The War Office and the Corps agreed to his proposal and details were given in the *Royal Engineers Journal Supplement* for April 1911.

Unfortunately, history is fact, or it should be, and if you distort it a problem arises when a source for the true facts is found. In the RE Library there are some old ledgers and one of them contains miscellaneous subjects such as priced stores lists and details of deserters for the 1830s*. Amongst the pages there is the exact lineage of companies from 1787 to 1839 and, from information in the ledger, there is no doubt that these details are the results of T W J Connolly's first historical researches (see the article *T W J Connolly – The Man* in the December 1994 *RE Journal).* The lineage is given in the form of charts for each unit, showing exact dates of formation and disbandments, and changes of location, titles and OCs. Connolly was a meticulous researcher and with Muster Rolls** and other Army documents available to him, one can be sure that the charts are accurate. The table with this article (opposite) gives a summary of the lineage information for the relevant period from 1787 to 1820, with Colonel Ward's allocation in the last column. As the Corps expanded, the numbers 13 onwards were allotted when additional companies formed.

An additional complication was the attempt, in 1806***, to allocate numbers. The change was unpopular and some companies continued to use their old titles. Those that did change soon reverted to their old titles. The unpopularity may well have been due to the fact that the numbering was arbitrary and did not take into account seniority, since the two original Soldier Artificer companies at Gibraltar were numbered 9 and 10.

With three possible sets of numbered histories it is obvious that only one can be used, otherwise different units will claim the same history. The problem with Colonel Ward's allocation is that there is no continuity through battalion organization. For example: Portsmouth Company goes into

*The date that this ledger was added to the library is not certain, but it probably came to light when AG7 (or PB7 as it is now) turned out an almost forgotten cupboard sometime in the early 1970s.

**Muster Rolls were also pay rolls and, to prevent fraud by payments to men who did not exist, every unit had to hold a muster parade on the 25th of each month with all men present. Today, very few of the Royal Military Artificer rolls exist for the early 19th century, but they would have been available in Connolly's day. By comparing the names on the rolls, he could be certain that when a unit changed its title it remained the same unit.

***T W J Connolly's "History of the Royal Sappers and Miners", 2nd Edition, Volume 1, page 157.

the Peninsular War as 1/3 Company and emerges as 3 Company, but 3 Company served in the war as 4/2 Company. Even worse, 9 Company has a genuine, continuous history back to 1787 as Chatham Company, but the Chatham history was allotted to 6 Company while 9 Company was given the West India history dating back to only 1793. The 1806 numbering is really a non-starter since, if it was used, 9 Squadron could claim to be the oldest in the Corps.

The only practical solution is the obvious one of accepting Connolly's charts as the correct history, even though it means the loss of seven of the named company histories. The RE Library adjusted the skeleton history sheets in 1980, for squadrons 3 to 9, to conform with this true state of affairs. The purpose of this article is merely to put on record the sequence of events, so that future generations will not have to ponder over the reasons for changes in unit histories.

**LINEAGE OF COMPANIES 1772 TO 1820**

| Formed | Title | 1806 Numbering | Retitled /formed | Company | Disbanded | Retitled | Current* Number | Ward Allocation |
|---|---|---|---|---|---|---|---|---|
| | | | | **1st Battalion** | | | | |
| 1772 | 1st Gibraltar | 9 | 1811 | 1st Coy | - | 1819 | 1 | 1 |
| 1786 | 2nd Gibraltar | 10 | 1811 | 2nd Coy | - | 1820 | 2 | 2 |
| - | - | | 1811 | 3rd Coy | 1819 | - | - | - |
| 1787 | Woolwich | 1 | 1811 | 4th Coy | - | 1819 | 4 | 7 |
| - | - | | 1811 | 5th Coy | - | 1819 | 10 | - |
| - | - | | 1811 | 6th Coy | - | 1820 | 6 | - |
| - | - | | 1811 | 7th Coy | 1819 | - | - | - |
| - | - | | 1811 | 8th Coy | 1819 | - | - | - |
| | | | | **2nd Battalion** | | | | |
| 1787 | Chatham | 2 | 1811 | 1st Coy | - | 1819 | 9 | 6 |
| - | - | | 1811 | 2nd Coy | 1819 | - | - | - |
| 1806 | Dover | 3 | 1811 | 3rd Coy | 1819 | - | - | - |
| - | - | | 1811 | 4th Coy | - | 1819 | 3 | - |
| - | - | | 1811 | 5th Coy | - | 1819 | 5 | - |
| - | - | | 1811 | 6th Coy | 1819 | - | - | - |
| - | - | | 1811 | 7th Coy | - | 1819 | 7 | - |
| - | - | | 1811 | 8th Coy | - | 1819 | 8 | - |
| | | | | **3rd Battalion** | | | | |
| 1787 | Portsmouth | 4 | 1811 | 1st Coy | 1819 | - | - | 3 |
| 1787 | Gosport | 5 | 1811 | 2nd Coy | 1819 | - | - | 4 |
| - | - | | 1811 | 3rd Coy | - | 1820 | 11 | - |
| 1787 | Guernsey (half coy) | 8 | 1811 | 4th Coy | 1819 | - | - | 8 |
| 1787 | Jersey (half coy) | | 1811 | 5th Coy | 1819 | - | - | |
| - | - | | 1811 | 6th Coy | 1819 | - | - | - |
| - | - | | 1811 | 7th Coy | - | 1819 | 12 | - |
| - | - | | 1811 | 8th Coy | 1819 | - | - | - |
| | | | | **4th Battalion** | | | | |
| 1787 | Plymouth | 6 | 1811 | 1st Coy | 1817 | - | - | 5 |
| - | - | | 1811 | 2nd Coy | 1817 | - | - | - |
| 1804 | Spike Island | 7 | 1811 | 3rd Coy | 1817 | - | - | - |
| - | - | | 1811 | 4th Coy | 1817 | - | - | - |
| 1806 | Halifax/Nova Scotia | 12 | 1811 | 5th Coy | 1817 | - | - | - |
| 1793 | West India | 11 | 1811 | 6th Coy | 1818 | - | - | 9 |
| - | - | | 1811 | 7th Coy | 1817 | - | - | - |
| - | - | | 1811 | 8th Coy | 1817 | - | - | - |
| 1799 | Minorca | | - | - | 1802 | - | - | - |

*These numbers were continued in sequence (ie in 1824 the number 13 was given to the company formed for the survey of Ireland).

# Of Mighty Midgets and Galloping Canaries

COLONEL HEATH TWICHELL JR, US ARMY (RETD)

*Heath Twichell is a 1956 West Point graduate, who earned both a Combat Infantryman's Badge and a PhD in history during 24 years on active duty – alternating command assignments in the United States, Germany, and Vietnam, with tours as a faculty member at his alma mater and the United States Naval War College. He subsequently taught International Relations at Rhode Island's Salve Regina University, leaving in 1988 to devote full time to research and writing.*

*Colonel Twichell is the author of numerous articles and two books, the first of which, "Allen: The Biography of an Army Officer, 1859-1930" won the Allan Nevins prize in American History. His latest, "Northwest Epic: The Building of the Alaska Highway" from which this article is taken, is dedicated to his father, one of the builders of the original pioneer road.*

QUICKLY built by the US Army Corps of Engineers over an unmapped stretch of the Canadian Rockies in the tense aftermath of Japan's attack on Pearl Harbour, the 1500-mile Alaska Highway was intended as an emergency supply route for the airfields of the Northwest Staging Route and US military bases in Alaska. The wartime highway soon spawned an array of related construction projects across more than one million square miles of western Canada and Alaska, an area four times larger than France. By 1944 the Alaska Highway had its own oilfield and a newly built refinery and pipeline system (called CANOL), a telecommunication network, a dozen temporary landing strips – and more. At a time when skilled workmen made $1.50 an hour and $1 bought a barrel of oil, this huge project cost over $500 million.

Because the Japanese never managed to cut the sea lines of communication to Alaska, neither the Alaska Highway nor CANOL saw heavy military use. But in terms of human effort, resourcefulness, and gritty endurance, the construction of the highway was an awesome achievement.

Working in a vast, empty land where the temperature could drop 80 degrees overnight, a hastily organized force of 46,000 soldiers and civilian workmen took less than two years to finish what one officer called the "biggest and hardest job since the Panama Canal."

That officer was my father, Colonel Heath Twichell, and this is the story of his experiences as Second in Command of the 35th Engineers, one of the seven regiments that pushed through the original pioneer trail. The story opens in August 1941 at Camp Robinson, Arkansas, where the newly activated 35th was beginning its training under the command of Lieutenant Colonel Robert D Ingalls, four months before Pearl Harbour...

With a cadre of regular Army officers and noncoms, plus a number of recent college graduates serving out their ROTC (Reserve Officers' Training Corps) commitments, Ingalls began the process of converting 1000 draftees fresh from basic training into proficient military engineers. He had barely begun when the regiment received orders to participate in the Louisiana manoeuvres, the largest peacetime exercise ever staged up to then by the US Army. More than 400,000 soldiers, organized as two contending armies, were to converge on the manoeuvre area from bases across the US.

On 9 September 1941, just five days after the last shipment of 319 recruits arrived at Camp Robinson, the lead elements of the 35th headed south toward the manoeuvre area, 300 hot and dusty miles away. Despite their heavy packs and sore feet, many of the 35th's civilian soldiers must have been amused by the incongruity of the setting. Here they were playing at war while marching



Col Heath Twichell
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through peaceful southern towns where folks cheered and clapped and ran out to offer lemonade and cookies as they passed.

The War Department (WD) planned the Louisiana manoeuvres as both a test, and a demonstration of the growing capability, of the US Army, which had increased from under 200,000 men to over 1.6 million in the two years since Germany's invasion of Poland had touched off World War Two. Disillusioned by the failure of World War One to settle Europe's problems, however, many Americans remained strongly isolationist. General George C Marshall, two years on the job as Army Chief of Staff, often faced a hostile Congress as he pleaded for the resources to proceed with the build-up. The Army's eight-fold increase in two years was proof of Marshall's effectiveness but Congress rarely gave the WD everything it asked for.

The uneven results of this rapid build-up were obvious during the Louisiana manoeuvres. Although the operation was grandly conceived, with the first American use of airborne troops and an entire armoured corps and more than 1000 aircraft in action, many details of execution showed just how unprepared for real war the US Army was. Coordination between ground and air forces, for example, was almost totally lacking.

Nevertheless, the manoeuvres were a valuable experience. Even the mistakes made by commanders and their staffs pointed the way to better tactics and techniques, as General Marshall explained in response to public criticism of the more egregious blunders.

What Marshall did not say, but what many senior officers were discovering, was that the Chief of Staff had no tolerance for those who adjusted slowly to new responsibilities or failed to learn from their mistakes. Such men found themselves sidetracked to dead-end jobs – or peremptorily retired.

Conversely, officers who demonstrated ability and initiative were rapidly promoted. Their outstanding performances in these manoeuvres made rising stars of the 2nd Armoured Division's aggressive commander, Major General George S Patton, and the Third Army's resourceful Chief of Staff, Brigadier General Dwight D Eisenhower.

The performance of Lieutenant Colonel Ingalls may have been eclipsed by such brilliance, but it did not go unnoticed. A Cornell University ROTC graduate who had served in the trenches during the last months of World War One, Ingalls had been promoted slowly thereafter despite his solid peacetime record. Command of a regiment was a rare opportunity. He was determined to make the 35th Engineers the talk of the Army.

Colonel Heath Twichell along the Alaska Highway with William H Upson, a writer for a popular magazine *The Saturday Evening Post*. To foil the censors, Upson fictionalized the exploits of the 35th Engineers.

Returning to Camp Robinson in mid-October, the regiment plunged into a gruelling schedule of 16-hour days, six days a week. Given the mobilization then under way, such hours were not unusual, but the same could not be said of Ingalls' training methods.

Ingalls had decreed that every man six feet tall and over be assigned to "A" company; those a few inches shorter to "B" company; and so on down to "F" company, whose members barely met the Army's minimum standard of five feet half an inch. West Point sized its cadet companies to reinforce the impression of precision and uniformity during parades, but it was not standard procedure in the Army. Ingalls' contemporaries thought him a bit odd for insisting on it.

Even so, the practice seemed to have had a positive effect on morale in the 35th. "F" Company's "Mighty Midgets", as they soon dubbed themselves, were unwilling to concede that they couldn't do everything as well as the "flankers" of

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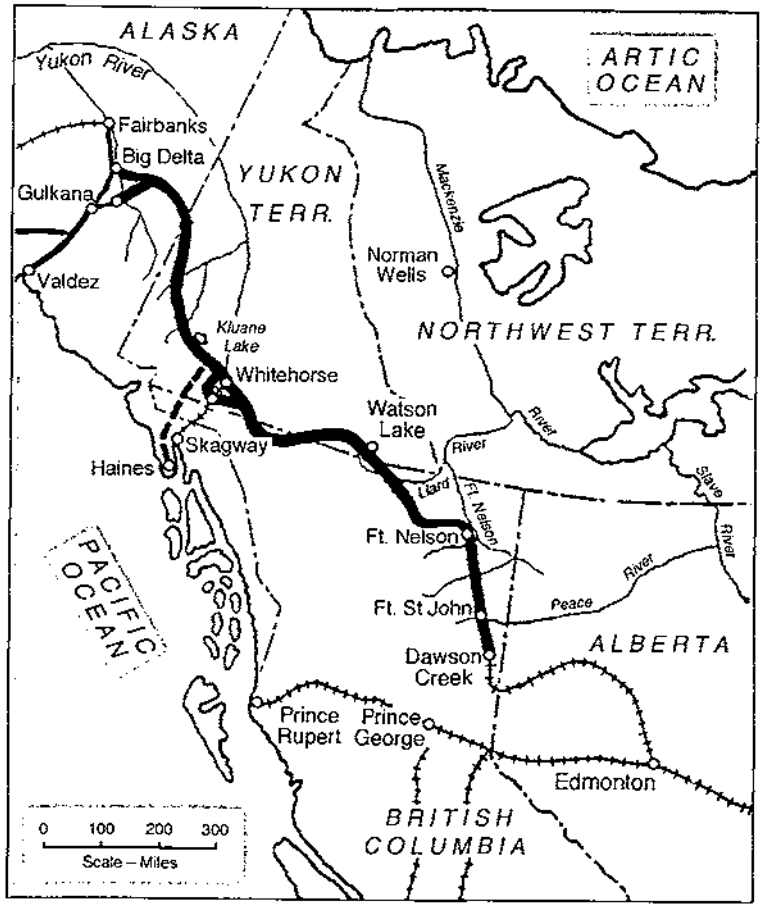


Route of the Alaska Highway.

"A" Company, despite spotting them almost a foot in height per man. Naturally, it was a matter of pride for "A" Company never to let themselves be outdone by the "runts" – a category that included not only "F" Company, but everyone else in the regiment. This good-natured rivalry was always a factor as the training progressed, whether the issue was which company had the most solidly constructed timber trestle bridge, or the least deficiencies at Saturday inspection.

Ingalls kept looking for ways to have his regiment stand out. Although the 35th was not authorized to have its own band, a search for musicians among the ranks turned up a handful of "volunteers" who were soon banging and tootling away in rehearsals, practising tunes Ingalls himself taught them on his ocarina. He then wrote some new verses to one of the tunes, renamed it "Hail to the Engineers", and made it the regiment's new marching song. Every last soldier was expected to know it in time for the Commanding General's impending inspection.

Came the day, 18 November, climaxed by a spit and polish parade, Ingalls joined the general on the reviewing stand. As his 1300 troops marched past in solid rectangular mass (sized by height, of course), the effect was impressive. Ingalls' boss told him so.

Ingalls replied, "Just wait a minute general: they're coming around again."

And so they did, marching at double time and singing lustily "Hail to the Engineers." For a long time thereafter, the 35th Engineer Regiment was known throughout the US Army as the "Galloping Canaries."

Less than three weeks after the parade, word came of the Japanese attack on Pearl Harbour. A frenzy of activity ensued, all furloughs were cancelled, and orders came to prepare for movement to the West Coast. On 20 December, the regiment left Camp Robinson in three long trains, arriving at Fort Ord, California, on Christmas Day. Home, for the holidays, was a bleak and rain-swept tent camp.

Overlooking Monterey Bay, 150 miles south of San Fransisco, Fort Ord was crowded with newly arrived units awaiting deployment as soon as a clearer indication of Japan's next move emerged. Rumour had it that the regiment was headed for the southwest Pacific to reinforce General Douglas MacArthur's forces, already in danger of being cut off in the Philippines.

Despite frequent disruptive alerts, the 35th's training routine quickly resumed its old pace. For the officers and non-coms, however, the first two months of 1942 were filled with ever greater turbulence and uncertainty. Each week, a few more of them got orders to report to Camp X or Unit Y, there to become cadre for one of the many new engineer outfits being organized around the country.

The first hint that the regiment would soon be working on the Alaska Highway came on 11 February, when Ingalls received a WD telegram placing him on "detached service" for a secret mission. Similar orders came for Captain Alvin C Welling, CO of the 35th's 1st Battalion and one of the few officers above the rank of lieutenant remaining in the regiment besides Ingalls and his Executive Officer (XO), Major Heath Twichell.

Ingalls left the next day for Canada to make a hurried reconnaissance to Fort Nelson, an isolated settlement in northern British Columbia. (Moving the 35th Engineers into position there over a primitive, 250-mile winter trail before the spring thaw made it impassable, was the key to the army's plan for opening an overland supply line to Alaska in 1942.) Joining Ingalls in Canada was Colonel William M Hoge, soon to command the highway project. Meanwhile, Welling left for the Engineer Centre at Fort Belvoir to help prepare requisitions for the enormous amount of supplies and equipment the project would need.

When Ingalls returned to Fort Ord two weeks later, the regiment's new mission was confirmed. Twichell learned that both he and Ingalls had just been promoted and passed this good news on in a letter to his wife, Frances, at the same time saying that he would not be coming home for a while – he also said: "Bob [Ingalls] returned from Canada last Friday. He was up there... making a preliminary reconnaissance for the new road to Alaska that you have probably been reading about...

"The regiment is going up there soon to construct some 400 miles of new road through a trackless wilderness... It is going to be a huge job, with many hardships and adventures, no doubt, but probably the chance of a lifetime."

Fort Nelson BC circa 1942.
*Credit: US National Archives.*

Then he described for her the brand new bulldozers and other heavy equipment that had just arrived, along with 11 van loads of arctic clothing – enough to issue each man a sheepskin-lined trench coat, reversible parka, fur helmet, sweater, scarf, gloves, wool pants, wool socks and underwear, two pairs of heavy shoes, goggles and a sleeping bag. "We certainly will be warm enough," he predicted.

The advance party, Company "B", with five officers and 160 men, left on 5 March. Taking five days to make the 2000-mile trip by rail up the coast

The "End of Steel" at Dawson Creek BC.
*Credit: Yukon Archives.*

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Plank and sawdust road across ice on Peace River, March 1942.
*Credit: Office of History, US Army Chief of Engineers.*

into Canada and east over the Rockies, the men had little to do for the moment but enjoy the scenery, "shoot the bull," play cards, or sleep. Each morning the train paused at some whistle stop for everyone to line up outside for a brisk round of callisthenics. This novel sight always drew the townspeople, who brought gifts of cigarettes and candy and stayed to cheer and wave as the train moved on.

Last stop: the "end of steel" at Dawson Creek, British Columbia, population 600. The company pulled in just before dawn on 10 March. Waiting to meet them on the dimly lit station platform was the familiar figure of Alvin Welling, wearing brand new major's leaves on his parka.

Now working as Colonel Hoge's advance man in Canada, Welling had spent a busy month since leaving Fort Ord. Based on his experience from previous duty in Alaska, he had done his best to convince the supply experts in Washington that their estimate of the logistical needs of Hoge's new command was pitifully unrealistic.

"My contribution," he recalled years later, "was merely to double or triple or, in the case of such items as welding rods, to double-triple the quantities." Arriving alone in Dawson Creek less than a week before the onslaught of men and supplies was to begin, Welling faced a challenge that might have daunted a less self-assured officer. He began by meeting with town officials, businessmen, and landowners to explain what the Army was going to need immediately: every available square foot of covered storage space, buildings suitable for headquarters, and several large tracts of land for bivouac areas. Given the short days at that latitude in early March, Welling spent many hours with a flashlight stumbling around through snowdrifts reconnoitring the sites suggested by the Canadians.

The advance party brought with it unseasonably warm weather. An early thaw meant serious trouble: if the ice on the nearby Peace River gave way before the regiment could get across, all hope would be lost of reaching Fort Nelson and pushing a road across the Rockies before the end of 1942. Although Welling could do nothing about the warming weather, he could at least do something about the softening ice.

Scouring the local sawmills, he obtained enough sawdust to spread a one-lane blanket 1500 feet from bank to bank, and sufficient heavy planks to lay a makeshift deck on top of that. This combination would insulate the ice and spread the weight of the Engineers' heavy equipment as it rumbled across the river. Putting down the sawdust and planks became the advance party's first job at Dawson Creek. That done, along with minor repairs to several small bridges south of the river, the troops got a well deserved evening off. Most spent it crowded three-deep at one or another of the town's few bars.

Next day, despite some tense moments on the ice, the company's heavily loaded trucks and bulldozers made it safely across the Peace. Reaching Fort St John by nightfall, the men pitched their two-man pup tents in a wheat field and made final preparations for the 250-mile trek up the winter trail to Fort Nelson.

Company "B's" mission, as the advance party, was to make quick repairs on the trail's rougher stretches and then, at Fort Nelson, not only to clear and lay out an area for the 35th's base camp, but also to construct storage facilities for the enormous stockpile of supplies that would be coming up with the main body. As the company headed north on 12 March, the temperature rose above freezing for yet another day. By then, the rest of the regiment was on its way.

Travelling on four separate trains, each consisting of about 35 Pullman, coach and flat cars, the 35th's main body had left Fort Ord on 10 March. Converging on Dawson Creek from camps elsewhere in the US were two more trains carrying

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specialized engineer units. Due to arrive two days ahead of the regiment was Company "A" of the 648th Topographic Battalion, with five officers and 160 men. Right behind it came the 74th Light Pontoon Company, six officers and 101 men skilled at river crossing operations. Bringing up the rear was a freight train carrying enough gasoline, oil, rations, tentage, spare parts and other things to last the force at Fort Nelson for the next five months.

After being cooped up in crowded coaches for a week, Ingalls' men were in high spirits when they reached Dawson Creek. By late afternoon on 16 March, as the regiment's last train-load pulled in, the earlier arrivals were already camped at Fort St John.

The ice on the Peace River still held, but as the thaw continued, the risk increased of it giving way under the unit's heavier machines. The largest, D-8 bulldozers weighing more than 23t, went across at night when the air was coldest. Even then, the ice visibly sagged and rippled under the passing weight of each vehicle.

With the 35th Engineers about to begin the most crucial leg of its journey, Colonel Hoge flew into Fort St John. Setting up temporary headquarters in a log cabin, he met with Ingalls and his staff to assess the regiment's prospects for reaching Fort Nelson over the rapidly thawing winter trail. Beneath the surface layer of slush and mud, said Welling, the ground was still frozen solid to a depth of several feet. But what if the thaw continued? The possibility of the regiment being stranded halfway to Fort Nelson had unimaginable consequences.

Hoge already had a reputation for audacity and courage, but he was not reckless. Hedging his bets, he ordered Ingalls to split the 35th into two balanced forces. One was to start immediately for Fort Nelson; the other would hold back at Fort St John. When the first half was certain of reaching its destination, a decision would be made whether to send on the rest. Hoge was certain that if the trail held up for two more weeks, Ingalls would be able to get his entire unit to Fort Nelson. If the trail dissolved sooner, at least half the force would still be positioned where it could do useful work.

This scheme went into effect even before the last train-load of men, equipment, and supplies made it to Fort St John. To move the extra cargo, Ingalls planned to use the regiment's trucks like buckets in a giant conveyor belt. After making an initial run to Fort Nelson, each truck would return to the Dawson Creek railhead to be reloaded and sent back north. With three or four round trips per vehicle (assuming that the trail, drivers and trucks all held up), everything would finally get to Fort Nelson.

The first half of the regiment began moving up the trail on 16 March. By that time, the temperature had been above freezing for over a week, occasionally hitting 50°F. According to the plan worked out by Ingalls and his XO, the 250 miles of trail was divided into three sectors, each with an officer in charge and a roving tow truck operating out of a temporary base camp. Each camp had stockpiles of fuel and oil; a chow line serving meals at any hour; and heated tents with cots, where rested drivers could change places with exhausted ones coming in off the trail. The key to keeping traffic moving constantly was having enough extra drivers. That meant using nearly every man who could handle a truck, regardless of his normal duties.

Day and night the march continued, as the stockpiles at Fort Nelson steadily grew and empty trucks headed back down the mushy trail for another load. Then, suddenly, winter returned. Overnight the temperature dropped almost 80 degrees. With the trail again frozen solid, Ingalls immediately ordered a speed-up: all remaining units were to leave Fort St John as quickly as possible. April, with its warm chinook winds, was just nine days away.

The numbing cold may have ensured the success of the regiment's mission, but for Ingalls' men, trained for the Pacific, not the Arctic, it meant pain and hardship. Driving in the open cab of a bulldozer or road grader was the most terrible job of all, but even the canvas tops and side curtains of the trucks barely protected their drivers from the wind. Nor were their passengers to be envied, bouncing along in the back atop piles of cargo. Every soldier wore the winter clothing issued him in the States. As protection from the bitter cold, most of this new gear was adequate – but just barely. There were serious problems with the insulated boot. Ingalls began to receive reports of frostbitten toes and feet.

The cold was so intense that engines had to be kept running. At minus 30°F, the only way to restart a stalled vehicle was to build a fire under its oil pan, a procedure not recommended by the operator manuals. Fire posed other risks as well. Cold, exhausted men became drowsy and disorientated when exposed to sudden warmth. Although drivers stopping for a bite to eat after many hours on the trail did no real damage to themselves when they literally fell asleep in their plates, several soldiers suffered minor burns after

toppling dizzily into campfires while warming their hands.

The round-the-clock pace increased the toll. With reflexes and judgment dulled from lack of sleep, men began to make mistakes. Wrecked and broken-down vehicles accumulated along the trail faster than they could be towed in for repairs. Each temporary base camp soon began to resemble a military junkyard.

Toward the end of March came another sudden weather change. This time, winter seemed gone for good. As the mud season arrived in earnest, the last convoy started up the trail. Preparing to head north himself, Ingalls had one more problem dumped in his lap. A Canadian contractor hired to haul 100 truckloads of aviation gasoline to Fort Nelson had no four-wheel drive vehicles – and the draft horses he was using to help his overloaded trucks through the softest spots were no match for the axle-deep mire. Finally, the contractor gave up, abandoning hundreds of 55-gallon fuel drums along the route. The Canadian government asked if the US Army would mind carrying them the rest of the way. Ingalls agreed, having planned all along to send a salvage crew with a wrecker and flatbed to sweep down the trail at the last possible moment and haul every broken-down vehicle back to Fort Nelson.

The sweating, cursing, bone-tired soldiers on the salvage crew who now had to finish the contractor's work no doubt had a few choice epithets for their accommodating commander. But as Ingalls slogged his way north, his pride in what the regiment had just accomplished was increased by his satisfaction in finding no abandoned equipment along the way. His men had left nothing in their wake but 250 miles of rutted mud.

Ingalls sensed that the regiment now needed a break. Until the ground dried enough to permit construction to begin, he let up on the pressure, but only a little. After all, the battered collection in the motor pool needed lots of maintenance.

Lined up in neat rows on the damp, raw earth stood 93 half-ton dump trucks, 44 heavy and medium bulldozers, 25 jeeps, 16 heavy and medium cargo trucks, 12 three-quarter-yard pick-up trucks, 10 command cars, 9 road graders, 6 12yd carrying scrapers, 6 rooter ploughs, 2½yd power shovels, several pile-drivers, a truck-mounted crane, a 6t flatbed, a concrete mixer – and one sedan. Off to one side were stacked enough pontoon boats and decking timbers to cross a good-sized river. Canvas tents protected the more portable items: electric generators, air compressors, welding sets, and gasoline-powered chain saws. Ingalls soon set up a training school to teach his operators how to do more than start, steer and stop their powerful new machines – all there had been time for in Fort St John.

With the work came plenty of sleep and three square meals a day, plus time for letters home. The next courier flight out of Fort Nelson carried news to many waiting families that the regiment had made it through.

By reaching Fort Nelson, the 35th Engineers had eliminated only the first uncertainty in the Army's complex plan for building the Alaska Highway. Whether the inexperienced 341st Engineers, cloned from a 35th cadre back at Fort Ord and soon to arrive in Dawson Creek, could ever construct a dry, all-weather route across the gelatinous expanse of muskeg between Fort St John and Fort Nelson was very much an open question. Plenty of experts familiar with the area said it couldn't be done. Even greater unknowns now faced Colonel Ingalls and his men. Was there a buildable route through the poorly mapped and incompletely explored area of the Rockies west of Fort Nelson? Were there passes through the mountains low enough to remain free of impassable snowfalls? Until an aeroplane could be made available for reconnaissance, nobody – certainly neither the WD's planners in Washington nor Ingalls and his staff at Fort Nelson – knew the answers.

On 9 April, Bataan fell. With the withdrawal of General Johnathan Wainwright's forces to the tiny island of Corregidor in Manila Bay, Japan's military control of the western Pacific was nearly complete.

Ingalls knew this was the psychological moment to start work. Although the predicted rains of the next six weeks would not permit much real progress, why not have the bulldozer crews complete their training by beginning a trail over the 50 or so miles of rolling foothills that lay between Fort Nelson and the eastern slopes of the Rockies? Surely, long before his men reached those first, mile-high ramparts, a way through them would be found.

On 11 April 1942, the 35th Engineer Regiment began work on the Alaska Highway. The casual instructions given to Lieutenant Mike Miletich, who was in charge of the dozers that day, belied the drama of the moment. "Colonels Ingalls and Twichell called me into the tent," Miletich recalled, "and they said, 'this morning we are going to start the Alcan Highway... Take a starting point... just west of the Fort Nelson airstrip and ... head west on an azimuth.'"

# A Time in My Life

ROBIN WILLIAMS

*The following is a much edited short extract from a booklet recently written by the author about his activities during the period 1942 to mid-1945. At the time he was a platoon commander in 69 Field Company RE part of 6 Army Troops Engineers and landed in Normandy on D-Day. Later he became a regular and retired in 1966. A copy of the booklet is lodged in the Corps Library.*

### The Winter 1944/45 At Son

After the Arnhem failure we settled down for the winter in the village of Son, north of Eindhoven. Workwise our time in Son was unremarkable; roadworks, and more roadworks. After Christmas it was bitterly cold. There was a great and prolonged frost, and to repair potholes we just mixed sand and water and allowed it to freeze. This was all very well until a rapid thaw occurred, when we watched a brigade of tanks destroy 15 miles of road between breakfast and lunchtime.

I will let you into a secret about how to calculate the strength of a masonry arch bridge, something every Sapper officer knows. I was responsible for a length of road on which there was a bridge in a bad state of repair, with cracks in the main brick arch. Told to find out what loads it was capable of carrying in its damaged state, I deduced, after laborious measurements and judicious use of the formulae given in the RE Pocket Book, that it was only suitable for 20-ton vehicles. A sign was painted to this effect and as we were erecting it a 40-ton tank crossed. The bridge did not collapse so we painted out "20T" and inserted "40T". Not long after a number of tanks on transporters came by. After a heated argument they in turn went over and "40T" was replaced with "70T". I do not believe the bridge suffered thereafter.

We had a good Christmas celebration made better with a barrel of oysters and some brandy. This was hardly our normal fare so we asked where the luxuries had come from. Apparently when a convoy of Her Majesty's Guards had been held up on a local bridge nearby, one of our cooks had lifted the flap of their officers mess truck' and had put his hand in.

### At Genk

We spent a month at Genk in Belgium before Christmas. More roadworks, but it had its moments. I was asked to help a farmer clear antipersonnel mines from his fields; we walked along a row which he had picked up. He said, pointing: "There was a mine here, there was a mine here; that one killed my brother and we buried him there; there was a mine here ..." We cleared a further 50 or so and discovered that the ones he had picked up had been tossed fully fuzed into a slit trench. We carefully disarmed them – the whole operation making our hair stand on end.

In a cafe one evening there was a dance and I was approached by a Belgian lady who said that I was the double of her nephew. She was Madame Fierans, wife of Antoine Fierans, manager of a local coal mine. I used to spend evenings with them and they certainly made life pleasant.

Charles Edgson, our 2IC, was an enthusiastic bridge player and was always trying to get up a four. I seldom played, but he prevailed on me to join him for an evening with two Belgians. They hardly spoke English, we did not have much French, and played with continental cards where the jacks look like queens. At the end, one of the Belgians turned to me and said slowly in halting English "You are the worst bridge player I have ever played with." I took the hint and have not played since.

During the whole campaign I met General Montgomery, twice. On the first occasion he drove over our bridge in his distinctive staff car; he stopped and called us round for a chat, asked us what we were doing and wished us well. On the second occasion he again stopped, gave us some cigarettes, and gave me a copy of the *Capetown Argus*, sent to him by a well-wisher from South Africa. I recall the address: General Montgomery, British Liberation Army, and that was all. We drew lots as to who should keep it as a souvenir.

### Four More Rivers to Cross – Gennep Bridge

Things changed in mid-February 1945 and we built three large bridges in succession, the most interesting of which was a high level Bailey bridge at Gennep over the Maas. 1000ft long with five unsupported spans (each 200ft). The river was in flood and during construction it went up 6ft and

down 12ft. The masonry piers were intact except for the centre one only about 6ft of which remained above water level. The OC, Major Fenwick, and I went out to take measurements. The far bank had not been cleared of the enemy and a German with a Spandau allowed us to get onto the pier before firing. Luckily he was not very accurate, but we were pinned down for about an hour. Using explosives, we had to get rid of the broken steel girders. My platoon dealt with the nearside span. Each member was to be cut using slabs of guncotton, primers and a cordtex ring main. I calculated the quantity of explosive to be used. Unknown to me Sgt Allen added some extra, the sappers added a bit more and there followed the most massive explosion; the whole sky lit up and the remains of the bridge just melted. We were showered with bits of steel, and of the bridge girders there was no sign.

The bridge took about 18 days to build and we got into a routine of day and night shift work. There was nothing particular about this except for two incidents. First, one night a sapper slipped whilst working on one of the masonry piers and fell. He would certainly have died in the tangled girders and flood water below had it not been for the man next to him who was immensely strong; he just caught him with one hand by the front of his jacket and heaved him back on the pier.

The second story concerns life jackets. A low-level Bailey pontoon bridge had been built downstream. There were three soldiers in difficulty in a motor boat with a faulty engine. Two of the men aboard were wearing life jackets and one was not. The motor boat ran broadside into the pontoons and sank, and all three men were keelhauled a full 60ft under the pontoons. The two with life jackets bobbed up and were saved but the one without was never seen again.

### Lottum Bridge

THE Lottum Bailey pontoon bridge was built by our group, across the Maas but upstream of Gennep, at the beginning of March. It took six days, and was technically interesting in that we had to cater for a rise and fall in flood water of the order of 25ft. It was across the line of a ferry and the approach roads were already there. The recce of the far bank was carried out in a small boat by an officer and a sapper. Surprised by some Germans, they could not get back to the boat, so swam back; a considerable feat in the cold water.

What was also interesting was what happened when my wife and I visited Lottum in May 1994. The ferry site was marked on the map, and a ferry was plying to and fro. I spoke to the ferryman to explain my interest, and he suggested we went to the cafe at the end of the ramp, as the owner was the son of the wartime ferryman.

We introduced ourselves to Leo and Diet Vergeldt at "De Maashof", as the cafe was called, and had lunch there. On the cafe wall he had three brass plaques showing serial numbers taken from the pontoons of our bridge, and in the garden an anchor, a few bridge parts, a couple of transoms and a stringer, all of which appeared little worse for 50 years in the open. A bank in the garden was held up by some of the wooden decking planks from the bridge, and I found a transom clamp and deck bolts in the remains of a pillbox which had been converted into a little garden beside a caravan.

### River Rhine

THE whole atmosphere changed when we reached Germany. There was a "no fraternization" rule, and we did not have to be considerate to the local inhabitants. When we needed billets we just invited the owners to go elsewhere.

We were operating opposite the town of Rees and our first job was close support rafting using folding boat equipment. This was not an easy business as three rafts were sunk by shellfire while loading at the river bank. Miraculously only one sapper was wounded, while asleep, by a spent bullet from one of our own aircraft. Harry Charles, 2 Platoon Commander, did particularly well during the rafting operations and I believe this is where he got his Military Cross.

After the Rhine we went back into Holland to dismantle some of the bridgeworks over the Maas, as there was a shortage of bridging material to cross the next big rivers, the Weser and the Elbe. We also got some home leave, which was welcome, and in this context there was an amusing incident. Alongside our road bridge at Gennep a rail bridge had also been built. Our leave train was to cross it, but the Belgian engine driver took one look at the bridge and said it was not safe. No amount of cajoling would make him change his mind. It took about four hours to find a British driver to move the train; once across the Belgian took over again.

### River Elbe

AFTER completing the bridge dismantling work in Holland, 69 Field Company moved forward to cross the Elbe. A Luftwaffe airfield barracks was taken over for accommodation.

It was ironic that during work on the Elbe crossings we had a tough time, especially as everyone knew the war had only days to go. 7 Army Troops Engineers were bridging at Artlenburg, southwest of Hamburg, and experienced well-aimed shellfire onto the bridging sites, and even an air attack which damaged the bridge before it was completed. We were rafting with Bailey equipment downstream. There was a lot of shelling. Sgt Proctor, our motor transport sergeant, was killed and there were seven other casualties. It was 30 April. I found a letter amongst my father's papers which I had written not long after. In it I said "It was touch and go on the Elbe crossing that I did not miss VE Day altogether. It was most nerve-wracking and annoying, as it need never have happened. I do not mean the Elbe crossing itself, but what was poured on us by the Germans in their last gasp!"

### VE Day and Thereafter

We were at a small village called Bispingen, just north of Soltau, for VE Day. I think it is fair to say that most of the company got drunk. We had a lunchtime party in the officers' mess for the sergeants and found one of them still asleep behind a sofa when we had our evening meal.

Looting was frowned upon and I did not notice much going on; it was difficult to encumber oneself with too much gear and in any case there was little worth having. Some of us acquired German cars and I had an Opel with a dashboard gear lever for a short while: I was offered a Leica camera for it and refused, which was a pity, as it broke down the next day and had to be abandoned.

When we got back to work we were on road repairs yet again, with numerous craters to fill in. To do this we employed German labour requisitioned from the local town office. One day we went to pick up our quota of 250 workers amongst whom there was a number of women wearing silk stockings and high heeled shoes; they did not take kindly to breaking rocks and barrowing it into craters, but we did not feel too sorry for them.

I got time off to visit Celle to stay with my father, who was working for UN Relief and Rehabilitation Administration. He was responsible for a Polish displaced persons camp, and the majority of his charges had been at Belsen concentration camp. Not surprisingly they were a wild lot and they foraged for food far and wide. The murder rate averaged eight per week, mostly Germans. While I was talking to my father in his office a German women with a 14 year old daughter was ushered in, complaining that the Poles had raped the daughter and had stolen their bicycle, and how could she get the bicycle back. Priorities were different then.

I was also taken to Celle jail and saw Kramer, the Beast of Belsen, and his mistress Irma Grese. Shortly after, they were tried by a military tribunal and hanged.

The Poles were housed in a German army barracks, and on the barrack square a noted strong man from Belsen gave a demonstration of his strength. I gave him a shilling which he bent double between his forefinger and thumb, and he tied a knot in a steel reinforcing bar. He sat on a 4-wheeled farm cart with the traces of two horses in his teeth, whipped the horses and they cantered round the square. We came to the conclusion that this man did not go short of food in the concentration camp.

In June we moved to Osnabrück, and the only excitement there was the Victory Parade on the main square. No artillery was available, so I was given the job of providing a 21-gun salute. Using quarter pound charges of ammonal we set up 25 charges (allowing for a few misfires) and a cunning system was devised for electrical firing. I had a stop watch and gave the corporal the order to fire. All went well until there was a misfire and I lost count. At about the 23rd firing there was a louder bang than the rest and the wall behind which we were crouching blew down; we, covered in a thick layer of dust, were exposed to the full gaze of the assembled VIPs and other watchers. Murphy's Law, I believe!

On 11 July I caught a train and ultimately arrived at a transit camp at Knokke on the Belgian coast. From Ostend I returned to England.

It was all over. I was a year older, unharmed, had not been required to fire my pistol once, had done something worthwhile and on occasions had had a really interesting time. I had vindicated my choice of joining the Royal Engineers.

# Antipersonnel Mines – Military Utility, and Humanitarian Considerations

LIEUTENANT COLONEL J W SAGE BSc(H)

*Commissioned in 1978 following five years in the Territorial Army, the author's initial postings included tours in the Falkland Islands and Kenya. Thrust into a staff appointment in Headquarters 1 Armoured Division in Verden, he found the job immense fun and very satisfying. After Staff College he commanded 42 Field Squadron in Hameln, deploying on Operation* Descant *to Northern Ireland and then to the Former Republic of Yugoslavia on Operation* Grapple 1, *to support 1 Cheshire Group. Always his ambition to deploy the squadron armoured personal carriers on exercise, he briefly managed this at Soltau for ten days; never in his wildest dreams did he envisage painting the same carriers white and running up and down the Yugoslav hills in them.*

*Regrettably all good things come to an end, and he arrived in the Ministry of Defence on the countermobility desk. It was here that he became involved, with the United Nations, Foreign and Commonwealth Office, International Committee of the Red Cross, and others, in the business of antipersonnel mines. Promoted to lieutenant colonel, the Army now expects him to write doctrine at the Directorate of Land Warfare to guide the force development work from the year 2010 onwards – oh dear.*

*His main hobby is paragliding so if not at his desk in Upavon, he can be found in the hills only five miles away.*

## Introduction

Over the last 12 to 18 months there has been an ever-growing campaign to raise public and political awareness to the dangers posed by the indiscriminate use of land mines; frequent questions in Parliament, letters to members of parliament and ministers, articles in newspapers and magazines, and a number of television documentaries. Although antitank land mines do cause some problems, they are relatively few in number and hereinafter the term "mines" will be taken to refer to antipersonnel (AP) land mines only unless stated otherwise.

Today it is believed there are about 100 to 200 million mines laid around the world. Countries such as Cambodia, Angola, Mozambique, Afghanistan, the former Republic of Yugoslavia, and Kuwait have been littered with them. Frequently laid with little rhyme nor reason, they are unmarked and unrecorded and can remain dangerous for years. In many cases, mines have been used irresponsibly as a deliberate weapon of terror to target civilians and prevent them farming or carrying on their normal daily lives.

It is estimated that somewhere in the world 1000 people a month (mainly women and children tending crops) are injured by mines (usually causing traumatic amputations) and many die before reaching medical aid, or often are never even found as they die where they fall in remote areas – thus estimates are probably conservative and the true number of deaths may never be known.

The UN and many non-governmental organizations (NGOs) are actively involved in demining efforts in many countries. However, demining to the level required before the local population can return safely to their normal lives is a slow and tedious business. The UN estimate that every mine cleared costs between $300-$1000, and, together with the time and labour involved, this



Lt Col J W Sage
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results in only a fraction of the land needing attention being cleared. It is a sad fact that more mines have been laid than can ever be successfully removed, and mines will continue to be laid more quickly than they can be cleared, particularly if they are used randomly and indiscriminately, unless some form of control is applied on their use or on how they operate.

It is against this background that pressure has been building to address the humanitarian problem caused by the indiscriminate use of mines.

### THE PROBLEM AND POSSIBLE SOLUTION

THE problem is how to rationalize these conflicting requirements: the legitimate military need to use mines, against the dangers created by mines to the civilian population, particularly after the conflict has ended[1].

In an effort to address this humanitarian problem, the USA and France each imposed a unilateral moratorium on the export of AP mines in the summer of 1993. The US also sponsored a UN General Assembly resolution which called for states to implement moratoria on the export of AP mines which pose grave dangers to civilian populations. This resolution was adopted by consensus in November 1993. It is not legally binding on nations but politically and diplomatically does carry a lot of weight.

Although mines can, and do, cause casualties to civilians during a war, it is mainly after the conflict – often many years later – when the true cost of these mines in terms of suffering and damage to the economy becomes apparent. If mines with a limited life can be used in war, after which they either self destruct (SD) or self neutralize (SN), then many of the problems associated with their continued use will be removed. With modern electronics, the best example being the common quartz wristwatch or alarm clock, it is not difficult to design a SD or SN mechanism that has a high degree of reliability. With many mine fuzes already being based on electronics, the additional cost of a timed-life mechanism would not necessarily be high.

Some, including a number of NGOs, argue that such SD/SN mechanisms are woefully unreliable and the only solution is a prohibition of the development, manufacture, stockpiling and sale of mines. Typically, NGOs cite failure rates of 10-20 per cent in the Gulf War. However, these figures are unsubstantiated. Although it is not denied that failure rates of some weapons were worse than anticipated, this was due to the soft desert sand, extremes of temperature and above all the use of a variety of weapons with old and outdated technology; most of the weapons that failed were air and artillery delivered bomblets and sub-munitions, not mines at all. Future mines are expected to have SD/SN failure rates that are better than 1:1000 and those that do fail will do so in an inherently safe way, ie unarmed. A further safeguard is that the battery will die in a relatively short space of time and so prevent the mine being activated. It is the UK's intention that only land mines (both antitank and antipersonnel) incorporating SD or SN mechanisms with proven failure rates at least as good as that above, will be purchased in future.

The principal international treaty governing the use of mines is the "1980 UN Weaponry Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects" (the short title of which is the 1980 UN Weaponry Convention). Protocol II of the convention governs the use of mines, booby traps and other devices. In September 1995 there will be a conference to review the provisions and propose amendments to it. In preparation there has been a number of meetings of governmental experts sponsored by the UN in Geneva. The meetings concentrated – as future meetings will – on proposals to amend Protocol II. It is hoped that the conference will result in an amended weaponry convention which as many states as possible will feel able to ratify, and that allows and recognizes the legitimate military utility of mines whilst at the same time ensures, as far as is possible, that such mines cause minimal damage to civilians and the infrastructure of a society.

The main amendments proposed to Protocol II include the following, not in any order of priority:

- All remotely delivered long range mines must have SD/SN mechanisms incorporated.
- Any mine that does not have SD/SN capability can only be used in a marked and recorded area, and must be removed at the end of the conflict. This would include the current Ranger scatterable AP mine.

[1]No other solution to the problem of denying access to an area is as cheap or quick, requires minimum logistic effort and, above all, is as effective as the simple mine. The suggested use of foams, glues, or extra barbed wire does not achieve the same result for as little effort and exposes our troops to far more danger from enemy action.

- All parties to a conflict must supply all possible information to the UN and other interested parties, after the conflict, to allow demining to take place.
- All mines should be detectable by readily available (electronic) equipment. Arguments that mines which are detectable will be readily cleared by an enemy, miss the point that the delay caused by detection and subsequent clearance means the mine has achieved one of its main aims, that of slowing down the enemy.
- SD and SN times will be as short as is practical, consistent with the military requirement.
- More stringent requirements will be imposed for recording and marking of minefields.
- All appropriate measures (for example advance warning of remotely delivered mines (RDMs), posting of warning signs around minefields) must be taken to ensure that civilians do not become accidental targets. It is of course already illegal, under the current Geneva Convention, to target civilians directly.

If all of the above can be brought into force, and adhered to by combatants, then real progress can be made to limit the problem. However, mines that are currently on the ground causing today's suffering, can only be dealt with by the application of time, effort, money and improved technology for demining. The UK, through the Overseas Development Agency, contributes to various mine clearance programmes around the world in order to help ameliorate some of the problems caused by mines already laid. It is important to separate the past and present problem from the potential to control effectively newly developed mines in the future.

On 17 August 1994, in an effort to try to get states to focus on easily implemented initiatives, the UK introduced, at the Conference on Disarmament, a draft proposal for a "Code of Conduct for Exports of AP Mines". In outline it proposed that: States will not export any AP land mines to any country not party to Protocol II of the 1980 Convention, and that States observing the Code will not exchange with each other any AP mines which are not fitted with a SD/SN facility. International discussions on these and other proposals to regulate transfers of AP mines and the associated technology, continue. Non-state organizations[1] such as freedom fighters and the like, would not legitimately be permitted to procure or use any mines at all.

One thing is certain, however. Today, there is a will in the world at large to address the problems caused by the irresponsible use of AP mines.

The UK is currently investigating the operational necessity to replace the ageing Ranger scatterable AP mine system (that remains live for many years) with FAPSM (Future AP Scatterable Mine) at the turn of the century, and the procurement options. This will undoubtedly be a vehicle launched scatterable mine system, to complement VLSMS (Vehicle Launched (anti-tank) Scatterable Mine System) and other mine systems such as MINX (Mines in the Next Century), ACEATM (Aimed controlled effect antitank mine (an off-route mine)), and ADW (Area Defence Weapon – a top attack mine). The FAPSM mine will be detectable by current detectors and programmable with a limited laid life at the end of which the mine will destroy itself (SD)[2]. In all aspects FAPSM will meet or better the present proposals to amend the 1980 UN Weaponry Convention and will allow the UK to deploy with a viable and legitimate weapon system in any future conflict.

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[1] An organization that does not have the international recognition and legitimacy of an NGO such as the UNHCR or the International Committee of the Red Cross etc.

[2] Currently, the only realistic way for a mine to SD is for it to detonate as if it had been activated otherwise. Future technology may allow non-explosive SD such as deflagration or chemical decomposition, but these methods are likely to reduce the reliability of the system. Furthermore, one of the main aims of SD is to remove any traces of the mine after the event, for a number of reasons: civilians will be happy to go back into previously mined areas as they will see no evidence of mines; no components can be used for terrorist purposes; and children, who are often most at risk, cannot accidentally activate the mines by, for example, placing them in a fire. These are the main advantages of SD.

When a mine has SN it is still physically there and will have to be cleared, and unless deminers are very brave they are likely to treat the mine as live and therefore there is little advantage in employing this system.

# The General Officers' Medal Fund

COLONEL J E NOWERS BSc(ECON) FIMGT – DIRECTOR RE MUSEUM

THE museum's medal collection amounts to some 4500 items, including 24 Victoria Crosses and three George Crosses. Important Sapper medals occasionally appear in auction rooms and are then lost sight of for years and, whilst the museum itself does not buy medals, the Friends of the Royal Engineers Museum have successfully established a source of funds for such purchases.

All serving and retired Sapper general officers have been invited to pledge funds to allow the purchase of medals to enhance the collection, and the first purchase from this General Officers' Medal Fund has been a medal group awarded to Sapper G W Quinton, which includes a Distinguished Conduct Medal (DCM), awarded for Quinton's actions on the night of 4 November 1918. Sixteen Sapper generals contributed to this purchase.

The action relating to this award took place in the vicinity of the village of Ors near the Sambre Canal in Belgium. 96th Brigade (32nd Division) was tasked with making a crossing of the canal and 218th Field Company was instructed to prepare floating foot bridges for the initial crossing. The site of the crossing came under intense artillery and machine gun fire. Two foot bridges supported on cork floats were put across but almost immediately smashed. Two of the company's officers were killed and two wounded. The company commander, Major A H S Waters, took charge and succeeded in restoring one of the bridges under almost point blank machine gun fire. So intense was the fire that the brigade had to abandon the crossing in favour of an adjacent one effected by 14th Brigade. Most of the bridging detachments were either killed, wounded or gassed.

Victoria Crosses were awarded to Major Waters and Sapper Archibald and the DCM to Sapper Quinton. Two other DCMs and possibly as many as 13 Military Medals were also awarded for this action which highlights the fact that this was a very fiercely contested crossing. It will not have gone unnoticed that these events took place barely one week before the Armistice! The Victoria Cross to Major Waters is in the RE Museum. It is interesting to note that also in the museum is the Victoria Cross awarded to Major G de C E Findlay of 409 (Lowland) Field Company, in connection with another crossing of the Sambre Canal by 2nd Brigade (1st Division) near Cotillon on the same day.

The citation for Sapper Quinton (*London Gazette* 10 January 1920) reads as follows:

> "For great courage and devotion to duty near Ors on 4 November 1918 during the preparation of a floating bridge over the Sambre Canal. He worked until the bridge was completed, notwithstanding very heavy machine gun fire from the opposite side. Three quarters of the whole of the Sapper unit engaged on the bridge became casualties."

Sapper Quinton came from Hadleigh and had served previously in the Leicestershire Regiment.

Mention has been made of the second Victorian Cross awarded to Sapper Archibald for the same action. The whereabouts of this medal is something of a mystery and if any reader has any information regarding it would they please contact either the director or curator on (01634) 822312.

The cataloguing of the museum's medal collection continues, some 1700 individual items have been inspected and recorded.

# Gorazde

LIEUTENANT M D CURTIS BSc

*Lieutenant Curtis read for a degree in Geography at Queen Mary's College, London University. After graduating he spent the next 18 months working in numerous jobs before going to Sandhurst in May 1992. From here he then attended Troop Commanders' Course 109 in Brompton Barracks, Chatham, Kent. His first posting was to 38 Engineer Regiment where he joined 32 Field Squadron. Soon after his arrival he was on his way to the former Republic of Yugoslavia, as part of the augmentation force, in command of 1 Troop.*

## Introduction

"You had all best pay attention to this gentlemen, as you could find yourself in somewhere like Bosnia when you leave here." (Much laughter from those assembled.) "Don't laugh, it happened to a friend of mine and this was just the sort of information he needed to know," said the instructor (laughter continued). "It will never happen to me," everyone was thinking. Incorrect assumption!

Such was the attitude to Bosnia during the early civil engineering phase of the course. Bosnia, or the Former Republic of Yugoslavia (FRY), seemed a million miles away from the classroom. The words of wisdom from the instructor were considered to be mere threats to encourage us to pay attention and stop passing the obligatory hand-drawn cartoons. They had little effect on the majority, of which I was one: eight months later my life changed dramatically.

On leaving Chatham in February 1994, I found myself in Ripon with 38 Engineer Regiment ready to take up my first posting. I was due to join 11 Squadron when they returned from Bosnia in April. In the interim I was to work with 2 Troop (2 Tp), 32 Field Squadron (32 Fd Sqn). Also during this period I was to attend the shallow water diving course in Portsmouth. This I did and arrived at *HMS Nelson* physically fit and mentally prepared for what was to come.

However, fate had other things in store. Two hours into the course a phone call ordered me back immediately. 2 Tp had been put on 72hrs notice to move to provide engineer support to an augmentation force, possibly to be used to reinforce the British contribution to the UN force already in Bosnia. By 11 March a decision had been made and we were on our way to South Cerney and a trooping flight to Split.

## Gorazde

Once in theatre our first port of call, along with the 1st Battalion the Duke of Wellington's Regiment (1 DWR), which we were supporting, was Bugojno, 15km north of Gornji Vakuf. Here we constructed a hardened camp in an old shoe factory complex, which occupied the 48-man troop for six weeks. At this point the town of Gorazde became headline news. In the centre of a Muslim pocket surrounded by Serb forces, it was getting pounded by mortar and artillery fire. Sitting in the bottom of a valley surrounded by high ground, the town proved an easy and soft target. The siege attracted the attention of the world media which focused on it as an example of the atrocities which had plagued the beleaguered country for the past two years. Stories of extreme human suffering and deprivation soon filtered out and concentrated people's attention on the drama. In answer to increasing public pressure,



Lt M D Curtis
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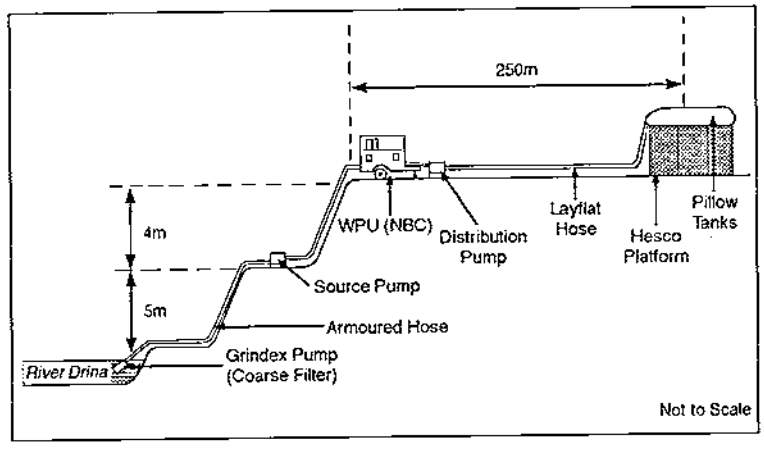
the UN sanctioned a force to enter the war-torn town and as a result 1 DWR was tasked to provide a force for 30 days.

We were to supply a section of men, plus four explosive ordnance disposal (EOD) personnel, to provide potable water through the water purification unit (nuclear, biological and chemical) (WPU (NBC)), a mine clearance team and general combat engineer support. As only a section had deployed, with its G1098, for a period not exceeding 30 days, we were limited in what we could do. Also, when we found ourselves in the same location three months later, constructing a permanent camp, obvious problems arose. We were, however, lucky in one respect. On arrival in Gorazde we found a troop of French engineers already in situ. They were well organized, well equipped and well motivated. Without their presence we would have been woefully undermanned and unable to construct a permanent camp.




Diagrammatic drawing showing the water distribution system in Gorazde.

## First Impressions

On travelling to Gorazde we experienced a problem which plagued everyone, but especially the engineers, for the duration of our stay. This was the time spent at various Serb checkpoints en route to and from our destinations. At each checkpoint we were to show manifests of personnel, vehicles, equipment and stores. If these manifests did not tally up exactly with the copy held by the checkpoint guards (and they never did), we would be held up while the problem was bounced around the higher echelons of power. On the journey down we were held at checkpoint "Sierra 1", outside Sarajevo, for 7hrs. We made it through eventually and found ourselves at "Rogatica" some 12hrs later, where we were held for five days. It was soul destroying.

Once in Gorazde we found ourselves located on what was a pleasant green field site. Prior to our arrival it was a football pitch, and totally unsuitable for siting a camp to hold approximately 400 people; the location was chosen without an engineer recce. Although the site expanded into a factory complex some 250m x 50m, it was woefully inadequate. It had not been confirmed that we could use any of the existing buildings let alone the area surrounding it; the infrastructure was unsubstantial and existing drainage minimal, as was existing hard standing.

It was obvious the football pitch would create a multitude of problems. During heavy rainfall the thick clay soil would cause surface water to puddle and with constant vehicle use it would become a quagmire. However, there was worse to come: the sunbaked surface of the football pitch had lulled many into a false sense of security and, therefore, when advice to move to a more suitable locations was given, it was ignored.

## Provision of Purified Water

Initially, the major concern was to locate a suitable water source. The WPU (NBC) unit had already proven its value in Bugojno and was, over the next three months, to do the same in Gorazde. The source we found was the river Drina, one of the seven main waterways in the FRY and so more than capable of providing the volume required. The football pitch was approximately 200m from, and 9m higher than the level of the river, and therefore pumping from source to distribution point would require some thought. The job fell to members of the troop who, due to their experiences in Bugojno, tackled the task logically and a number of possible solutions was produced. Various combinations of pumps and storage tanks were tested and the eventual system was both simple and effective. Using the Grindex pump from the G1098 as a filter, water was drawn up to the WPU (NBC) by a source pump, situated 5m above water level. Once purified the distribution pump

pushed the water to the two storage pillow tanks in the centre of the camp. The tanks were located on a 1.5m high Hesco-Bastillion platform providing an adequate head of pressure to fill jerry cans and water bowsers.

This solution proved the distribution pump was capable of pushing water further than the "DS solution" of 100m. In our case the distance between pump and pillow tanks was somewhere in the region of 250m, thus showing that trial and error are sometimes better than relying on field engineer pamphlets and *aides-mémoire*!

### Other Initial Tasks

Whilst the provision of drinking water was taking shape other basic amenities had to be installed. Deep trench latrines needed to be constructed as there were no existing facilities which could be "adapted". We worked closely with the French engineers on this task. Whilst we had the light wheeled tractor (LWT) to dig the trench the French had the welding kit to construct a cover-from-view screen. This was one of the many areas where the LWT proved its worth. The back-actor was invaluable as a ditching and digging tool and its manoeuvrability made it an excellent tool to work on the narrow, steep tracks leading to the various observation posts (OPs).

### Power Supply

In addition to the provision of potable water and construction of latrines, the supply of power to OP facilities and field lighting kits also came high on our agenda. We had brought with us a 16/24KVA generator which was immediately put to good use reinforcing a smaller Norwegian generator already there; together their combined output proved sufficient to power the camp in its initial state, but three months later the generators were working to their limits due to the influx of additional power-consuming equipment. A power plan for the future camp was drawn up and relevant generators and associated stores were ordered. However, as with all other projects, the procurement of stores through the UN system is a long and laborious process. With the coming of winter the provision of sufficient power would become critical.

### Temporary Roadway

Once the essentials of water, power and latrines had been dealt with, attention turned to other tasks. First of these was the provision of a semi-permanent track through the centre of camp. Two days after we arrived the weather changed from beautiful sunshine to torrential rain. With constant trafficking by armoured personnel carriers, plant and other large vehicles, the surface of the football pitch quickly turned into an unworkable quagmire.

We used a local quarry for stone, although the term "quarry" is somewhat misleading; it was in fact a sorting area for river-dredged material which had been stockpiled, washed, sorted and graded into different sized stone piles. As the stone derived from the river bed, it was generally very smooth and although nowhere near ideal for road construction it was all we had so we had to make the best of it. The French employed their two tippers and two front-end loaders and we our S26 and medium wheeled tractors (MWT), and the end result, although not perfect, was better than nothing – traffic kept moving through the camp without getting bogged in. Although not making a good "pavement" material it did provide an excellent base for the cook's tent and the sleeping accommodation. It lifted the tents two or three inches above the surface of the pitch so that when it rained people were not eating and sleeping in a paddling pool.

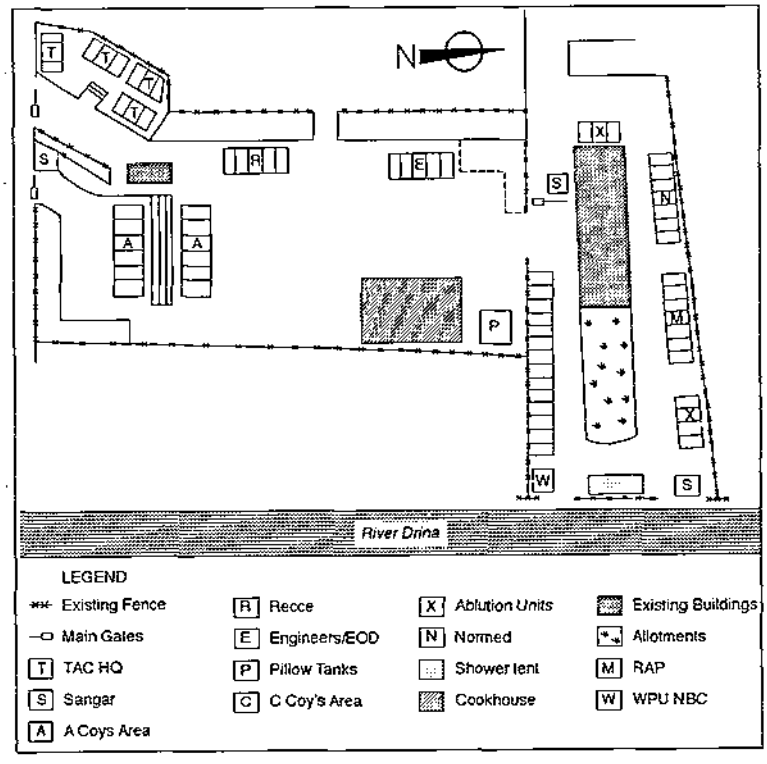
### More Permanent Construction

Having, on arrival, installed all the basic amenities and secured the camp from the inquisitive local population, attention now turned to winterizing and constructing a semi-permanent facility. By this stage it was obvious that the 30-day "national limit" for British forces in Gorazde was unlikely to be met and that in all probability we would be spending the rest of the tour there and others would replace us when we left. Using tents in the summer is all right and using a field latrine for up to 30 days is acceptable, but in winter when it would be raining/snowing and suchlike, these two options would not be advised if morale and operational capability were to be kept to an optimum.

With the absence of a Specialist Team Royal Engineers recce and camp design, the engineers on site had to start from scratch, so we put our heads together, produced a plan and stores bids, and work got under way. Knowing the problems with convoy reliability it was somewhat surprising when within a month the first accommodation and ablution units turned up.

The accommodation "flat packs" are easy to construct and locate, using a crane/wrecker, or a framework designed for unit erection which is supplied by the manufacturer.

Ablution units come as pre-constructed, stand-alone units whose location was determined by water sources and drains. In our case both sources and drains were to prove a problem. The water supply in town had been turned off for some months and the availability of drains on site was almost nonexistent. However, we managed to locate sufficient drainage in C Coy's area and resigned ourselves to using 5000-litre storage tanks mounted on "flat packs" on top of International Standards Organization (ISO) containers to provide a head of water. To link all this up we needed suitable pipework which, although ordered, had not been delivered. This was extremely frustrating; we had 13 ablution units and no piping to plumb them in.




Gorazde site plan. Not to scale.

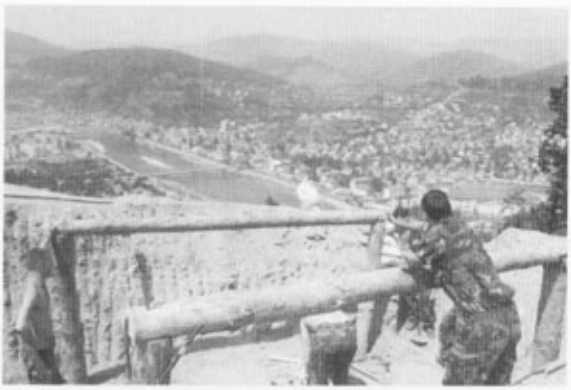
## Work Outside Camp

In addition to work in camp there was a number of jobs to be carried out in the local area, the most important being construction of OPs and checkpoints. When we first arrived and were establishing ourselves, a number of temporary locations was used by the infantry which changed regularly as more and more detail regarding the military situation materialized. More permanent locations could be constructed now the position of the confrontation line was fixed, and areas of vital and key terrain established. Both French and British forces were heavily involved in this work. As the French had 40 men, their contribution to the OPs was substantial. Each site required a hardened shelter, sangars, vehicle slots and as much security and protection as possible, mainly in the form of razor wire fences and earth bunds. Shelters were constructed out of local pine trees and polythene sheeting was used to weatherproof the structures. Although the end results often resembled shanty-town type structures they represented a great improvement to what was there before. Again the problem of resources plagued us, so improvisation and "make do" was the order of the day.

One of the locations, OP2, was ideally located, and constructed by the British contingent using the "make do" principle. This "log cabin" affair was dug into a ridge with a commanding view of Gorazde. Pine logs were used for the framework, aluminium vehicle sections for the decking and sandbags for general protection. A set of "National Trust" style steps was dug down into the shelter to finish it off. It proved an excellent section task which the men very much enjoyed.

## Track Maintenance

A second major task which involved plant assets was track maintenance. Routes up to the OPs were invariably steep, muddy and narrow. Saxons and Landrovers often bogged in. Again, the LWT proved the most versatile asset we had. It could get to areas which other vehicles, even Landrovers, could not. Its central pivot facility made it highly manoeuvrable; its back-actor and front loading bucket made it extremely flexible, and traction on the more slippery sections of track made it invaluable. The MWT on the other hand, although ideal for moving large amounts of material quickly on flat areas, proved too big,



OP2 under construction. This location had a commanding view over Gorazde.

cumbersome and unstable on steep tracks. Although used to some degree on the routes it was often left behind in favour of the LWT.

On one occasion the MWT slipped off a wet clay track and lurched precariously on an unstable slope. We secured the top-heavy vehicle with a tirfor Jack and strop, dug a channel with the LWT and extracted the MWT by driving it forward bit by bit whilst taking in the slack on the tirfor. Once it had moved forward slightly it slid into the channel we had dug and ended up on more solid ground. The ironic thing was that the MWT had been sent up the slope to extract a Saxon which was also bogged down!

These tracks will be a constant source of work. Due to the lack of resources and suitable equipment to improve and maintain the tracks properly, "patching up" the worst areas is all that can be achieved. It would not be a surprise if the next engineer contingent advised the use of horses and oxen with carts to transport equipment and personnel during winter!

### Tasks to Aid the Local Community

Jobs to improve the infrastructure of the town were also tackled. Our main effort was concentrated on the water purification works located on the outskirts of Gorazde. This system began with a dam and sediment trap upstream which was the first main filter. Water was then channelled into further sedimentation tanks, a chlorination facility, and finally supplied to the town by gravity feed. When we arrived the dam and sediment trap directly below, was saturated with fine sediment, the result of large volumes of earth washing out from the valley sides due to the considerable deforestation which has taken place. The LWT was used to dig out what we could. Two half-metre deep gullies were cut into the top of the dam to facilitate the flushing through of sediment in the future.

Further downstream the sedimentation facility was also in need of attention. The Bosnian Serb Army (BSA) had demolished most of the buildings, and one of the few that remained looked decidedly wobbly. It was deemed unsafe and we agreed to do a controlled destruction of the building. In this task the winch and spade of the MWT were used to great effect. A suitable area along the side of the road was located, cleared by the EOD section, and the MWT driven into place. The spade was lowered and the winch rope attached to a four legged strop which in turn was connected on to a particularly weak area of the building. Then, with cameras at the ready, the winch was set to work. After several attempts, and some work with the sledge hammers, the building came down. Again the plant assets had proved their value, and we cleared the rubble away so that the civilians could start reconstruction.

One task outside the camp which we carried out on more than one occasion was the recovery of bogged in Saxons. On at least three occasions Saxons slid off the road and ended up on precarious slopes awaiting extraction; luckily only minor injuries were experienced by the unfortunate crews. The extraction often fell to us rather than the light aid detachment (LAD), due to the fact that their recovery vehicles were often too large for the routes. The LWT, and even the MWT with winch, could often get to the stricken vehicles but the LWT proved the best and, accompanied by some field engineer common sense, the Saxons were always recovered – much to the LAD's dismay.

### Problems

In retrospect, a great deal of work was completed both in and outside the camp at Gorazde, despite

the problems which bedevilled us throughout and which will affect any unit going into the area.

The first and most serious of these was the lack of stores obtainable through the official system. Equipment frequently took several months to arrive, was often incompatible with other equipment being used, and incomplete on receipt; because of this many jobs could be started but not finished. The situation was further complicated by the fact that at least 50 per cent of convoys from Bugojno and Sarajevo were cancelled which was extremely frustrating, inconvenient, and had an affect on morale. For many, the convoys offered the only link they had with what was going on elsewhere. If mail was constantly held up and fresh rations ran out, forcing a return to Compo, morale soon deteriorated. The BSA dictated what we had brought to us and when. By letting this less than satisfactory situation perpetuate itself the UN showed how powerless they really were. Nobody should underestimate the effect lack of mail can have on the men.

The second major problem faced by all, not least the engineers, was constantly changing plans. What was decided one day was often altered the next due to the political situation; it was unavoidable. For example, the locations of OPs changed regularly, reflecting the constant repositioning of confrontation lines. This could mean recently completed work was no longer required or that materials or a completed construction might have to be moved elsewhere; a large degree of flexibility was required.

## Conclusion

In conclusion, my time in Gorazde taught me many things about troop commanding, construction and the way the Army runs and conducts itself when on an operational tour – a learning experience far more valuable than any course. The men within the engineer detachment, without doubt learnt many things about their own trades and skills. Plant operators were in constant use and became extremely efficient with their machines. The artisan tradesmen had to think about practical solutions to problems, such as plumbing and electrics, adapting what they had been taught in a "luxurious" training environment. They used their common sense constantly and improvised outstandingly on a number of occasions. The B1 combat engineers proved invaluable; their ability to get the job done despite adverse conditions was admirable. Everyone felt frustration and isolation when convoys failed to get through and stores and equipment were not forthcoming, but they still persevered to get the job done to the best of their ability. This, combined with ever-changing plans, taught everyone the necessity of flexibility in their approach to work.

In addition to all the foregoing, plant assets were invaluable, being heavily involved in some shape or form in 80 per cent of the work carried out. Life would have been considerably more difficult without them. Lastly, the need for good logistic support was paramount. It is so often taken for granted but, when you are in such an isolated area, the importance of regular supplies and a well organized and well run logistics chain is highlighted.

Looking back to the troop commanders' course, I realize that there is a considerable difference between training and real life tasks. In Chatham we always had the correct stores and equipment in the right quantities, in the right place at the right time. Everything seemed to work like clockwork. In reality, more often than not, a situation requires improvisation and adaptability: getting "hands on" experience and learning by your mistakes is an excellent way to acquire these abilities. With these skills abundant within the troop, solutions were nearly always found. In short, the tour was extremely beneficial and one I am glad to have been a part of.

# Op Grapple 4 – The Tito Challenge

CAPTAIN R C THOMSON LLB

*Captain Cameron Thomson was commissioned into the Corps in 1992 and after completing 108 Troop Commander's Course was posted to 5 Field Squadron, 22 Engineer Regiment in Perham Down, Tidworth. He has completed tours of Norway and Cyprus and in April 1994 was attached, with his troop, to 61 Field Support Squadron for Operation* Grapple 4. *Cameron Thomson is posted to 25 Engineer Regiment in July 1995.*

## Introduction

On 12 August 1994 a Troop of 30 Sappers from 61 Field Support Squadron (61 Fd Sp Sqn) deployed to Mostar and, with SPABAT (Spanish Battalion) engineers, bridged the River Neretva at the "Tito" bridge site. The bridge, a two-span 270-foot MLC 60 extra wide Bailey bridge (EWBB), was funded by the Overseas Development Agency (ODA) and is indicative of the role that Sappers have fulfilled in Bosnia for the last two years. That is to create and maintain the infrastructure necessary for the delivery of humanitarian aid.

## Task History

Mostar lies on the main route connecting Sarajevo with the Adriatic coast. The River Neretva divides the city between the historic Muslim east and the more industrialized west which, bar one enclave of 8000 Muslims, is Croat. Before the war, east Mostar was largely dependant on the supply of services – particularly electricity – from the west. The destruction of all five bridges crossing the Neretva therefore had a disastrous effect on the Muslim's quality of life, particularly for those living in the enclave. After the destruction of the original "Tito" bridge, the Muslims in the enclave were effectively besieged with no regular supply of power or running water; conditions were such that in 1993 the American International Rescue Committee (IRC) funded the construction of an EWBB on the "Tito" site by Muslim engineers. However, that bridge remained open for only a few months. In May 1993 the Croats launched an offensive and by the end of June had so damaged the bridge that it ceased to be effective as anything other than a pedestrian walkway. This interfaction fighting continued in Mostar for a further eight months until 23 February 1994 when the Muslims and Croats agreed to a cease-fire. Bridging the Neretva then became the priority for the newly instituted European Union (EU) Administration of Mostar, which worked for the next three months with SPABAT – in whose Area of Responsibility (AOR) Mostar lies – to develop a construction plan acceptable to both sides.

## Planning and Reconnaissance

Operation *Grapple 4* Sappers first became involved in the plans to rebridge the Neretva in May 1994. A feasibility study of the potential bridge sites discovered that only the "Tito" site was suitable for military equipment bridging. The EU administration then approached UNPROFOR Sector South-West (SSW) requesting engineer assistance to rebuild the bridge subject to ODA funding. The CO allocated this task to 61 Fd Sp Sqn based in Tomislavgrad (TSG) and a series of site recces was conducted by the author and the



Captain R C Thomson
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RSM. To bridge the "Tito" gap would require a broken-span EWBB comprising a 14-bay double double reinforced (DDR) span and a 9-bay DDR span supported on a 30ft 3-tier equipment pier.

During the site recces it became obvious that the actual build would be the least problematic of the proposed operation's phases. Due to the extensive damage that it had suffered, stripping the IRC bridge – a broken span EWBB comprising a 14-bay Triple Double Reinforced (TDR) span and a 9-bay Triple Single (TS) span – would be both time-consuming and potentially very dangerous.

Three options were considered: a conventional delaunch, a separate delaunch of the two spans to opposite banks, and finally a demolition.

The first one was automatically precluded by the condition of the bridge; the span-junction posts had been so badly damaged that the spans could not be reconnected to form a continuous bridge thus preventing a conventional delaunch. A separate delaunch of the spans, though possible, was not recommended; too much time would be needed to construct counterbalance bridges onto both spans. Booming such a badly warped bridge over rollers would be inherently difficult, and soldiers cutting the junction posts to separate the spans would be at considerable risk. Recommended was demolition by explosive means, provided that SPABAT and local police forces could satisfactorily clear the danger area.

Using no more than 140kg of PE4, the spans could be cut in seven places causing the bridge to fall into the gap in 3-bay sections. With an oxy-acetylene torch these could then be cut into more manageable sizes and recovered using a Foden recovery vehicle and SPABAT's 25t crane.

### Preparation

The squadron became a hive of activity as it prepared to support a second major deployment outside its AOR. EWBB and demolitions training were carried out at a site near TSG with SPABAT engineers and a half-section detached to Engineer Resources in Split to check and prepare the EWBB sets. In TSG, stores' lists were checked and rechecked while the author and the RSM took all section commanders to the site to ensure that they were fully familiar with the task ahead.

### Execution

By 22 August the administrative area had been established and a tented camp erected in the ruins of the Neretva hotel. While one section continued to prepare the 32 DROPS (demountable rack offloading and pick-up system) racks of EWBB sets, the remaining two began the hard and dangerous task of removing the decking, walkways and battle debris from the bridge. The bridge was so badly warped that the majority of decking pieces could only be removed with a chainsaw. Furthermore many stringers were no longer secure and were merely seesawing on the transoms – these were tipped into the gap. The majority of the decking was recovered and by 26 August the bridge, stripped of all but its structural members, was ready for demolition.

Preparing "Tito" for demolition.

Explosives were moved from TSG to Mostar under escort, arriving at 0800hrs. Work started immediately, with two sections fixing charges using mine tape tightly wrapped, and the third preparing charges. With temperatures varying between 30°C and 40°C, personnel were at risk from dehydration and heat exhaustion, especially when wearing helmets and flak jackets. Rotating the three sections therefore provided personnel with the opportunity to cool down and drink some of the 15 litres of fluid that was the average individual daily consumption during the task.

From 0800hrs on 27 August, SPABAT and the local militia began to clear civilians from the danger area, within a radius of 300m from the

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The "Tito" bridge 90 per cent completed.

bridge; further out to a radius of 1000m they were ushered into shelters and basements. Concurrently an 845 Squadron RN Sea King overflew the areas to check they were clear.

Meanwhile, from 1000hrs onwards the bridge site itself was invaded by the press and at times it seemed that all the journalists and photographers were intent on getting in the way as much as possible. However by 1130hrs all personnel bar the firing party had been cleared, and on the orders of the CO, the demolition was armed, and fired at 1208hrs.

Contrary to all expectations, given the number of charges involved, no blinds were found by the author or SSM after the demolition, and recovery of the wreckage from the gap began immediately. Using SPABAT's 25t crane and the Foden, 90 per cent of the wreckage was removed during the following six days. Much of the wreckage on the west bank could easily be dismantled by hand and craned out of the gap. However on the east bank, the bridge sections had become entangled when they had fallen and had to be cut by a welder before the crane could lift them. For safety reasons, a cage was constructed to contain the welder and his gas bottles and craned over the bridge wreckage. From this cage the welder, who was also attached by his safety harness to the crane's hook, could safely cut the bridge into sections without having to worry that the section he was cutting might fall on to him. Admittedly this was a slow process, but the extra care taken on all phases of the task paid dividends in that the troop recovered from Mostar without having suffered so much as a hammered thumb.

On 3 September, when the build should have started, it was discovered that a water pipe in the home abutment had fractured and that water seepage had begun to undermine an area 10ft back from the gap. This setback did not actually delay the task as the pier had to be fully constructed before setting out could begin. However its long-term implications for the strength of the bridge were a source of great concern even after the pipe had been blanked off. In order to guard against the risk of future undermining of the abutments, the author and the RSM decided to redesign the bridge and spans were increased to 15 and 10 bays DDR respectively, giving it a total length of 270ft, which included the cantilevered DDR bay and span-junctioned DS bay required for the 15 bay span.

After the pier was completed on 5 September, work on the bridge spans began in earnest. Given the importance of launching a broken span bridge on a level plane, a full day was allocated to setting out and levelling the construction rollers, using a theodolite to the level of the heavy rocking rollers positioned on top of the pier. The setting out having been completed accurately, the bridge's 10-bay launching nose and spans were constructed with little difficulty.

SPABAT engineers threw themselves into the bridge construction with an admirable and even alarming enthusiasm and very quickly formed cohesive and effective sections with the composite troop of Sappers. The "Tito" bridge was jacked down, ramped and decked by 10 September leaving the troop free to check and recheck for bent nails in the wearing course, missing panel pins and to tighten any bracing loosened during the launch, in preparation for the bridge opening ceremony on 12 September.

## Conclusion

On 12 September, Herr Kosnic, the EU administrator, opened "Tito" bridge to vehicular traffic thus connecting east and west Mostar for the first time in 15 months.

The third bridge to have occupied that site in as many years, its survival is ultimately dependant on the people of Mostar themselves. However, it should be seen as a significant step forward in the peace process and will prove invaluable in creating the conditions necessary for the city to return to normality.

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# One More River

# Some Personal Reminiscences About Burma

BRIGADIER JOHN CONSTANT

In the spring of 1944, I was in Cocanada, on the east coast of India, training Royal Marines to carry out beach landing operations at night; under other conditions this task might have been a fairly straight forward assignment, but the shallows in which they had to land were infested with venomous sea snakes which often proved fatal to the local fishermen with their bare feet, and were discouraging for all of us who had to do the night-landings.

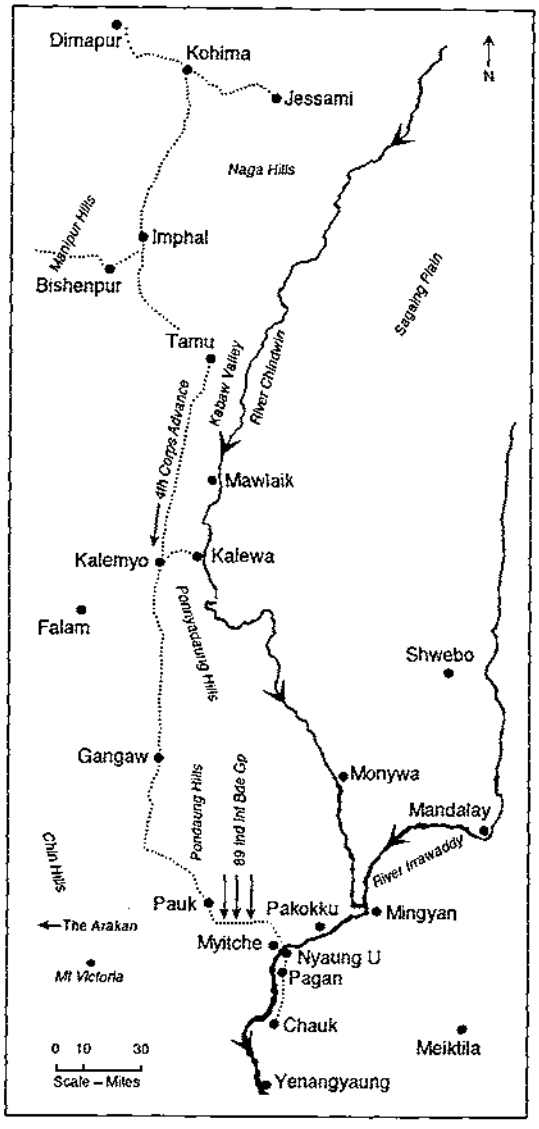
Soon afterwards, I attended a short "CREs course" at the Indian School of Military Engineering (SME) at Roorkee. There, I met Tom Foulkes for the first time; he was a well-known figure in India, having been with the Royal Bombay Sappers & Miners for some 14 years. With his experience of Burma, he told us about the great rivers there, especially the Chindwin, the Irrawaddy, the Sittang, and the Salween, which we should have to cross when we started chasing the Japanese out. In particular, he mentioned the problems caused by annual floods altering the course of rivers, cutting the banks here, silting up existing banks there, and creating new shoals almost everywhere so there was always a danger of ferries going aground, even in the middle of a great expanse of water. Hugh Wakely was the instructor in bridging at the SME, and the three of us spent several evenings discussing methods of dealing with these problems.

The course ended, and I returned to Cocanada posthaste to find that it was to close its training role forthwith, and that I was to take 161 officers and men of 78 different corps and regiments of the British and Indian armies, with 87 vehicles of 29 different makes and types right across India to Juhu near Bombay. We drove this "circus" as far as possible each day, bivouacking for the hours of darkness wherever we could find suitable space, and self-contained for rations in spite of all the ethnic prejudices and religious customs to be observed. After four days on the road, we reached Juhu and I found that I had already been posted to Burma, and was to fly there the next day. Flying from Bombay, with stops at Dumdum near Calcutta, at Comilla and at Imphal, I was then driven to Kohima in Assam, where the battle had just ended and my new job was already vacant. I shall never forget the appearance of Kohima, when I saw it for the first time. The severity of the battle, with its continuous shelling and mortar fire, had stripped all the leaves and twigs from the few trees still standing.

It was not to be a sapper appointment at all, but filling the post of brigade major 89th Indian Infantry Brigade, a part of 7th Indian Division. On the way there, I had reported to the divisional commander, Major General Frank Messervy, whom I knew from his time as general officer commanding 7th Armoured Division in Egypt. As I arrived, tired and sweaty after days of travelling, he greeted me cheerfully with the words, "Well, John, you may think I made a bit of a b**** of it last time, but you'll find I know what to do here." His modesty and charm quite overtook me, and I enjoyed his many visits to brigade HQ then and later, during the battles in Burma as corps commander. In the latter role, one of his more distracting habits was to insist on playing liar-dice at the same time as I was trying to conduct brigade operations on the command net.

The jungle was infested in many places with ticks, carrying typhus from which many died, weak and emaciated as they were from the long drawn out struggle. However, when I joined in the summer of 1944, the division was in reserve, resting and refitting after months of fighting in the Arakan, whence they had flown to Assam, mules (five kicking creatures to a Dakota) and all. Our brigade, camped out strategically in case of Japanese resurgence, consisted of the usual Indian Army's ethnic mixture: British (2 Kings Own Scottish Borderers (KOSB)), Indian (1/11 Sikh) and Gurkha (4/8 GR). We also had, at least for the time being, 7/2 Punjab, as well as our service units including 400 mules. Close by were both a British field and an Indian mountain artillery regiment; the personnel for brigade HQ were found by 8 Gurkha Regiment (8 GR) and the men for the signal section were Sikhs. Our defence company came from the Maharajah of Baroda's State Forces; no sappers, as they were all concentrated elsewhere.

The brigadier was British, but one hundred per cent Indian Army – Dogra Regiment. A fine




Map of area covered in article.

figure of a man but somewhat shy; nevertheless we got on very well, and he rarely criticized me. He was a great believer in staff officers getting out and about, and welcomed my willingness in this respect, so it became my habit, whenever possible, to eat lunch with the soldiers, messing by companies, so they knew who I was.

By chance, I knew something of 8 GR, because their depot was in Quetta and I had met many of them when I was at the staff college there. In contrast, I knew little about 11th Regiment of the Indian Army, who were all Sikhs (unlike Punjab regiments which had companies of different religions.) Ours was their first battalion, and they were very proud of it. The senior Sikh officer, the *Subedar-major*, a real father figure, was old enough to have been my father, and this was epitomized by the fact that he had been fighting on the Dardanelles when I was born.

For the first few months, the principal task was to get everybody away on leave, in instalments, since it could take as much as three weeks for many to reach home. I felt sorry for the British, for whom "leave" meant just a different part of Asia; many, like myself, had not seen their families for four years.

By the time most had come back, reinforcements had replaced our casualties and deficiencies in equipment had been renewed, so training started in earnest with just one weekend break, when the nearby British 2nd Division held a joint sports gathering with ours. Among the highlights of the occasion we all enjoyed was the magnificent sight of the combined pipe bands of both divisions beating retreat, with all Scots wearing the kilt. In preparation for this, great efforts had been made, not all of which were welcome to me. All four of the infantry battalions surrounding brigade HQ had pipers, and each chose to practise on our side of their camp – such a cacophony ensued!

Another brief respite from training occurred when Admiral Mountbatten, supreme commander of Allied forces in southeast Asia, presented medals won by members of our division. The spit and polish was commendable and all ranks were elated to witness the display, which included a gallantry medal for one of our 4/8 GR soldiers.

One of the objects of our operational exercises was to increase our endurance on night marches in the jungle, where bamboo grew so fast that paths cut through it one week had grown up again a week later. The leeches were merciless, penetrating the folds of our puttees to feast off the blood of our legs, sometimes leaving their fangs in the flesh to fester; even after medical care this usually left a scar. There were many other insects and reptiles, but the most dangerous were malaria-carrying mosquitoes, so we all had to take our dose of mepacrin daily; this required good discipline and, in the hope of discouraging the Indian and Gurkha soldiers from taking theirs, the Japanese spread false propaganda that the mepacrin pill destroyed a man's virility.

I should, perhaps, mention that this part of Assam was sparsely populated, with thick bamboo jungle

occasionally interspersed with small open areas of primitive huts and vegetable plots for the Naga families, who wear little or no clothing, and keep dogs as a source of meat to eat. They have a habit, which terrified a detachment of three RAF men, manning an early warning radar on a spur some way to the east of us. One morning the RAF men woke to see seven Nagas, in single file, with upright spears on each of which was the head of a man from the next village raided by them in the night; apparently an annual occurrence.

A feature of infantry subunit training, which proved most effective, took the shape of each of our infantry platoons cooperating with a troop of Sherman tanks; the technique had developed from previous jungle campaigns. It was found that the murderous automatic fire from a Japanese bunker could be countered by a single tank, firing smoke, then solid shot, at the bunker, while a section of infantry advanced close behind it. The section commander kept in touch with the tank commander by telephone as they advanced together. When the Japanese were concentrating wholly on the tank, the infantry would swoop out and attack the back of the bunker with grenades, flushing out any survivors and killing them. Individual training concentrated on being able to avoid detection even as close as 50yds, at which distance it was considered essential to be able to kill a Jap soldier with one shot. Accuracy of aim and conservation of ammunition were vital.

Admiral Mountbatten, supreme allied commander SE Asia, presenting a gallantry medal to a rifleman of 4/8 Gurkha Rifles.

For a while, a totally different aspect of training included the provision of mock-up gliders, as we were told that our brigade was to be used for a *coup de main* operation behind Japanese forces in Burma, and the soldiers had to practise tactical deployment from these. Whether the whole ploy was a ruse to confuse the Japanese High Command, or whether plans were changed, I do not know; however, on several subsequent occasions when we were walking south through the jungle, Gurkha soldiers would raise the matter to emphasize that they had not been fooled, and felt they were destined to use their feet. They have a pleasant sense of humour!

Knowing how dependent we were likely to be on the Allied air forces, I spent a week with the nearest RAF group HQ, to be sure I understood, in detail, the way in which any calls for direct air support were handled, and what options were available in various circumstances. I also flew in Dakotas, to help push out supplies to units of 5th Indian Div on the feature known as the "Chocolate Staircase", a mountain of unstable shale and mud. When dropping to a unit in a narrow glen near there I realized, as a private pilot myself, how difficult it was to turn a fully laden Dakota through 180 degrees, when the valley itself was not wide enough.

The time approached for us to leave Kohima for operations south or east of Imphal, and a series of parties were given by officers of each unit, with plenty of rum available. At one of these in Imphal, given by a Nepalese (ie **not** Gurkha) unit called Mahinda Dal, they had hired the famous court dancers of Manipur for the evening's entertainment; the dancers were exquisite teenagers with elaborate costumes. The Nepalese antics intrigued us too, they were quite in contrast to the rough games usually played in a British officers' mess on such occasions. At the last one of these, before we started our long march, two of my ribs were broken as we were brawling. Our French Canadian field ambulance commander "comforted" me by saying that there was no better cure than marching with a heavy pack; how right he was, they have never given me any trouble in the 50 years since! My abiding memory of our position, almost 10,000ft above sea level on the hills near Kohima, is the

My batman, war-horse and syce.

view north, right across the Brahmaputra Valley to the Himalaya mountains, with Kanchenjunga sticking up like a great "tooth" above the others.

Just as Christmas approached, we were favoured for the first time by an Entertainments National Service Association (ENSA) team of entertainers, including a couple of intrepid Australian girls, who made our young hearts beat.

Our division started south past Imphal and down to the valley beyond Kalemyo – well over 200 miles of bumpy, dusty "roads" – which the majority of the soldiers suffered in the back of general service lorries. Part of this journey passed down the notorious Kabaw valley, for which we had yet another inoculation this time against Black Water fever. It might be a matter of some interest to sapper readers that two parallel ditches had been dozed for nearly 20 miles right through this swamp, and the spoil heaped high onto the ground between in the classical manner. As soon as it had drained, and consolidated, it was waterproofed with bituminized hessian and withstood the passage of thousands of heavy vehicles and two armoured brigades on transporters.

As we approached Kalemyo, I took the muddy track down to Kalewa, where the river Chindwin had recently been bridged by sappers of 19th Indian Div. In order to release it for refurbishing and reissue Corps troops engineers were replacing the pontoon equipment with locally manufactured pontoons of a much more robust design, ready to take heavier loads in bad weather.

Returning to brigade HQ in the jeep with my driver, batman and gunman, all three Gurkhas, we suddenly saw a pile of footballs on the empty track ahead. Deeply suspicious, we stopped and realized that an elephant had just passed. The Gurkhas had an earthy sense of humour, and there were many occasions thereafter, when these three would remember that incident and laugh about it. I found the Brigadier most interested in my account of the Chindwin bridging, and he admitted he would have loved to be a sapper.

The next day we said goodbye to our vehicles and just before we started marching along the Gangaw valley, we enjoyed a surprise visit by the army commander, General "Bill" Slim. It was quite informal; no parades, no spit and polish. I had not previously met him and found him to be rather dour, but he had a wonderful reputation as a fighting man, and we all appreciated his making time to see us off. The brigade was to go ahead of the division, dividing into three battalion groups, moving in parallel columns on forest paths, still almost due south through the Ponnyadaung, later Pondaung, Hill features towards Pakokku.

The Gurkha group was on the left, and the Sikhs on the right, while brigade HQ was in the centre column with KOSB. That night happened to be 31 December 1944, and in the moonlit open forest, the Scots celebrated Hogmanay as best they could, without noise and lights, and but a limited supply of liquor. At the Brigadier's suggestion some of us moved independently among the soldiers, chatting quietly about their homes and families.

We had acquired an intelligence platoon of Anglo-Burmese, who served an additional purpose by providing an occasional source of good toddy, when they knew of a tree in the right condition. Although **we** never saw any women, these Anglo-Burmese used to collect any parachutes, deemed to be unserviceable, to swap with the village girls in exchange for information about the Japs.

These days were spent in extreme simplicity, with a lack of any creature comforts, so that our only means of transport, the mules, could be almost entirely laden with ammunition. Not even a spare pair of boots was carried although replacements could be demanded in the daily airdrop. We each carried a pack with a change of underclothes, our wash bag, one blanket, a poncho/groundsheet, and two days' hard ration, as well as a kukri, two grenades, 15 rounds of ammunition and our personal weapon – in my case a USA .300 semi-auto carbine. We marched in tactical formation for about six hours each day, with the imperative of reaching the dropping zone by 1400hrs, to ensure the resupply was gathered before our starving Japanese enemy could grab it. As an all-drinking brigade, the occasional loss of the rum ration was felt deeply, and the mail drop often seemed to go

astray. The meat ration was frozen, and fodder for the mules was dropped free hitting the ground with an almighty wallop.

Late on the second day a Japanese Zero fighter appeared very low overhead, no doubt hoping to intercept a heavily-laden Dakota. We had no anti-aircraft guns, so used every available Bren light machine gun. This drove him off but not before he had made a couple of strafing runs. Few, if any, were hit but several suffered terrible pain from bamboo splinters which were tiresome to extract.

Although we observed wireless silence, our signallers kept watch all night for the three or four encrypted messages usually expected. As soon as each was deciphered I was woken to check whether it demanded immediate action, since most referred to the day ahead. It was always a problem to concentrate one's bleary eyes, with a minute electric torch under the blanket, and decide whether or not to disturb the brigadier, who was 15 years older than me and I felt had to be cossetted. I hesitated ever to wake him, and usually took whatever action appeared appropriate; there was only one occasion when I was reproved for **not** waking him, and even then he agreed with the action I had taken.

In brigade HQ, we rarely saw any live Japanese, but our patrols killed a few each day, so we knew that they were keeping our movements under observation; one day we found a signal cable lying on the ground and tapped into it to hear them twittering away in excited tones; however none of us could tell what they were saying and the nearest interpreter was six hours away.

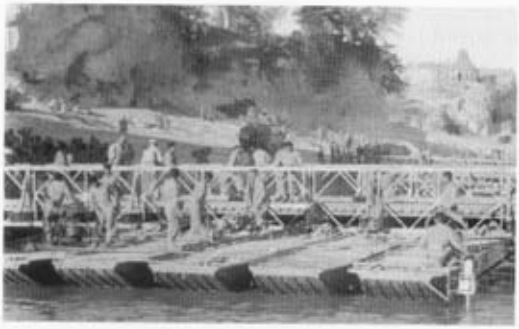
Being unable to communicate directly with our outlying columns, each sent a small patrol across in the afternoon with their routine report, returning with operation orders, which one day involved our Gurkha battalion in having to make a night march to occupy some vital ground about ten miles further on – no mean task. The brigadier knew that this would cause trouble, as the battalion commander was a man of strong views, who became a full general about 20 years later. I was ordered to take two horses, with a sikh syce, and go back with the patrol to emphasize that the night march was **essential**; I was told to be back before dark but to have extracted a firm compliance before that. It proved as difficult as we had anticipated and darkness fell as he was still arguing, but I had to remain obdurate. At last he agreed, so the syce and I galloped the four miles back. Just as we were close, a fusillade broke out as one outpost of the defence company lost his nerve and fired into the dark. His unit

My signallers, with egg-laying hen.

already suspected that some Japanese were shadowing them; how right they were. The Japs opened up, as did more of the defence company. Fortunately, neither of us nor our horses were hit, as we continued to gallop to safety. The incident served to remind us all that we really were being watched. In subsequent years, I have often wondered whether I had the dubious distinction of being the last British officer to ride a horse "in battle"?

With our 400 mules, the Irish vet was kept very busy, and when one of the cantankerous creatures slipped on a narrow mountainside path and fell 100ft or so, he climbed down to put the beast out of pain; but it was already dead. He thoughtfully cut out its liver so that we could enjoy some fresh meat as the weather had precluded any air drops for the

"She says: 'Do send me a picture of yourself in your lovely green uniform, so that I can think of you as you really are.'"



Pontoon equipment raft for one Sherman tank discharging below the fatal cliffs at Nyaung U.

last two days. We all enjoyed the liver except the intelligence officer, who came from South Africa and told us they had had to eat their mules at the Siege of Mafeking (AD 1900) and that no South African would do it again. He was a pessimist by nature, so we called him "Sunshine". His sense of humour was exemplified by his remark one very cold night, when the blanket each of us carried was proving quite inadequate; "So this is the tropics" he said, and caused us all to check our maps, to find that we had reduced our northing to 22 degrees.

While our brigade was outflanking the Japanese detachments trying to hold successive defence positions on the forest lane between Kalemyo and Pauk, the rest of the division and all of its engineers (except the one section of doughty Madras sappers with us) were opening it up into a route capable of carrying the whole of 4 Corps, including an armoured brigade of Sherman tanks on transporters, and the earthmoving plant required to build a forward airstrip which could be developed into an airhead for landing RAF Dakotas and US Air Force Curtis Commando aircraft of their Combat Cargo Task Force.

Our mission remained that of reaching the River Irrawaddy to secure prospective bridging sites, and to prevent the outflanked Japanese troops getting across the river to reinforce their units there. We succeeded and were ready to receive our vehicles as they came down the new "highway" with the main body of the division. As our presence in the jungle had been detected, we had lost the initial element of surprise, but the Japs had never realized that we were advancing in such great strength. As well as the advantage of air supply, our firepower was greatly increased by the offensive support from the air, controlled so accurately from the front line by a RAF pilot and his signaller, just like an artillery forward observation officer. Almost always we used the same technique for winkling out the "last man, last round" Jap bunkers, setting them alight with napalm, followed by parafrag (air burst shrapnel) as they stumbled into the open: this accurate targeting never failed and ensured that those Japanese were not available to withdraw for another fight.

As soon as we had secured the bank of the Irrawaddy, preparations for its crossing built up apace. I was sent to examine the tactical aspects of all likely places for launching boats and rafts. These included a mud bank bigger than a football field, covered in low vegetation. As a good view of the opposite bank could be obtained from there, the Sikhs had extended their flank to occupy it, and I went with the company commander, flat on our bellies for concealment, to watch for Japanese movement. What we observed was not Japs but a bullock cart. That night, the Sikhs found enough country boats to send a strong fighting patrol across, manhandling a mountain gun onto the bullock cart we had seen. Dragging it to a suitable position they fired four rounds in the direction of the supposed Jap unit HQ, then back to our side of the river; later, we heard from friendly sources that the Japanese had spent a sleepless night looking for the gun.

After dark on 13 February 1945, it was our task to set up an elaborate traffic control system on the plain west of Pakokku, so that the unending (or so they seemed) elements of the bridging train could be brought to their appropriate bank sites, ready for assembly by first light. So tight was the planning and issue of equipment that the essential outboard motors (direct from the USA) were flown into the battle area with no opportunity for proper testing and preparation. After one company of 33rd Indian Infantry Brigade (33 Bde) had paddled silently across the mile-wide river with complete surprise, the next two companies were to follow before first light, using the outboard motors. However, some could not be started, delaying departure, and more broke down on the way across. Surprise was lost and first light revealed their exposed position, and the Japs opened up with medium machine guns concealed within caves on the Nyaung U cliff face. Both company

commanders were killed, as was one of the sapper officers with them; only two assault boats reached the beach, and that wave was effectively aborted, with hapless crews trying to paddle sinking vessels across the 3-knot stream under fire.

Nobody thought of St Valentine, in the few minutes after first light when all seemed to be chaos; boats were moving in every direction, and bodies were being dragged from the water. My intelligence sergeant succeeded in swimming back, unwounded.

In the cool morning light, the guns of the division opened fire to destroy each Jap position as it was identified, and this was soon augmented by a "cab rank" of ground attack aircraft. As 33 Bde rallied, a wave of rafts made of folding boat equipment was quickly on its way, reaching the far shore with minimal casualties this time. A little D4 bulldozer landed and trundled up behind the cliff to bury the Jap bodies where they lay at their posts. It had all happened quickly, and the leading infantry were fanning out from the bridgehead as sappers completed all the folding boat rafts and went on to the much slower task of launching the pontoons. By nightfall the whole of 33 Bde was over, with a few tanks, and some of our brigade as well; the rest followed the next day.

Our brigadier could not wait to cross; he was successful in getting over on D-Day to reconnoitre the battlefield, and to have a good look round Pagan, the ancient capital of Burma, with its famous Shwezigon pagoda. He was taking a great risk, as wounded Jap soldiers would crawl into the doorways of the pagodas, lie there until one or more members of our forces passed close enough, and commit suicide by letting off a hand grenade hoping to kill or wound our men. This was considered to be "honourable", avoiding the shame of being captured alive. It was a particularly nasty custom, as in many cases it was one of our stretcher-bearers or a first aid medic who paid the price!

Having reached the river ahead of all other troops, it was galling to have to wait so long to cross. However, the pause gave me time to remember the achievements of the previous seven weeks, including our move of nearly 600 miles through the twisty lanes we had to call "roads", and inevitably to give thought to the battles looming ahead particularly those of crossing the Sittang, Salween and what beyond; would we reach them before the summer floods?

This operation at Nyaung U went on for days, as the forward troops raced ahead in open savannah to make sure the Japs could not bring guns within range of the crossing; and the whole Corps with its

Our first Jap captured live.

armoured brigade debouched through the bridgehead, on their dash to the Meiktila airfields.

Our task then became one of slogging our way southwards down the east bank of the river, with an east African brigade on the west. With little resistance at first, Japanese defences soon hardened until one night they put in a two-company counterattack on the Sikhs, just in front of brigade HQ. As it was beaten off, the rest of their battalion went through exactly the same tactics and failed again; the noise was unbelievable, and the brigadier was furious when he found that the Sikhs had gone through the whole of their first line ammunition. They always liked excitement.

I might mention that the Gordon Highlanders 10th Battalion had been raised as antitank gunners, and were with 2nd British Div. Now we found that the 11th Battalion were in Sherman tanks, and in support of us. We prayed that the two units would not let their rivalry become lethal! Of some 550 men in that unit, I believe that 286 enjoyed the surname of Gordon, and so many were "Jamie" that they used to address one another by the last three figures of their army number. They were great soldiers.

Our air support was a model of efficiency. At the appropriate seniority in each air formation HQ, the operations staff officers allocating the air strikes had been students with me at the Indian Army Staff College, and were always most helpful. Not only did they produce the strikes, but they also had one Hurricane adapted for spraying insecticide over the defeated Japanese positions, where their occupation had been so unhealthy.

Having mentioned that the Sikhs always wanted their attacks to be noisy, it was a complete contrast to find that our Gurkha battalion preferred silence. Time and again, they would carry out a successful operation, by mounting vigorous recce patrols across their whole front, while one fighting patrol took a

wide sweep well clear of the enemy. This was followed by the rest of that company, and in turn, by others until the whole front had been handed over to the KOSB, while all the Gurkhas had moved round to the rear of the enemy ready to carve them up, first by using their kukris on any individual unlucky to pass, and then the whole battalion together, with the bayonet. This left a grim sight next morning.

These Gurkhas had such a strong sense of personal honour that one of them, in the rank equivalent to sergeant, was so upset when his valour was questioned that he went absent for two days, much to everyone's horror fearing he might have been captured: a cruel fate indeed. He reappeared in front of his commanding officer holding out the head of a Japanese officer, cleanly severed and quite fresh. His valour was never questioned again.

As we approached Chauk, our gunners played a wicked trick on us. The commander Royal Artillery had got hold of a 7.2in Howitzer and some ammunition, each round about 200lb, with a range of 11 miles. Since the Japs did so much patrolling at night, they were understandably tired and usually had a siesta after lunch, especially those behind their forward defensive localities. Our gunners used that period to bring this monstrous weapon right forward to the brigade HQ area, quickly loosing off a few rounds into the enemy, and departing again – shoot and scoot! – and what an awful noise. This used to infuriate the Japanese, who retaliated by bringing down as much gunfire as they could onto us.

Great bravery was shown throughout the brigade, but we felt special admiration for the medical staff in the field dressing station. They had both surgical and transfusion teams, so that the wounded could be given the earliest surgery and painkilling drugs. Whenever the enemy shelled our area, we could sink down into slit trenches, but the medical staff would usually carry on operating, as it could be lethal to patients if they stopped. The staff had the additional fear that if the Japs broke through, they would bayonet the wounded, as they had done to that same field ambulance the year before in the Arakan.

We also had a little known American unit of men, who exhibited a rather different form of bravery: the Quaker conscientious objectors, who flew single-engined light aircraft, usually Piper Cubs, right up to the front line to pick up our wounded. They landed on almost any track, however rough and, often with no more than a field dressing, the wounded man would be back in medical hands in no time. The courage of these noncombatant airmen saved many lives and innumerable amputations, which would have been necessary if gangrene had had time to set in, as it had done on the long dusty ambulance rides in the western desert of Egypt.

There was great jubilation when we took our first prisoner of war. The Japs had invariably committed suicide rather than be captured, however badly wounded, but now the Sikhs brought one in, expecting to be tortured, no doubt. He was well treated and sent to divisional HQ, where the interpreter had been waiting for weeks for just such a moment.

I had been away for four and half years, during which I had not seen my wife and had never seen my daughter, born soon after I had left UK. My time for repatriation came at last, and my successor arrived to take over. Just before I left, I heard a keen staff officer say "There is too much talk about 'repat', lets get on with the war!" And he was newly married, with his wife in uniform at Corps HQ. On my last day, the Anglo-Burmese intelligence platoon arranged for me to be given a "Burmese breakfast", a traditional celebration, like a buffet of about 100 dishes, from which one helps oneself to as many as possible. The occasion was one of much interest. They told me that it was the motor car which had, in the years before the Japanese invasion, been the agent effectively alienating the Burmese country folk from the British officials. "In our father's day" they said, "the officials rode through the villages on horseback and chatted to everyone; now they drive through in a cloud of dust, and the people feel they do not care for them."

The next day I left 89 Brigade, but my war was not yet over! I was able to make my way back to Chittagong in a returning supply aircraft, thence to Calcutta and Bombay, where I arrived in good time for the next convoy of troopships to the UK. I called on the Royal Bombay Yacht Club and was offered a sail in one of their boats; a very pleasant change from Burma. In the bar afterwards, I was talking to a British naval officer, who told me that he had taken over a newly arrived Corvette, and would be accepting her next morning, when I could join him for sea-trials – no special kit required, just my normal uniform. So there I was, at crack of dawn, aboard and out to sea. We were about 20 miles out to sea when a signal arrived to report a Japanese submarine sighted, and we were to go for her. Great excitement for all except the dockyard representatives who, like me, had no kit with them. We hunted that sub for a week, before going into Colombo for fuel, when I jumped ship to report my "absence without leave" and once again made my way to Bombay to find, as expected, that my convoy home had left and I was to wait for the next one.

# A War Department Steam Locomotive
# We Will Never See Their Like Again

CHARLES MEACHER

*This is the second article about railway locomotives, written by Charles Meacher, who wrote* The Sappers' Biggest Construction Job? *published in the April 1992* Journal. *This article covers the period 1920 to the end of World War Two, and describes the author's experiences with various types of locomotive engines encountered, from Scotland to Persia, and a few places in-between.*

MY first acquaintance with a War Department (WD) steam locomotive came early in my life when I was a schoolboy during the 1920s at Dalmeny village school, within sight of the Forth Bridge. On the single line between Dalmeny Junction and South Queensferry, we had a daily visit from *Maude*, a North British Railway (NBR) 0-6-0 type goods engine. Like ships, steam locomotives were feminine gender and we associated the name with the girl who was invited to "come into the garden". At an overhead bridge near our school we used to get a steam bath as *Maude* puffed along hauling barrels of whisky to the King George IV Bond, returning to Edinburgh with empty casks for more whisky. But there was nothing characteristic of a woman about *Maude*, with the NBR number 9673. This class, designed by Matthew Holmes, was introduced in 1888 and when war came in 1914 ten of these versatile engines were sent to France. On being released from service with the Royal Engineers' Railway Operating Department (ROD) after the First World War, they were named as follows: *Byng, French, Somme, Mons, Plumer, Gough, Maude, Joffre, Allenby,* and *Haig*. Like their soldier namesakes, these engines are no more, except *Maude* which is preserved and still at work with the Scottish Railway Preservation Society (SRPS) at Bo'ness, just up river from where she worked from 1928 until retirement in 1966. Between being demobilised and transferred to Haymarket Depot, Edinburgh, *Maude* hauled coal trains in the Glasgow area.

Little did I think during my halcyon school days with *Maude*, that my adult life would bring about a strong affinity for this metal war veteran. Nor did I foresee my involvement with bigger steam engines in World War Two in North Africa and Italy.

When the threat of war in 1938 became the real thing in 1939 I was working for the London North Eastern Railway, stoking a pug in Leith Docks. In February 1940 the British destroyer *HMS Cossack* arrived with 299 merchant navy men rescued from the *Altmark*, the ship that serviced the pocket battleship *Graf Spee* in the Atlantic. This was a sequel to the *Battle of the River Plate.*

From her base at Port Edgar, near where *Maude* used to shunt, the *Cossack* had chased and trapped the *Altmark* in Jossing Fjord near Stavenger and, with the cry "the Navy's here," British sailors released their compatriots in neutral waters and brought them to Leith. I was smitten with the adventurous spirit this displayed, and forsook home comforts and a reserved occupation to volunteer for service with the Royal Engineers. After initial training at Siddals Road, Castle Donington and Melbourne, Derby, I was shunted to 931 Port Construction & Repair Company. While with this company at Eastbourne, I espied a notice in the mess room about "square pegs in round holes." The army wanted men doing the right job; as a steam locomotive man in civvy street, I should have been in a railway operating company. And so I was sent to Longmoor to be trade-tested as a steam locomotive fireman and a week later went back to Longmoor Downs for training as a railway engine driver (RED) – three weeks theory and five weeks practical.

The British Army was slow to appreciate the strategic importance of railways in wartime. During the Crimean War, Britain was urged by her army commanders to use this form of transport to support troops in the field, and General Gordon's predicament at Khartoum could well have had a different ending if a railway had been available. Despite Gladstone's disinterest however, the War Office came to the same conclusion

*Maude* No 9673, Haymarket August 1932.
One of 10 NBR engines named after service in France during World War One. Now preserved by SRPS Bo'ness, Lothian.

and soon the Sappers were in Cairo organizing and developing railways.

Prior to the Boer War, Longmoor began to develop as a large army base and became the main centre in Britain for railway training to suit military needs. Between the wars reservists went to this base in Hampshire to learn and teach, many of them my workmates from Edinburgh. Locomotives and coaching stock were borrowed from main line railways and when I arrived in 1943 there were tank engines and some tender locos hauling carriages; adequate for instruction purposes. Some were adapted with equipment such as air brakes for instance, likely to be found abroad. There was a school manned by very able instructors, and a good engine shed with coal and water facilities, also a modern signal box at Longmoor Downs. The NBR *Maude* class engines were now part of history and big austerity engines designed by R A Riddles, (Deputy Director, RE Equipment) for Ministry of Supply (MoS) along with LMS (London Midland Scottish) Class 8F locos, were being built by private manufacturers like the North British Locomotive Company, Glasgow. This firm in fact stopped producing armaments in order to concentrate on WD locomotive construction and built 545 "austerities".

During the "phoney war", prior to Dunkirk, there had been a British military railway presence in France with World War One relics such as the Dean's goods engines with 0-6-0 wheel arrangement like *Maude*. After the German takeover in Europe, 153 and 190 Railway Operating Companies (ROC) marched into Persia (Iran) in 1941.

Since the First World War the British in the Persian Gulf had transformed Basra into a modern port. This allowed LMS Class 8 locos to reach the Caspian Sea via the Trans-Persian (Iran) Railway to take war supplies to Russia via the back door. While doing this, Sappers sweated in the desert sun and shivered in the snow-clad mountain passes. The wind blew dust from the desert or, shifting, brought intolerable humidity. The Trans-Persian Railway was built without regard to economic factors, to bypass foreign rail terminals. Somewhat ironically it became a vital cog in Russia's southern lifeline.

Germany had for a long time worked closely with Turkey, while at the same time planning to capture or subjugate the country economically and then politically. Berlin-Baghdad was the German aim and the presence of Krupp-built steam locos alongside British WD engines on the Teheran shed could be seen as an omen. Of course the dictatorial Shah was in a position to trade with any country and his wealth of oil kept him in a strong position.

While 153 and 190 ROC sweated in Persia, dreaming of a medal from Joe Stalin for services rendered, 193 ROC felt the heat in the Western Desert while they qualified for the Africa Star medal. This somewhat grieved the "190" lads who, unlike the seamen on the Murmansk convoys, received no recognition from Russia.

Meanwhile the 199 Railway Workshop Company at Jaffa was well placed to keep the wheels rolling in Palestine and to show some inventive enterprise. A certain officer, namely K R M Cameron, who I worked with at Waverley Station, Edinburgh, after the war, put right a long-standing defect on the Stanier 8Fs. Like their sister engine, the 5MT, their inherent weakness was the water injectors. The boiler mounted clack valves very often stuck in the open position and allowed steam to blow back to the overflow pipe under the footstep. Occasionally this could be remedied with a smart tap against the offending valve but too often the blowback persisted and the loco had to be stopped, blown down, and cooled to allow for repair. In order to obviate this time-wasting practice, Kenneth Cameron designed a valve that could be closed at local level on the boiler, thus allowing for a repair to be effected without stopping the loco for a lengthy period. This valve stands proud of the boiler casing and can easily be seen on former WD engines.

A War Department Steam Locomotive (p64).

After service in Persia and North Africa these engines were shipped to Italy via Taranto where some were converted from coal, to oil-burning in record time. From Italy's main naval base they went north to Fabriano and Falconara where I caught up with them.

Also in use in Italy were American Baldwin engines which, unlike British engines, were designed and built as oil burners. Like their Liberty boats, these engines were designed for a specific purpose. Although simple and unadorned, their fitments were practical and efficient with creature comforts superior to ours. Wide comfortable seats were installed in contrast to the hinged piece of wood on British locos; the whistle cord came low in the drivers lap and the steam regulator and brake handle were within easy reach. The fireman was similarly relaxed and could operate oil-fired controls without effort. While seated he could open the injector water valve then pull up a handle like a car handbrake so that water flowed into the boiler, "singing like a lintie" as we used to say. In open country there was a rod to pull which released boiler scale under pressure. Instead of the usual two boiler gauge glasses there was one glass and three cocks placed diagonally which, when opened into a sloping trough, showed the correct water level, more dependable than a gauge glass which could give a false reading if blocked with grit.

No 203 *Sir John French* takes on water at Longmoor. Note the insulation of the water column against frost, also the rerailing ramp behind the headlamp. "Sir John" had a long and, successful life at Longmoor during and between World War One and Two. The locomotive had numerous fitments to facilitate training, including the Weir steam feed pump and outside Walschaerts valve gear.

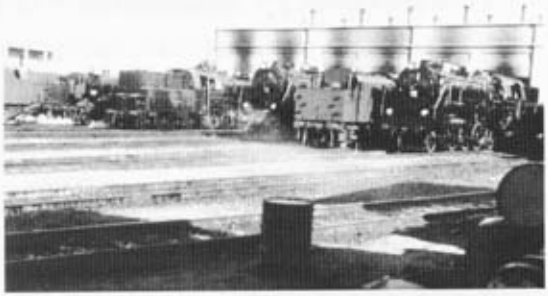
As the German army retreated along the Adriatic coast the railway lay totally destroyed in their wake – rails and sleepers torn asunder; bridges demolished; locomotive (electric and steam), rolling stock upturned and crushed with rusting wheels and undersides exposed to the sky. Cleaning up this mess was a daunting task for Railway Construction Companies but these Sappers bravely accepted the challenge and got "stuck in." Meanwhile the ROCs (192 and 189) were kept occupied elsewhere. It was the intention of Allied Command to return the railways to the Ferrovia Stato, State Railways, as quickly as possible, so from my base with "192" at Taranto I went every day to the station signal box to watch the Italian occupant perform. This signalling system was hydraulically operated so that with every lever movement there was a suction sound as, outside on the landing, a controlling plunger moved inside a vertical tube. Points as well as semaphore signals were operated in this way.

At other times I travelled with a train guard (Capo Treno) between Taranto and Bari, or Brindisi, saying nothing, doing nothing, only providing a British presence. Then followed a move to Movements HQ at Bari where, along with another Sapper, I was appointed Station Master (Capo Stazioni) at Modugno about ten miles west of Bari. We had two hospital beds in a former office, and telephone communication with the HQ responsible for discipline, while a local stores company provided food and pay.

Our job was to supply wagons to a nearby cement factory and to a RAF bomb dump at Bitetto the next station to the west. We also had to check troop trains and overnight freight arrivals every morning, sometimes before break of dawn. One cold, dark morning as I walked into the goods shed where we kept the yard statement book, I was aware of movement in a heap of straw. Dismissing this as rats stirring in their nest I carried on and collected the book. As I retraced my steps in the dim morning light, I saw the heap of straw rising and found myself face to face with the Afrika Korps – two big Germans, dishevelled and

A War Department Steam Locomotive (p65).

from 1900-1923. He designed the GCR class 8K which was chosen by the WD for the ROD in World War One when such a locomotive was urgently required. It was known as Class 04 2-8-0 and had the nice LNER appearance I knew so well. Over 500 of these engines were constructed and after World War One they worked throughout Britain and abroad. Those allocated for war service in 1941 went to the Middle East, the Egyptian State Railways, Palestine Railways and Syria also the Haifa – Beirut – Tripoli Railways and Iran.



Teheran Loco Shed. World War Two.
German Ferrostaal Decapods, Stanier 8Fs.

Possibly the smallest WD steam loco in World War Two was the standard WD 0-6-0ST (saddle tank). Mr R A Riddles, in his capacity as Deputy Director RE Equipment, was in charge of design. These austerities were constructed by the Hunslet Engine Company, part of the preparation for D-Day anticipating the need for such a locomotive. The first one came to Longmoor in 1943 when I had the opportunity to drive this smart wee engine. It had quick acceleration and its loud bark seemed to match its velocity. Such simplicity of design made for easy production and maintenance. Total weight was just over 38 tons and a short wheelbase meant easy clearance in sidings. The saddle tank held 1200 gallons which allowed for short journeys on military railways. With help from other manufacturers a total of 377 WD 0-6-0s were made available between 1943 to 1947. There was no shortage of customers when the emergency ended, various industries snapped them up and when I saw them working in collieries and other yards my thoughts went back to Longmoor and my early experience with this smart piece of austerity equipment.

On a much larger scale there were the Standard WD 2-8-0 and 2-10-0. These had a tractive force of 34,215lb and 39,670lb respectively, with driving wheels 4ft 8½in and 5ft. A total of 733 2-8-0s and 25 2-10-0s were run by the WD and these were capable of hauling very heavy trains like those with coal from Fife to Aberdeen via Forfar, a common sight right up to the demise of steam in about 1970.

During World War Two only Germany, the USA and Britain had large scale production of standard steam locomotives. German production was widely spread over occupied territory and this was undoubtedly an advantage when Allied bombing didn't interfere. In Britain locomotives were given high priority such was their worth in wartime. The USA with tremendous industrial capacity just took extra locomotive production in their stride.

The British WD austerity locos were mostly confined to Europe and prior to D-Day, Longmoor became a huge locomotive depository. With ready access to the Channel ports, the railway home of the Royal Engineers was ideally suited for the job.

My first experience driving a WD austerity 0-8-0 came on my return to the LNER in Edinburgh. I was sent to relieve a driver on a freight train and as I approached the handsome WD engine I thought "I've waited a long time to get my hands on you." After taking over the controls I pulled open strongly the pendulum-type steam regulator while eyeing the signal from the open window. The sudden movement caused my head to hit the upper steel frame and I uttered imprecations against the designer, the redoubtable Mr R A Riddles. However, I learned a lesson that day and avoided WD windows ever after.

Steam locomotives being shipped abroad invariably went as deck cargo, which resulted in heavy losses. A naval friend of mine said to me one day "you know Charlie, I've seen many engines go overboard while on convoy duty because of rough seas or enemy action", and ever since then I have had visions of Stanier 8Fs and Yankee Baldwins lying askew on the bed of the ocean. For some reason this conversation took place while we stood on the elevated coal stage looking down on a very congested St Margaret's loco depot in Edinburgh and I remember that I was shaking my head in despair, saying "what a mess!"

A War Department Steam Locomotive (p66).

unshaven, hatless but still wearing uniform jacket and trousers. I couldn't speak German and they couldn't speak English so we conversed in Italian. I learned that these exhausted soldiers had escaped from a POW camp at Taranto, jumped on a train and alighted during darkness at Modugno.

Together we went to my sleeping quarters and as I ushered them through a half door ahead of me, my Sapper colleague shot up in bed and grabbed his rifle. "Alright, Ernie," I said, "the war's over for these two, go back to sleep, I'll make breakfast." My inquisition was quite unprofessional, we merely talked about life in general and hope for the future. Then I realized it was time I reported my find, so I phoned the Stores Company. Very soon a sergeant major wearing First World War medal ribbons appeared on the scene with an armed escort. When this old soldier saw the Germans relaxing on my bed he developed a fit of passionate anger. "Get up on your feet," he roared, "fall in, escort and prisoners quick march – left right, left right, left..." Language was no problem now, no British soldier could have responded quicker, the Germans went back to captivity at the double.

I had seven days leave while at Modugno and went in search of my brother, who was with the Royal Artillery "somewhere in Italy." Hitchhiking all the way, I eventually came to the front line north of Rimini and found succour with the 1st Canadian Division. I had dinner with General Macnaughton, not at his table but in the kitchen close to his table. A captain told me where my brother's medium guns were likely to be – on their way to join the Poles on the Central Front – and then arranged transport for me to get back on the main road for hitchhiking.

It was dark when I found my brother's convoy near Assisi, too dark to look for him so, after checking with the sentry, I bedded down in a mobile laundry on a pile of dirty washing. Early next morning I joined some gunners brewing tea in a field and they told me my brother was in one of the trucks. As I approached this particular truck the battery sergeant major was banging on the outside shouting "wakey, wakey." I stood on a low embankment watching the side curtain being raised and as my brother's head appeared from under a heap of gun parts his face was a picture of surprise and disbelief. I had two days with him sleeping in his truck and queuing with the gunners for field rations, after all, the Royal Engineers and Royal Artillery are closely affiliated.

I returned to Modugno via Rome, Naples and Foggia and reached my abode at 2350hrs – nine minutes before my leave pass expired.

From being station master I went back to engine driving with 189 ROC at Falconara near Ancona. Here we had Italian coal-burning engines along with British and American oil burners, the ubiquitous Stanier 8F and the Yankee Baldwins, the latter so-called since they were built at the Baldwin Locomotive Works in the USA. Both these types had 2-8-0 wheel arrangement affording needful tractive effort. They were less labour intensive, no shovelling coal, no cleaning fires. Combustion was said to be perfect when only a blue haze appeared at the chimney. Whereas the coal burners depended on blast to make them steam, oil burners required only careful tuning and the correct mix of oxygen and oil gas vapour plus gentle draught.

On shed this explosive mixture could cause alarm. In order to ignite the oil vapour a long steel rod with flaming waste material was introduced into the firebox. Being designed for oil burning the Baldwin firebox was like an inverted brick oven with a solid base. The Stanier 8F on the other hand was a converted coal-burner and had only a brick crossbar for a firebox base. In the absence of a steel rod it was customary to throw lighted cotton waste on to the crossbar hoping the oil vapour would ignite. If, as usually happened, the burning waste fell in the oil pan (ash pan) the feed oil which had accumulated there would explode wrapping smoke and flames around the boiler.

An engine required a supply of steam to start the fire, (when steam is used to spray oil it can rage like a furnace or burn like a candle when controlled by fireman) this could come from another engine by suitable piping attached to a steam valve at the side of the smoke box, or from the engine being kindled. This steam was fed into the firebox through an atomizer set below the oil burner. Oil pours on to jet of steam and becomes atomized. This crude oil is piped from tender to atomizer at front of firebox and controlled by fireman in cab through handles and knobs provided. The fine oil spray could be controlled in the cab to burn like an oil lamp or rage like a furnace, either way it was labour saving.

An accident causing derailment was an ever-present danger. This is why the oil tank lid was secured with winged nuts; having taken on oil it was important to ensure that the lid was tightly closed and the winged nuts made this easy to do.

J G Robinson was the Chief Mechanical Engineer on the Great Central Railway (GCR)

# An Emergency Commission – (For a Short War)

BRIGADIER S T BALDRY MBE BSc(ENG)

*The author was first commissioned in 1943, granted a regular commission in 1946, and retired in 1980. After serving in Burma during World War Two he has particularly enjoyed commanding 37 Field Squadron, 32 Armoured Engineer Regiment and 29 Engineer Group (V).*

*On the Staff, Deputy Assistant Adjutant and Quartermaster General, 19 Infantry Brigade and Colonel General Staff, United States Army Command and General Staff College were highlights.*

IT was surprisingly difficult to get to an operational theatre for a fit schoolboy who had volunteered for service in 1942.

## BECOMING A SAPPER

THIS was the first hurdle. Being in India I was summoned to an interview at the fort in Calcutta. A tri-service board of senior officers asked questions about schooling, family and sporting interests, then

"Which Service would you like to join?"

"I want to be a Sapper, Sir."

The Colonel spluttered "Ridiculous, I am a Sapper and you are quite unqualified to be one ..." Kindly invitations to join one of the other Services were politely turned down. The secretary to the board then intervened to say that he had just noticed I was not 18 yet and so should not be there. He led me out of the room, told me to go away and spend the winter shooting, and that I would receive a letter in due course telling me where to report.

Instructions arrived to enlist on 2 March 1943 into the Border Regiment, prior to going to the infantry officer cadet training unit (OCTU) at Bangalore. A letter to the Engineer-in-Chief, India, saying I wanted to be a Sapper, received the reply to do as I was told whilst Engineer Branch would work on transferring me.

Amongst many excellent practices adopted by the Indian Army was one called an "Urzi Parade". This provided an opportunity for any soldier who had a real or imagined grievance to have an informal chat with his company commander. After a month I began to attend "Urzi" parades to say that I should be at the Engineer OCTU down the road; some two months later I was sent for an interview there. A written examination had been prepared which soon proved my lack of engineering knowledge, but the Commandant of the Madras Sapper & Miners overruled this technical drawback and with a broad grin remarked that I was apparently a persistent fellow who wanted to be a Sapper, so I could move over the next day. In November 1943 I was granted an Emergency Commission and posted to the training organization of King George V's Own Bengal Sappers & Miners at Roorkee.

## LEARNING THE BASICS

MY company commander met me with "Thank God you've arrived, I can now go on leave! This chart shows the training programme. You will meet the Viceroy's Commissioned Officers (VCOs) on First Parade tomorrow, I'll then be off and the company is all yours for a fortnight." I needed help and at least a hint of where to start.

Enter the *Subedar* (the senior VCO responsible mainly for advice on all Indian matters. The



Brig S T Baldry MBE
An Emergency Commission (p68)

platoons were commanded by VCOs called *jemedars*). The *Subedar* and I chatted (my Urdu was quite good), and he even answered questions that were uppermost in my mind but which I dared not ask for fear of showing off my ignorance. He had unlimited common sense. His kindly given guidance, without in any way embarrassing me, soon made the prospect of being the acting company commander a far from daunting task. Continuing my education next day, he announced that it was necessary to hold an Orderly Room. At the appointed time I sat behind a desk and he marched in.

"*Subedar* Sahib, I have never conducted an Orderly Room before. Anything unusual likely to occur?"

"Sahib, this case is one of absence without leave. It might be very similar to one I saw Captain Smith Sahib, a very fine officer, deal with."

He then gave a full account of what happened, quoting what Smith and others present had said. The unfortunate offender was then marched in. The accused, the witnesses and myself then spoke almost word for word what had allegedly been said in Smith's time and the proceedings came to a dignified and proper conclusion. I thanked the *Subedar* for his help; he gave me the smartest of salutes, and without a twinkle in his eye, or a satirical twitch of his splendid moustache, marched out of the office.

Life was great fun. There were 14 platoons to visit so the more boring subjects were easily avoided. I had access to an army charger and also bought a horse for myself. Much of the day was spent in the saddle supervising outdoor training.

My personal staff consisted of:

- a bearer who valeted for me and served me in the Mess,
- a sweeper who was shared with a few other officers,
- a *syce* to care for my horse,
- a part-time *shikari;* his job was to scout out game and make initial contact with the nearby villagers so that no time was wasted before shooting could begin,
- a horse-drawn tonga to take me out quickly after local partridges and duck (and carry home the bag),
- a bullock cart and driver was hired for more distant shoots after bigger game; this took my bearer, *shikari* and kit to a pre-determined spot where they would set up camp and make arrangements so that on my arrival on horseback shooting might begin immediately.

All this on a second lieutenant's pay. And after the sport, lying under the stars in the marvellous open jungles, with wildlife roaring, grunting, chattering and screeching around one was a perfect way to spend a Saturday night.

My military education was continued by attending an excellent, six-month long civil and military engineering course at Thomason Engineering College, which was also at Roorkee. The good life continued, and the only way to salve a guilty conscience was to ask regularly for a posting.

### A Field Unit

In late summer 1944 an order arrived posting me to the Tehri-Garhwal Field Company, part of 17 Indian Divisional Engineers (17 Div). I soon found myself as a platoon commander at Ranchi, where 17 Div was resting after their retreat through Burma followed by their successful defensive operations in the Imphal area.

Tehri-Garhwal was a native-ruled state west of Nepal. The Maharajah provided two infantry battalions and a field company to the Indian Army. The soldiers spoke their own language but could also speak Urdu. Although I never learnt Garhwali I understood it as it had some similarity to Nepalese which I could speak. On the evening after I met the men I walked alone through their tented lines and heard them talking about their new platoon commander. The leading spokesman thought that although he seemed a nice enough Sahib he would surely get them all killed. Next morning on parade I spoke to a number of Sappers in Urdu and recognized the voice of the pessimist. It soon became obvious to all that I had understood what the man had said the night before. When I asked him to repeat it just in case I might have got it wrong, his embarrassment completed a little pantomime which the platoon enjoyed.

### Burma

The division moved back to the Imphal area just after Christmas 1944, my Company supporting 99 Indian Infantry Brigade (99 Bde). Almost immediately we were ordered to become airportable and hand all vehicles, except Jeeps, over to the other two brigades. The company was then deployed on maintaining an earth airstrip a hundred miles south for use by RAF fighters – a dusty and monotonous task. Some relief was provided one evening by the visit of an Entertainments National Services Association party. Unfortunately its lights attracted a Japanese fighter pilot who fired a long burst from his machine gun as he passed. No damage was done, but some of the spectators became more excited than the incident warranted.

The XIVth Army was preparing to cross the Irrawaddy. I was given a jungle track to keep open

on the approach to the river, over which a vast number of vehicles of all sorts and sizes bounced, churning it to dust. My work consisted mainly of recceing and marking gaps between trees through which following traffic could be directed whenever something got stuck. "Where's your bloody road, Sapper?" was often yelled by passing soldiers; the only reply that seemed appropriate was "Keep going, it's round the corner." The men moving forward exuded confidence and humour; it was exhilarating to be there, doing even so simple a job as mine.

### Meiktila

17 Div's task was to cross the Irrawaddy as soon as a bridgehead was established, then make a 100-mile dash to capture and hold the strategic centre of Meiktila. 255 Tank Brigade joined the division. There would be no ground lines of communication (LofC); the force had to rely on resupply by air for anything it needed but was not carrying. 99 Bde was to be flown in to take part in the battle for the town after the capture of an airfield.

In early March 1945 we took off in US Army Air Force Dakotas, despite a tricky start caused by our pilot who refused to allow any weapons aboard. (He had at sometime had a bit of trouble when flying armed Chinese soldiers, but we persuaded him that we were of a finer breed.) Arriving over Meiktila on a sunny afternoon we found a fierce battle in progress below us – the war at last.

On deplaning I was given a Jeep and told to find out what was happening at a military police post on the road towards the town. Then I was to search for abandoned equipment such as guns, armoured vehicles, and anything else the enemy might like to repossess, and destroy it. (This task came up quite often over the next few months and was usually quite exciting, but blowing up large dumps of artillery ammunition can be too much so. My efforts occasionally resulted in shells whizzing to places where we thought we were safe, some exploding on arrival. Forest fires caused by burning cordite threatened to cut off our escape routes. Advice was sought, but most suggestions turned out to be even more hazardous. My Sappers began to believe that all abandoned ammunition dumps were haunted by evil spirits).

Meiktila was captured and we set about defending it. 99 Bde took up positions to one side of the airfield. Because of a Sapper platoon's size it was given a length of perimeter to defend about double that of an infantry platoon, despite the lack of any support weapons. This shortage was somewhat remedied by liberating rather than destroying an abandoned heavy machine gun and a mortar launcher. We never found an antitank gun.

For the next month the brigade repelled attacks at night; were shelled regularly; and on many mornings had to fight to clear the airfield of Japs. But the most usual task was for units to sally out searching for and destroying enemy forces. My platoon supported 1/7 Gurkha Rifles (1/7 Gurkhas) in these activities.

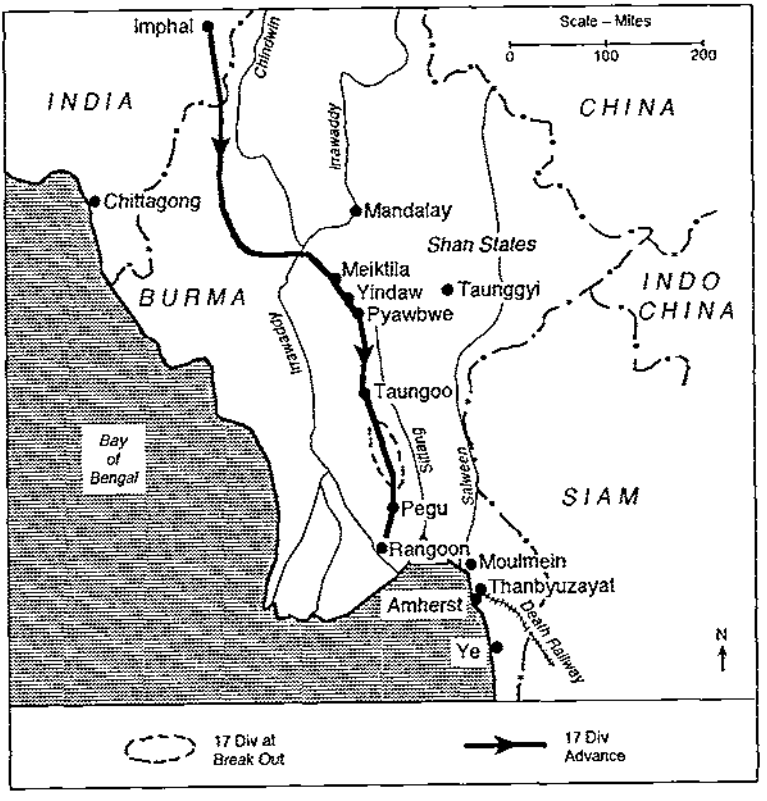
When not otherwise engaged, elements of the platoon were on the airfield helping to unload cargoes and turn round the Dakotas which brought in ammunition and half rations to begin with, and petrol, engineer and other stores later.

Life was varied at Meiktila, but to give an idea of the operations as seen by a raw platoon commander, a description of an outing with 1/7 Gurkhas follows:

> On a fine morning the battalion with supporting detachments set off on foot to attack a village which night patrols had identified as being defended. On the way a small party of enemy was spotted to our flank and a section of Gurkhas quickly dealt with them, (reminding one of a pack of beagles as they did so).
>
> Approaching a village that had been declared clear of enemy, there was a shout of "Sapper!" and the column stopped. Reaching its head and looking along a track, field glasses revealed an aerial bomb lying on a culvert. Two of us went forward – the device appeared to be booby trapped. Its complication, and a few other observations, led me to believe that it was phoney, so we cavalierly pushed it into the ditch. The Gurkhas hinted that the "mine" had not been treated with proper respect, then resumed the advance.
>
> As we entered the supposedly clear village we came under heavy fire. A hasty attack was ordered but soon brought to a standstill. We withdrew and awaited to be allotted divisional artillery support and a troop of tanks. A deliberate attack was then launched. I detailed four Sappers to support each tank; one commander, one to work on each side of the tank to look for mines, and the fourth to be on the tank's telephone at the back to stop it driving over a mine.
>
> The Shermans fired hundreds of rounds from their machine guns over the infantrymen, scything down hedges and fences to open fields of fire, and took out enemy strong points with their main armament. The battle got more and more fierce as increasing amounts of machine gun and mortar fire came our way, but slowly the Gurkhas' advance continued.
>
> Then the cry of "Sapper" was heard again. About 20 yards in front of an infantry section could be seen a plank with two antitank mines strapped to it. The device was leaning at a rakish angle over the road, and

the Gurkhas wanted it removed before they would go any further. (We knew about the Japanese suicide tactic of pushing mines under the tracks of approaching tanks.) There was no enemy action coming from the immediate area of the offending object, and the Gurkhas told me that they had earlier thrown a few grenades in that direction just before it appeared. I crawled forward and rolled into a trench which contained two dead Japs and the other end of the plank. Having defused the mines I was quickly joined, and then overtaken, by Gurkhas.

The advance got held up again, so it was decided to call aircraft to take out strong points that neither the artillery nor Shermans had silenced. The brigade's air attack controller (a very experienced RAF fighter pilot who was furious at being grounded for a rest) called up the cab rank and brilliantly guided the planes on to their targets. The attack continued.




Map of area covered in article.

Sometime later a Gurkha company commander told me that the attack was becoming so held up that the tanks would not be moving much more, and I should take my Sappers to a safer place. Having done this I rejoined him. He was sitting behind a large tree, and his orderly crawled up to us with two mugs of tea. I expressed surprise that he could be so relaxed when his men were involved in such heavy fighting. He replied that his soldiers were experts at the job they were doing, and he would embarrass them if he supervised them too closely. Shortly afterwards disaster struck one of his platoon. "Now I'm needed" he said, as he rushed off. With great gallantry he reorganized and encouraged his uninjured soldiers before ensuring that every wounded man was properly cared for.

Although the enemy suffered severely they fought on fanatically and our casualties mounted. At battalion HQ I heard the CO say it was time to stop hunting and go home for tea. Our force disengaged, and we wearily moved back to base.

There were not many minefields around Meiktila. The Japanese were however good at improvising mines and siting small obstacles. Armoured regiments had suffered from cleverly positioned mines used to initiate large aircraft bombs. The Indian Cavalry Troop which I supported often called for a Sapper before beginning a patrol. On arrival at the rendezvous I would be hauled into the leading car, and at high speed the patrol would search for Japs. They refused to believe that Sappers could not detect mines in such circumstances. I did however insist that I would go home if they wandered off the narrow tarmac strip that most of the roads consisted of. This rule was adhered to probably because two military policemen overtook us and almost immediately hit a mine in the verge, killing both men. Off main roads we decided to forget about mines, and these delightful cavalrymen let me fire their machine gun and generally play at being a Lancer.

One morning it was reported that the Japs had been heard mining the airstrip. The nearest infantry company told me that there had been much sound of digging; flares had not shown what was happening, and firing at the activity had provoked no response; nothing had been heard since about an hour before daylight. They were sure mines had

been left. The gate was opened and my driver and I slowly moved towards the airfield in my Jeep. About a hundred yards on machine gun fire came at us, and we tumbled into the drainage ditches on either side of the track. Firing chased us as we crawled back to the brigade perimeter. The subsequent attacks to recapture the airstrip met no mines. The digging activity heard earlier had been the construction and occupation of a strong enemy position of bunkers built of Bailey bridge panels and other stores from the engineer dump on the airfield.

### To Rangoon

By the end of March the operations in central Burma resulted in the defeat of the Japanese there. The time had come to leave Meiktila and make a 300-mile dash to reach Rangoon within 45 days, before the start of the monsoon.

A daily task was to establish a water point, and in our area the water tasted awful. It was passed safe by the doctors, except where the Japs had poisoned wells with picric acid. The brigade commander refused to touch a drop of it. One day I assured him that we had at last found a sweet source and gave him a glass. He deemed that such success deserved a visit to the well. The cover was lifted, he peered in and cried "Good God! It's full of snakes, and one at least is a cobra." My reply that the snakes were no danger (unless one fell in) had no calming effect. The head medical officer was summoned and although he fully supported me, it is probable that the brigadier never drank another drop of water produced by us.

One evening the commander gave orders for a brigade attack next morning. On capture of the Japanese position we were to keep going as fast as possible. The usual "Any questions?" was raised at the end of "orders". With some diffidence I said that I had done a recce of the dried up river bed and felt sure that the guns and transport would get stuck if they tried to cross as ordered. There was a considerably less risky place some distance away. The commander and the brigade major had a short discussion, whilst a battalion commander whispered to me that I was very foolish and deserved my impending fate. The plan of attack was changed. With some apprehension I saw the brigade major advance, but he brought congratulations for carrying out a recce no one had thought of, and for giving my advice in open forum. He added that in future he would seek my views before "orders". Next day went well, but some drivers had not trained to cross sand and got stuck. I ordered my dozer operator to nudge them out to the far bank. Months later, in a bar in Rangoon, I learnt that the commander of the transport had complained bitterly of the misuse of his vehicles (the backs of some had been slightly bent). There had been a call for the Sapper officer involved to be court martialled. My informant suggested I had influence in high places as somewhere along the line the charge had got lost.

Improvising crossings at demolished bridge sites was my platoon's main task. Bailey bridging jobs suffered from two major problems. The first was to get the equipment passed miles of nose to tail transport crawling towards Rangoon; it was difficult to get senior officers, intent on pushing their units forward, to realize that they would remain stuck until a bridge was built. The second arose because Bailey parts manufactured in Britain and the USA were incompatible and had become mixed. Sorting them out on a bridge site in the dark was tiresome.

To keep up the speed of the advance 5 and 17 Divs were leap-frogged through each other every few days. 17 Div reached the outskirts of Pegu just before the monsoon started in May. Only two structures over the river remained; one was a damaged railway bridge, the other a row of wooden trestle piers supporting a single track line. A Class 9 route was required. My plan was to build a continuous single/single Bailey over the trestles. A few hours later traffic came pouring over whilst the rain fell heavily. About midnight the traffic stopped. At dawn my *jemadar* woke me to say he was worried about the bridge because the water level had been rising fast. It was lapping the bottom chord of the Bailey panels and much debris was coming down the river. There was nothing we could do except watch. With a moan or two this interesting bridge slowly slid off the trestles into the muddy water, but it had done its duty.

### Battle of the Breakout

A day or two later Rangoon was captured, from the sea; a blown bridge north of the city had stopped 17 Div from getting there first. Operations continued because many Japs had been left behind us and were trying to regroup towards their LofC to the east. 17 Div moved back and with 19 Div took up positions to stop this happening. The resultant "Battle of the Breakout" was fought in terrible weather and the enemy was thoroughly beaten.

It surprised me that a limited leave scheme was authorized as soon as civilian ships returned to

Rangoon harbour. My OC offered me the chance to go if I could get myself to India. On my return the company was together at Taunggyi, in the Shan Hills east of Meiktila. My platoon was supporting operations towards the Chinese border.

### War's End

The Japs were still resisting but our force's attitude had changed considerably. Victory in Burma was now inevitable, so operations were conducted with the minimum of risk. Morale seemed to decline as the urgency went out of the business, but spirits soon recovered when the two atom bombs were dropped on Japan and the war was over.

Members of the platoon were awarded one Military Medal and two Mentions in Despatches (one posthumously) for their work over the previous seven months.

### After the Bombs

The Japs had treated the inhabitants of the Shan States so badly that they had deserted their villages. My first postwar job was to take a bag of money into the jungle to entice them back. The track towards China was in poor condition and needed a number of bridges built. As locals returned, I offered them employment as road and bridge builders. Soon I was motoring most of every day visiting work sites.

The jungle was full of game, especially jungle fowl and partridge. I took the company shotgun and tried to fill the pot by firing at birds as they took off, with my driver keeping a steady speed. This was unsuccessful, so I decided that as the gunner was moving fast it was fair to shoot at sitting targets. Results improved, but disaster struck one evening when I swung too far downwards and blew a hole through the radiator of the Jeep.

This happy job came to an end in October 1945 when an operation was launched to take the surrender of the Japs in south Burma. Because bridges over the Sittang and Salween rivers had been demolished, Moulmein and the country south of the town were still cut off. The only practical way to achieve the surrender was for a small force to arrive by sea, using landing ships. The 1st Sikh Light Infantry (1 Sikh LI), with a reinforced platoon of Sappers, a medical detachment and a few others, formed the seaborne force which landed on the beaches south of Amherst. As the war had been over so long, and communications had been difficult, it was not known whether we would meet with a hostile or friendly reception. We therefore planned to disembark ready for a smart parade, but would also be prepared to fight if we had to. The Japs were ordered to meet us on the beach at a time which would give us an hour or so to organize ourselves before their arrival. On disembarkation I searched for a track off the beach, and went along it in a Jeep with my driver and a sapper. Progress was slow as it was very muddy, and we came to a halt in a deep pool. Soon the whole crew was filthy but we had failed to extricate the vehicle. Looking up for a moment I saw a posse of Japanese officers in full regalia watching us. I approached the senior man, who initially did not believe that any officer would do such dirty work. I told him that I needed some manpower and his team would have to provide it. He saluted and immediately began to strip his party down for action. I said he was not to get any more than the minimum number of his men filthy, and he himself was to stay clean to make the surrender. We were soon unstuck. The Jap and his party (most covered in mud) carried on, and mine completed the recce for a track to the main road.

After the surrender it was discovered that a large number of Jap soldiers had deserted. They had kicked out or killed Burmese men in a number of villages, taken over the women, and were running the local economy most efficiently. A large tract of country was allocated to the platoon to search for such deserters. The Sappers loved the silent night patrols and raids on suspect villages. We got little help from the Burmese women who were happy with their Jap bosses whom they found more efficient, harder working and nicer than their own menfolk.

As Sappers we were kept busy improving roads and tracks, improvising bridges, supplying water and clearing scrub and jungle for an airstrip. I believe I was the first British officer to travel the infamous "Death Railway" (built by Allied prisoners of war (POW)) from its Burmese terminal at Thanbyuzayat towards the Siamese border. I wrote a report on it which seemed to meet with the approval of the CRE (Lieutenant Colonel T H F Foulkes). But he also sent a message to say that if my airstrip was not operational within a few days I was in trouble. I immediately declared it was safe for planes to land and he was the first visitor.

One evening the CO 1 Sikh LI sent for me, ordered the Mess *havildar* (sergeant) to bring a double whisky and then gave me a job. "By 9 o'clock tomorrow morning I want you to tell me what you are going to do with a few thousand

Japanese POW whom I want you to employ before they become bored and restless." I asked if he had any ideas and he replied "No." After another double I returned to my village.

To provide track and bridges for the Death Railway the Japs had dismantled the railway line from Thanbyuzayat to Ye. The latter small town was now isolated. Next morning I proposed that the Japs should build 50 miles of road to Ye. I would need to do a recce, but the major problem I foresaw was control and administration of prisoners. I suggested that a Japanese formation with its own units and officers was needed, but was told this option was not allowed by the rules for the employment of prisoners. When I got back from the recce, I learnt that my Jap force would be headed by a major general (who was old enough to be my grandfather), and would be organized to administer itself. We were soon deployed in company strength units (each supervised by a Garhwali NCO or Sapper) along the length of the proposed road.

A small problem arose with the matter of saluting. Wherever I appeared a Jap would bring everyone within earshot to attention, salute and report at length on what he thought was happening. Even when they were floating trees down a river the same thing occurred, with the result that those in the water would adopt the attention position and immediately sink. To keep work moving along, strict rules were devised on the amount of saluting to be done.

The plan was to open a Class 9 all-weather road surfaced with local hard core. All bridges and culverts would be constructed of timber. The major task of consolidating all the fill had to be done by hand with improvised "thumpers" made from tree trunks.

When the public works department was re-established and heard about the road, they allocated some money for local purchases. A prewar contractor learnt about this and sought me out. After a little chat he proposed that he ought to be the sole contractor and thought that by the time the road was completed we should both be rich men.

I do not remember spending much cash except to raise a troop of elephants. They became invaluable for hauling timbers despite the very limited hours they could work each day because their large bellies took many hours of munching to fill. The owners of the elephants had let their beasts free in the jungle to prevent the Japanese overworking them. The first owner I met said that he could find his elephants, given time, and I set off with one of his mahouts. We eventually found a spoor which he claimed he knew and followed this until we caught up with the animal. She was surprisingly docile and soon showed her pleasure at meeting her master again. By paying a bonus for finding each elephant, and regular wages thereafter, there were soon about ten elephants on my books.

The CRE visited the road and asked how the work was allocated to each detachment. My answer was that we used field engineering tables (printed by the Bengal Sappers in Roman Urdu) which showed how much work could be expected from a Sapper in one day in a wide variety of tasks; these figures were doubled, and the resultant amount of digging, filling etc was given to each Jap detachment as their next day's task. The CRE suggested that I was probably getting close to being a war criminal for demanding so much. That thought had never struck me, but there was absolutely nothing for the POW to do except work, keep themselves clean and fit, and try to vary their diet by catching fish. They undoubtedly went to bed tired but they caused no trouble, and after an initial moan or two even gave that up.

A little later Colonel Foulkes said I was to become his Adjutant. The road was not quite complete, so it was handed over to my company commander who was full of ideas about having a grand opening in a few weeks' time.

I had thoroughly enjoyed commanding Garhwalis for 18 months. They were intelligent, loyal and brave soldiers and I was sad to say farewell.

Just before leaving, I was asked if there were any boat builders and similar tradesmen amongst my Japs. If so, could I bring them up with me to build a fleet of yachts for a proposed sailing club. About 20 Japs of various trades volunteered, and they became part of our field park company. We soon had a flotilla of teak-hulled Sharpies, with sails made from tentage and most stays and rigging made from parts of crashed gliders.

Footnote: The complete story of the war in Burma is to be found in Field Marshal Sir William Slim's classic "Defeat into Victory".

# The Argenta Offensive, April 1945

# A Personal Account by a Replacement Subaltern

CAPTAIN E LIGHTFOOT BSc(ENG), MSc(ENG), PHD, MA, FICE, FISTRUCTE

*This article follows the short piece published in the August 1994* Journal, *and continues the author's account of some of his actions in Italy up to the end of the War.*

## PREPARATIONS FOR THE OFFENSIVE

THE advance of the Eighth Army up the narrow coastal plain by the Adriatic, and that of the Fifth Army (largely American) through the Apennines towards Bologna, had virtually come to a halt over the 1944/45 winter.[1] Once the huge plain of Emilia-Romagna was reached it was hoped that progress would be speedier; the difficult mountainous terrain, however, would be replaced by flat country with little cover, and with ditches, canals and rivers to be crossed, the many raised roads making any vehicles using them easy targets.

The Eighth Army was composed of three corps, from east to west, Vth, IInd Polish and XIIIth. The Vth Corps was to conduct the assault on the Argenta Gap, a strip of land only a few miles across between the flooded Lake Comacchio, which adjoins the Adriatic, and a flooded area to the west. It comprised, from east to west, the British 56th and 78th Divisions, the Italian Cremona Group, the 8th Indian and the 2nd New Zealand Divisions. The 56th Division had been regrouped into two Queen's brigades and the 24th Guards Brigade (24 Guards Bde), consisting of 2nd Coldstream, 1st Scots Guards and 1st Buffs battalion.[2]

## HOW I STAYED IN THE EIGHTH ARMY

I JOINED 571 Army Field Company at Sessa Aurunca, between the rivers Volturno and Garigliano, north of Naples, in late January 1944. We were acting as Corps RE and continued in this role up to Città di Castello on the Upper Tiber until the end of July. During August and September we acted as divisional RE in direct support of King's Dragoon Guards, 12th and 27th Lancers, as they fought their way through Sansepolcro and Pieve San Stefano. From October onwards we reverted to Corps RE from Bagno di Romagno to Brisighella, which is in the northern foothills of the Central Apennines. Though part of the so-called American Fifth Army in February (and some time before) we rejoined the British Eighth Army after the capture of Rome in June. The company was to be withdrawn to Greece, it was thought, (then considered of secondary importance), so I was moved out to continue with the Army in Italy, not yet having served 18 months in a major theatre of war.

My posting was in fact to the RE Experimental Bridging Unit at Capua but there were some difficulties getting there. My personnel utility broke down about 100 miles north of Rome. I managed to get a lift into an officers' leave hotel near the top of the Spanish Steps but couldn't find any easy way of moving on. Eventually, somebody told me about an American forces bus running daily from Naples to Rome and back so I decided to catch it. This required a drive across Rome in full kit in a black horse-drawn *carrozza* (with all my possessions, including a large steel trunk and a bedroll.) I persuaded the Americans to take me and was dropped off in the dark just south of Capua. Fortunately the first British Army truck I stopped took me to the unit. An officer there provided beer and sandwiches and I told him I wanted to get back into action. This unit was, as it happened, also serving as a staging post for reinforcements and a small batch of sappers was moving north the next morning. One of the officers was sick so I simply took his place!

I joined 221 Field Company just south of Ravenna, was allotted No 2 platoon and went on Bailey bridge and raft rehearsals for the next two days. The company then moved forward and dug in a mile or so south of the River Reno[3]. We were in support of 24 Guards Bde.

## PREPARATIONS FOR 9 APRIL 1945 OFFENSIVE

THE River Reno had been crossed near the Adriatic and the 2nd, 9th and 43rd (Royal Marines)

[1]Linklater, E. "The Campaign in Italy", 1939-1945, HMSO London, 1977.

[2]Knight, C R B. "Historical Records of the Buffs, 1919-1948", Medici Society, London, 1951.

[3]War Diary, 221 Field Coy RE, WO170, 5204 Public Records Office, Kew, London.

Commando had captured the "Spit" for a few miles north in the first few days of April. When we arrived the town of Mandriole was already won and we occupied part of San Alberto. A house on the northern bank, just northwest of the town was ours, confronting a heavily fortified German position about 250yds away at the top of the sharp bend in the river. The German position extended from the flooded lake through the flood-bank to the river with lots of barbed wire, picket mines and tank mines in front.

By night we cleared the mines for several miles between the river and the lake to the east of this position, suffering some casualties from *schuh* mines. About this time many of the officers, including myself, attended a briefing in a cinema at Faenza; there we met General Whitfield, commander of 56th Division.

### Capture of the German position at San Alberto

On 9 April we still did not know the plan of attack so I went in search of a command HQ to find out what it was. The other platoons were planning a bridge to the west of the German position and were building floating sections to tow upstream. The "shoot-in" for the offensive was at 8pm; it started just as I was crossing the river to join one of my sections at the captured house. By the time I arrived a platoon of the London Irish was staggering back from an unsuccessful attack, having lost their officer and several men.

Presently, a platoon of the London Scottish appeared, to exploit the second phase, which was for the sappers to clear the mines. I knew that tanks were crossing the river to the east so I ran back a mile or so to fetch one. Within 200yds of the house, however, it stopped. The tank commander said he couldn't possibly fire on the German position because some of our infantry should already be in the area beyond. A petard-firing gun might have succeeded, but he didn't have one!

Upon my return to the house, the London Scottish had retired but the OC, Major E P J Williams, and the CSM were waiting for me. The OC thought there was no option but to take my men in with an infantry attack, but I persuaded him to try bombing them out. So the OC, the CSM, LSgt C C Hills and myself crept forward with bags of grenades. Unfortunately, we received a shower of grenades ourselves which wounded the OC and the CSM. It took a while to get them back.

During the night the Germans managed to bazooka the floating bridge sections, some of which were lost, one with a bulldozer on it, and to machine-gun the crews. However, early next morning a tank managed to get into position and after a few shots the Germans surrendered. We rounded up about 20 men with only a corporal in charge. A machine gun crew also came in from a small island on the lake to join their comrades.

### The Comacchio Landing with the Buffs

On the night of 12 April I went with one of my sections to join the Buffs for an amphibious operation. We moved out just after 3am and climbed into one of the fantails (or buffaloes) in a wooded area near the lake, about two miles west of San Alberto. These amphibious transports can carry approximately 30 men. We moved off at a speed of about 5mph, crawling over flooded ground and churning over deeper water. At about 11am we approached an eastern-facing shore, well north of Argenta. I was standing with Major D F Bennett, of the Buffs' A Company, in the leading fantail, when the enemy opened up; we were machine-gunned but many of the vessels behind were hit by cannon fire from the north. We got out via a ramp at the back, and moved up to the shelter of a road running along the shore on a 6ft high embankment.

In spite of the heavy fire Major Bennett crawled up onto the road. Returning, he asked me to take a German position about 50yds to the south on the other side. With two sappers and a Bren gunner following I ran over the road, along the base of the embankment and soon spotted four Germans in a dugout. They were sent back over the road with their hands up. This incident had, unfortunately, been observed from a house about a kilometre away and we were fired at continually to keep us pinned down.

During the afternoon we were entertained by the RAF, whose planes circled above and then occasionally dived down at us with machine guns blazing (our identification flares had been lost). Presently, some very accurate Spandau fire came along the bank from the south. Our Bren gunner tried to reply only to have his helmet grooved; sand poured down between us in the trench from where the bullets had struck the ground above. I discerned a pattern in the bursts at regular intervals and decided our hunter was trying to get near enough to throw grenades. After one particular burst I got the Bren gun in action, firing blind but

scattering the bullets and making sure not to shoot high. There was no reply; we later found a German sprawled out behind his Spandau about 70yds along the bank.

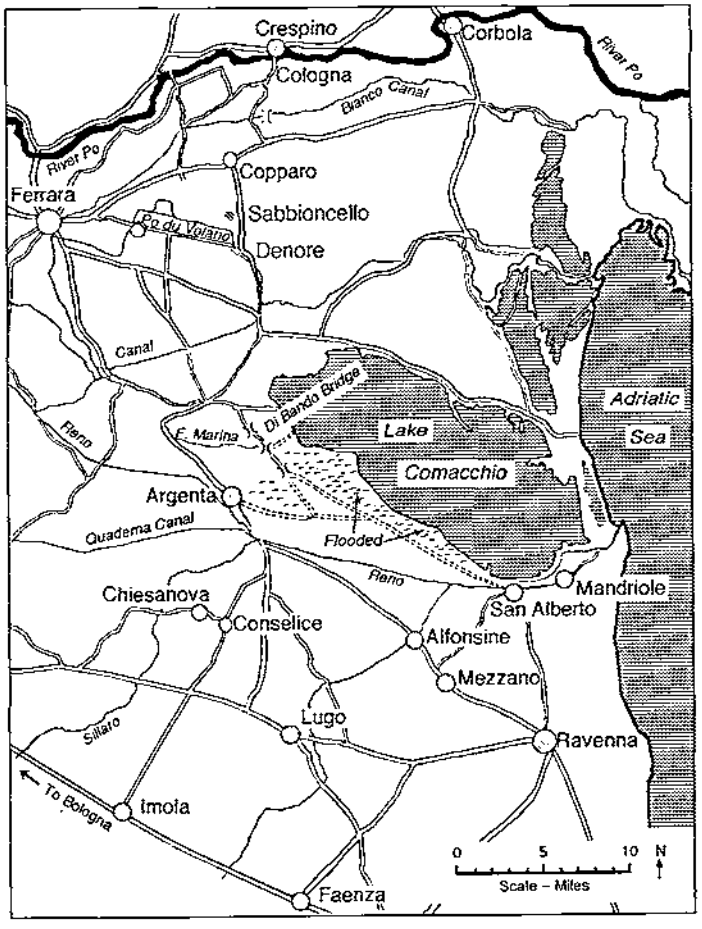
Though we carried 24-hr ration packs we had forgotten our water bottles so all we could eat were the boiled sweets.

After being in full glare of the sun most of the afternoon, dusk was a relief. The planes had gone.

Once darkness descended the attacks kept coming, aided by the light of Verey-type parachute flares. Shouts of "hands-up" and thunder from heavy boots were heard as Germans rushed across our positions. We could hear cries from the wounded and dying.

Eventually, all was quiet and I let my three chaps sleep in turn, the sapper pair then the Buff. It was difficult staying awake but just as well I did, because in the early hours I suddenly saw a German silhouette. I shot a second, then there was running and shooting on the other side.

As dawn approached a German vehicle from the south thundered along the road with guns blazing right through our position. A little later a British Red Cross van came to evacuate our wounded. Some time after a section of British infantry crawled past heading north. We bid them "Good Morning", much relieved, but taking them by surprise! Across the road we found breakfast in progress; it was hard to believe that most of the unit had survived the night. Suddenly, a very accurate burst of Spandau fire killed four of the Buffs. Everybody dived for cover; somebody threw me a trenching tool ...




Map of area covered in article.
*The map is based on one first published by the Royal East Kent Regiment, and is printed with their kind permission.*

### Neutralizing the Bridge

Soon Major Wright shouted me over to explain about the bridge captured intact the day before, and which lay about half a mile to the west on the other side of a minefield and some dykes. I had to disarm it if it was wired for demolition. I took a corporal with me; we moved fast, having to take running jumps over the ditches.

There were aerial bombs at both ends, with primer charges above and wiring for electrical firing. We quickly cut all the leads and threw the primer charges into the water. Upon our return I reported to Major Bennett, who seemed a bit disappointed that we hadn't taken out the aerial bombs too! (They were about 10ins in diameter, three or four together in each group.)

By mid-morning we sappers were told to withdraw. Covering the German I had shot in the night we filed past the second body and I felt some weary satisfaction that all the sappers were returning.

### Follow Through

We had some difficulty during the next day or two in getting past the pumping station at Di Bando. This had been the original objective of

Fantails (Buffaloes) in rehearsals at Menate on Lake Comacchio, April 1945.
*Imperial War Museum.*

C Company of the Buffs 1st Battalion, which had landed to the north of A Company and had almost been wiped out. Though a section of the company had tried to capture this important objective they had been forced to withdraw. Attacks were later made by 9th Commando and further west by the Scots Guards; the Fossa Marina there was finally crossed by assault boat on the night of 16 April.

We seemed to be held up for days at this pumping station; Ark tanks had been driven into the deep concrete channel there, one above the other, but in a very difficult position for a bridge. Eventually, the infantry won us sufficient room to build a Bailey near the demolished road bridge and the fighting moved north again.

One day a forward tank managed to dump a large fascine into an E-W canal; a queue of vehicles built up and was heavily shelled. I thought a Bailey was needed for the next day and asked for the equipment to be sent forward. The site chosen was on an adjacent road but the slope down to the canal was littered with dead. I took a bulldozer forward after dark to shift the bodies as quietly as possible, but was ordered to withdraw because clearance had not been obtained – a very important pre-requisite for such a job!

Towards evening the next day I went with LSgt Hills' section, to help a platoon of Scots Guards forward over several canals using inflatable boats. They put in a classic attack on a farmhouse under cover fire from flanking parties, finally rushing in with grenades to find nobody there; the Italian farmer and his family were entrenched in a shelter under a silo. He told me the Germans had left that morning and I figured they would fall back two or three miles at least, to make any work for weapon positions worthwhile.

On we went to give the second farm the same treatment. I persuaded the Guards commander to approach the third by stealth and again found it clear of enemy. We had achieved our objective well after 2am and were tired, so I gave two of the three inflatables to the Guards for their return whilst we stayed behind to sleep in the farm. This was foolish bravado; we were two or three miles ahead of the front and had we been captured during the night I might have found myself court-martialled in *absentia!*

The next evening, 20 April, I was detailed to take some of my men in a White scout car to join a flying column of the Buffs. En route we overtook a horse-drawn wagon carrying German "NAAFI" stores; the drivers were taken prisoner, the horses released and the wagon pushed off the road into a ditch. Shortly afterwards the column stopped and a shell screamed overhead. We got out fast, the next shell wrecked the scout car and went right through the radio. We continued by cramming into the other vehicles and soon arrived at a village, daylight nearly gone, and with mortar fragments continuously scattering between trees along the main street.

### Setback at Sabbioncello San Vittore

Within minutes one of the Buffs' officers consulted me about his idea of rushing a bridge a mile or so beyond our present location in Denore and over the Po di Volana, a sort of southerly thread off the main River Po (still some miles to the north). Apparently, a Bren gun carrier had already been there and had not encountered the enemy. Judging from the mortaring going on the enemy had merely held their fire, so I suggested an attack on foot. I expected to set off over the fields but we (myself and four sappers) found ourselves at the tail of a platoon of infantry marching along the raised road to the west in the dark. We were machine-gunned at the crossroads south of the bridge and got down in the forward ditch. An order to withdraw over the road was passed along the line, but not to us. In the midst of the German attack we escaped through a

The Argenta offensive p78

barn and eventually rejoined the Buffs after advising them not to bloody-well shoot us as we crossed the road (I confided that I was a Geordie (not quite true) and used to play rugger for Hartlepool Rovers!). Eventually, we brought a couple of tanks up and tried to approach the bridge directly across the fields only to encounter German bazooka fire from several directions. The tanks withdrew and the bridge was blown sometime before midnight.

Early next morning, I went down to the blown bridge to estimate the size of Bailey required to replace it. A little German Mongol soldier crept over the concrete remnants on the other side holding a mess-tin, and though my sapper had a rifle we didn't think it very sporting to shoot a man just having a drink!

### On to the River Po

On the late afternoon of 24 April I was sent forward to the River Po to look for a suitable crossing by Class 40 tank raft. There were several infantry attacks going on at that time but we happened on an empty sector of the front and came upon a simply unforgettable sight – scores of enemy vehicles abandoned in the fields up to the river and lots of cavalry horses there too, peacefully grazing. Many of the vehicles had demolition charges fitted, but igniters and fuzes were either missing or had not fired. We soon found a suitable site just south of the village of Crespino on the far bank.

The next day I made a further reconnaissance and my platoon built the tank raft that evening. The River Po is normally over 500m wide at that point and was flowing fast in flood. The banks were well-wooded and the final approach bent down steeply over a drop of about 10m. We badly needed a bankseat to build from and I went down to hasten its construction. At that moment machine guns opened up from across the river. When I got back up to the unloading site my platoon had vanished. I walked back along the road shouting "2 Platoon, come on out of your bloody holes!" A figure loomed up in the dark; heavens above, it was the CRE! Soon all were back at work and we completed the raft by early morning.

The tanks came up just after noon and we tried the rather feeble 8HP Petter engines against the rapid flowing river. (There were four, driving propellers at each corner.) Halfway across I couldn't avoid getting the raft into a spin and we were lucky not to get grounded on an island downstream. (One has to make headway before the faster flow is encountered in midstream; the actual trajectory is a large "S" curve.) Fortunately, some experienced watermen were sent to command the Petter engine crews and the operation proceeded apace, over 80 tanks being taken over by breakfast the next day.

I was consuming a mug of tea the next morning, sitting on the nearside bank of the river when a sergeant from a relieving platoon approached and saluted. "Sir", he said, "is it alright taking cavalry horses over with the tanks?" Twice I didn't hear what he said before he retreated! (I hadn't officially noticed this enterprise.)

### Diminuendo

After a day or two our company, along with many others, moved forward over a very large and impressive Bailey bridge across the River Po just north of Ferrara. En route we were obliged to relinquish all the very interesting German vehicles we had acquired; I had already grown quite fond of a petite amphibious two-seater...

We arrived at Rovigo early on 28 April and found ourselves involved with other companies building a pontoon bridge over the RiverAdige that same evening. After a series of mishaps the bridge was completed by 1pm on 29 April.

Before we got very far with the decking, after having touched down on the far bank, German soldiers came clambering over the bridge in the dark, saying *"Die Wehrmacht ist kaputt."* We collected them round a fire in a nearby farmhouse where we gave them mugs of cocoa.

The war in Italy was over, but 56th Division still had a job to do, especially vis-à-vis the Yugoslavs over disputed territory near Trieste. Our VE (victory in Europe) day was spent in a tiny village where heavy rain washed out a planned open-air dance.

I was at a course at RE Capua when the atom bombs were dropped on Japan, but it was more than a year before I was discharged. My last appointment was Garrison Engineer, General HQ Central Mediterranean Force, at the Royal Palace, Caserta, so I couldn't really complain! I was a typical civilian-type sapper officer, I suppose!

### Tribute

This was my first experience of heavy fighting with the infantry. The Buffs suffered 157 casualties (killed, wounded or missing) and the Guards casualties were very heavy too. I would like to record my profound respect for the men of 24 Guards Bde and of 221 Field Coy, and my enduring affection for 56th (London) Division and the Eighth Army.

# Technically Challenging Work for Twelve Weeks

CAPTAIN R GORDON BEng

*The author graduated from Loughborough University in 1989 with a degree in mathematical engineering, and after completing SGC 893 and Young Officers Course 101 was unlucky enough to be posted to 62 Cyprus Support Squadron, where he commanded the support troop for 18 months. In September 1992 was posted to 59 Independent Command Squadron where he spent the first 18 months of the tour commanding a field troop. He has spent the last six months of his tour employed as the Project Officer for Exercise* Waterleap 94. *He is currently attending Junior Command and Staff Course, and is due to take over as Adjutant 33 Engineer Regiment (Explosive Ordnance Disposal) in July 1995.*

(Picture shows the author on exercise with the US Marines Corps in California)

## Introduction

Each year a UK engineer squadron deploys to Canada on Exercise *Waterleap*. The aim is to carry out construction work on behalf of the Canadian Armed Forces, which will provide the tasked unit with technically challenging work for the 12-week exercise period. The unit for Exercise *Waterleap 94* was 59 Independent Commando Squadron (59 Indep Cdo Sqn) and the exercise took place at Canadian Forces Base Detachment, Wainwright (Camp Wainwright), Alberta. Camp Wainwright is situated east of Edmonton, and is used each year by three UK Land Forces (UKLF) battle groups on the *Pond Jump West* exercises. The training area associated with the base covers some 600km and contains sufficient ranges and field training areas to cater for over 3000 troops at a time. Camp Wainwright has been chosen as the major training area for the Canadian Land Forces Western Area (LFWA), and the Canadian Department of National Defence (DND) is currently planning major construction works in the long term to improve the existing facilities. Exercise *Waterleap 94* formed (as will Exercise *Waterleap 95*) a part of this plan to improve the training facilities at Camp Wainwright.

## Aim

The aim of this article is to describe the conduct of Exercise *Waterleap 94*, highlighting major problems encountered, and to make recommendations which may prove useful to other units taking part in similar exercises in the future.

## Requirement

The aim of the exercise was to complete four construction tasks identified on the initial reconnaissance (IR), within 12 weeks, on budget, and to the quality required by the client. The four tasks were:

Bulk Fuel Installation (BFI). The existing fuel supply within Camp Wainwright was not capable of meeting the peak demand during the summer exercise season. Therefore a second BFI was required, consisting of two prefabricated steel fuel tanks (250,000 litres for diesel and 100,000 litres for unleaded gasoline) situated within a concrete fuel containment bund, and incorporating a traffic circuit with access to receipt and issue points.

McDonald Bridge. Access to certain parts of the training area are restricted due to the course of the Battle River, which is only fordable from June to February; for the remainder of the year access is via one extra wide Bailey bridge (also constructed by 59 Indep Cdo Sqn on Exercise *Waterleap 89*). An additional equipment bridge, founded on concrete abutments was required to provide all year access, and reduce pollution of the Battle river.

25m Outdoor Range. An additional 25m small arms range was required to meet current training needs. It was to include a troop shelter with integrated covered



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firing point, a 5.5m high reinforced concrete stop butt wall, and a programmable electric target mechanism.
Bivouac Sites. Three bivouac sites were each to be provided with three prefabricated toilet blocks and an underground, reinforced concrete kitchen sump.

The estimated cost for the four projects was CAN$1.84M, and the tasks were to be completed using up to a maximum of 165 personnel.

## Planning

Planning for Exercise *Waterleap* is now a well established procedure which begins with an IR approximately two years before the exercise is due to start. The IR for *Waterleap 94* was carried out by the OC 59 Indep Cdo Sqn and two members of Military Works Force (MWF) in September 1992, and identified the four tasks outlined above. As a result of the findings of the IR, a six-week detailed reconnaissance (DR) was carried out in May and June 1993. The DR team consisted of 15 men and was based on 527 Specialist Team Royal Engineer (Works) (STRE(Wks)). The QM 59 Indep Cdo Sqn also joined the DR for a two-week period to conduct the administrative reconnaissance. During the DR a Canadian officer of prime interest (OPI) was nominated by the camp construction engineering officer (CCEO). The OPI was responsible for overseeing all aspects of the exercise in the period between the DR team leaving Canada and the exercise unit arriving. In November 1993, the DR team published the detailed reconnaissance and planning report (DRPR) which marked the start of the detailed planning process for the exercise unit. As a result of the recommendations included in the DRPR, the nominated project officer (PO) then carried out the following actions:

- Arranged relevant pre-project training.
- Arranged the confirmatory reconnaissance (CR).
- Identified any shortages in tradesmen.
- Tasked the troop commanders to produce a detailed engineer plan for each of their specific projects, based on the overall plan included in the DRPR which was produced using Microsoft Project V3.0.

The planning phase of the exercise was then completed by two final visits to Canada:

Contracts Confirmatory Reconnaissance (CCR). The CCR was carried out in February 1994, by four members of MWR whose aim was to confirm that all major contracts had been correctly put to tender.
CR. The CR is normally carried out concurrently with the CCR, but due to squadron commitments the CR did not take place until March 1994. The CR comprised the OC, QM, PO and resources SNCO from 59 Indep Cdo Sqn whose aim was to confirm the arrangements for all aspects of the exercise including the administrative plan. At the conclusion of the CR the Resources SNCO remained in Canada working in conjunction with the OPI to coordinate the purchase and supply of all materials.

## Pre-Project Training

Recommendations on the type of pre-project training required were included in the DRPR, and this was used to plan an extensive package of trade refresher training and management training. The main aim of the pre-project training was to rehearse constructing those specific elements of the project which were considered to be the most technically demanding. The Royal School of Military Engineering (RSME) provided workshop space and materials to allow the tradesmen to carry out this training. The welders constructed metal steps; the bricklayers and concreters practised constructing formwork; the petroleum fitters rehearsed constructing and testing a fuel pipeline; and the surveyors practised setting out some of the more demanding aspects of the project. In addition to this, an emphasis was placed on health and safety training which was carried out at three separate levels. Firstly, the squadron sergeant major (SSM) and support troop commander (Sp Tp Comd) attended a one week Site Safety Management Course run by the Construction Industry Training Board. Secondly, the troop officers and SNCOs attended a three-day Site Safety Course at RSME, and finally the troop JNCOs attended briefings by the unit safety officer on COSHH, risk assessment and safe manual handling practices. The importance of thorough well planned pre-project training cannot be over-emphasized and as a direct result of this training two important aims were achieved:

- Over 80 members of the squadron underwent some form of pre-project training which resulted in the most junior soldiers arriving in Canada with an accurate picture of exactly what the exercise involved. This in turn led to a major saving in time during the first three weeks, due to higher than expected productivity.
- During the entire three and a half month exercise only one site accident required hospital treatment. Thus, by placing a high priority on health and safety training for all ranks, the number of site accidents was kept to an absolute minimum.

## Deployment

Deployment onto the exercise was in three parts; a pre-advance party of 43, an advance party of 13,

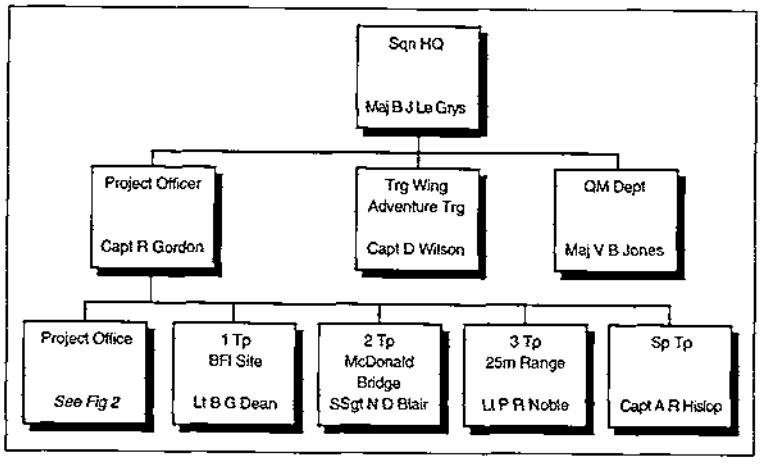


Figure 1. Squadron orbat.

and a main body comprising of the remainder. The pre-advance party deployed three weeks prior to the main body, and was tasked with setting out all sites and carrying out the preliminary earthworks. This was essential on the BFI task as the entire site (approximately 100 x 200m) had to be raised by 0.7m before any construction work could begin. The pre-advance works also included taking over the accommodation, vehicles and plant.

## Command and Control

BEFORE deployment the squadron reorganized into its *Waterleap* orbat. The main changes being the creation of the post of PO, and movement of some tradesmen between field troops as dictated by tasks. The OC retained overall control but delegated daily management of the project to the PO (see *Figure 1*). The PO also commanded the project cell which comprised five attached technical advisors (see *Figure 2*). Throughout the exercise the troop commanders were given maximum possible freedom to complete their tasks, with technical advice being available as and when required.

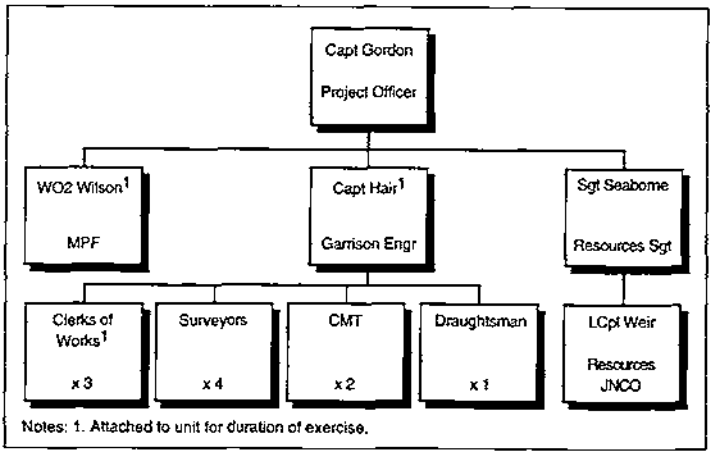


Figure 2. Project cell organization.

## Description of Tasks

Bulk Fuel Installation. The first major part of the BFI task was the removal of approximately 6000m$^3$ of top soil from the site, and the subsequent importing of 11,000m$^3$ of aggregate to raise the level of the site. This was necessary in order to provide frost protection for the construction work, and to provide the site with a drainage system. The aggregate was delivered to site using 33yds$^3$ "belly-dumpers" which, when used in conjunction with graders, were capable of spreading the material considerably faster than using normal tippers. Once the desired level had been achieved the majority of the construction work involved pouring concrete for the following:

- Hexagonal concrete bases for the fuel storage tanks.
- A containment system consisting of a concrete base and concrete bund walls to prevent any fuel leakages spreading onto the site. To ensure that the concrete containment system did not leak all construction joints included a "Dura-joint" rubber seal. This seal consisted of a 6in wide strip of rubber which was set into the concrete along all joints.
- Two 50m long sections of concrete carriageway.

Other construction work involved the completion of the traffic circuit using asphalt, the construction of a control hut, and fencing off the inner section of the site, (see *Figure 3*). The mechanical aspects of the task involved connecting the fuel pipes from the storage tanks to the diesel and gasoline issue and receipt points. The fuel pipes were supported by a

series of "pipe supports" at 10m intervals. Each pipe support consisted of a 3m deep column of reinforced concrete, to prevent damage from frost heave. Due to the sandy ground and high water table, difficulties were encountered drilling the 3m deep holes using a normal 650mm diameter earth auger fitted to a Bobcat. The holes were eventually dug by a contractor, using an earth auger inside a cylindrical metal sheath to prevent collapse. As the metal sheath was withdrawn the ready mix concrete was poured in. The pipework was then welded together by contract, and the quality of all welds was checked by on site x-raying.

Figure 3.

McDonald Bridge. The McDonald bridge task involved constructing a 39m Acrow 700 Series bridge on concrete abutments. The concrete abutments were constructed by pouring concrete into a combination of traditional timber formwork, and Mod-u-Form formwork. It was soon discovered that timber framework proved to be quicker and easier to construct than Mod-u-Form formwork for small and irregular shapes. The bases of the abutments were protected by placing a layer of rip-rap protection (large boulders up to 700mm in diameter) on a standard geofabric membrane which prevented loss of fines due to river erosion. Each boulder was individually placed so as not to rip or damage the geofabric membrane. The Acrow bridge is based on the Bailey bridge, but is made with a higher grade steel resulting in greater strength. The construction method is similar to the Bailey, but with some notable differences, which were eventually figured out using the manual supplied by Acrow. However, despite assurances from Acrow, the bridge supplied was deficient in several components and almost 240 holes had to be re-drilled in the bridge stringers. The task also included importing approximately 2500m$^3$ of aggregate for use in realigning 300m of gravel access track.

25m Outdoor Range. The main construction work involved in this task was the 6.9m high reinforced concrete stop butt wall. This was constructed by pouring ready mix concrete into Mod-u-Form formwork in four separate lifts. The concrete was poured using a crane and skip and then vibrated using the normal poker vibrators which were lowered into the formwork. A timber framed range building was also constructed, which included a troop shelter and covered firing point. The building was built on independent slab and beam foundations to prevent twisting of the building frame as a result of any major frost heave. Any minor heave will be taken up by the freedom of movement of the independent floor slabs. The site was landscaped and turfed by contract and the range was enclosed by a chain link fence. The electric targetry was installed by the squadron electricians and the console was checked prior to commissioning by a representative from the company who produced it.

Bivouac Sites. Three bivouac sites were constructed, each site comprising three pre-fabricated wooden toilet blocks, and a 14,000 litre capacity kitchen sump. Each sump consisted of a concrete tank which was cast in situ using Mod-u-Form formwork. The tank was constructed below the surface, so only the top 6ins were visible once it had been back-filled. The tanks were poured in three lifts, and each construction joint also included a rubber "Dura-joint" seal to ensure the tanks did not leak.

### Project Finance

The estimated total project cost was CAN$1.84M, which was almost seven per cent greater than the actual total project cost which was CAN$1.72M. This original estimate had included Canadian goods and services tax (GST) which is currently seven per cent. However GST was paid centrally by the DND and was not charged against the project account, had this been known at the time of the DR then the estimated cost would have been much closer to the actual cost.

### Administration

Camp Wainwright caters for up to 3000 troops at any time, and so coping with an additional 154

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British troops did not prove to be a problem for the existing camp facilities. Accommodation for officers and SNCOs was in their respective messes, and other ranks were accommodated in 40-man rooms. Locally employed civilians were hired as cleaners, and to assist in the main kitchen. Postal facilities were already in place to serve the British Army Training Support Unit (Wainwright) and mail took between two and four days to arrive from UK. The QM was allocated an administrative budget by UKLF, which was run separately from the project account to pay for items such as laundry, rations and medical fees.

### Other Aspects of the Exercise

Adventure Training. An adventure training base camp was set up in Mount Robson Park, eight hours drive from Camp Wainwright. The camp catered for up to 15 soldiers who spent six days adventure training in the Mount Robson and Jasper Parks. The activities included canoeing, rock climbing, mountaineering, horse riding and white-water rafting. The activities were paid for by a combination of personal contributions and grants from Army and Royal Marine (RM) sources.

Sport. Teams representing the squadron played regular rugby and football matches against local teams, and members of the squadron also took part in a triathlon and the Jasper Park Whistlers Mountain Race.

Diver Training. Military diving equipment was brought out from UK to enable the diving team to carry out diver training in the local area of Camp Wainwright, and in Mount Robson Park. Nine members of the squadron diving team also flew to Vancouver and conducted a week's diver cross-training with the Canadian Fleet Diving Unit (Pacific).

Local Leave. All members of the squadron were granted nine days local leave, and individuals made visits to Mexico, California and Las Vegas amongst other places.

### Lessons Learnt

- Microsoft Project V3.0 was used by the DR team to produce the initial critical path plan for the overall project. However, the traditional paper cascade plan was still found to be a more reliable method of monitoring day to day progress.
- It is essential to set aside sufficient time to plan and conduct effective pre-project training.
- Traditional timber formwork is quicker and easier to construct for small or irregular shapes.
- The details of all contracts drawn up by the DND must be checked to ensure they exactly meet the requirement.
- Where a task involves a significant amount of preparatory earthworks prior to the construction works, the deployment of a pre-advance party will prevent troops being under-employed.
- It is important to use the same units of measurement as suppliers when planning and designing. For example the Mod-u-Form formwork is supplied in imperial dimensions, whereas all formwork drawings provided by MWF were in metric units. This did cause problems when constructing the concrete foundations for the 25m range building.

### Conclusion

Exercise *Waterleap* provides an excellent opportunity for a UK engineer squadron to undertake a major construction project. The training value gained from such an exercise is invaluable and has benefited all ranks as follows:

- The skills of all tradesmen have been fully tested and they have gained considerable experience working alongside specialist contractors.
- JNCOs have not only had to practise their own trades, but also assume a supervisory role, in order to check and maintain the standards of the other tradesmen. They have also been required to allocate manpower to tasks and plan ahead in order to submit accurate stores and equipment bids.
- Troop officers and SNCOs have been able to command their troops whilst completing complex tasks involving the use of a number of specialist external agencies and the use of expert technical advisors. They have been responsible for the detailed planning of their tasks and the daily organization of manpower and resources to complete their tasks within the given time. They have also acted as site safety supervisors throughout the exercise.
- The PO has been required to prioritize and coordinate the deployment of plant, equipment and specialist manpower between the four task sites. He has also been responsible for the management of a CAN$1.8M dollar budget, and has ensured that standards of work have been to the satisfaction of the client. He has also been the point of contact with all outside agencies including contractors and suppliers.

In conclusion, the technical and management experience gained by all ranks involved in Exercise *Waterleap 94* has been invaluable. The squadron is now at a high state of readiness for general engineer tasks that may arise from the need to support 3 Commando Brigade RM on operations.

# Hands Up All Scaredy Cats!

BRIGADIER J H HOOPER OBE

*Further to Brigadier Hooper's article on mine clearing, in the December 1992 issue of the* Journal, *the following article takes up the theme of "fear" and discusses one or two ways in which he managed to overcome its effects; and why the courage to overcome adversity seems, at times, to desert us.*

As I hang around the wrong side of the Pearly Gates waiting for the duty saint to find time for a spot of plea bargaining, I have no doubt that my mood will be one of reasonable optimism. Such a mood has sustained me through a moderately eventful life. As far as I can recall, I have not knowingly done anyone a bad turn although doubtless there are many who would contest this claim. Give or take a few thousand years penance for bad temper, intemperate language and other shortcomings, I have little fear about moving on, indeed it might be quite exciting.

Having spent much of my time falling out of aeroplanes, off horses and under the feet of seriously hostile rugby forwards, I have found that physical damage can be borne if not bravely, at least adequately.

So what's there to be afraid of – well not much really when one comes down to it. But "twas not ever thus", oh no, with Ian Lyall Grant as OC, Fergie Semple as 2IC and Bill Powell as RSM, any sensible subaltern in 9 Squadron during the early 50s walked, if not in constant fear, at least in a constant state of anxiety and there were many moments before and since that I have been very nearly immobilized by fear. This article came to mind after reading the exploits of some very brave Sapper officers during WW2. So what's this fear all about?

Most people know that what happens to the little pink body when its owner is frightened is designed to preserve the aforementioned body from harm. Adrenaline and noradrenaline are released together with other hormones which have the effect of dilating the coronary arteries to enable increased blood flow to reach necessary parts. Other blood vessels are constricted, blood pressure and sugar are increased, surface blood vessels contract to reduce bleeding from wounds, (the blood drained from his face), pupils dilate to assist vision, breathing tubes dilate, digestion slows down, perspiration increases to keep the body cool (he sweated with fear). The little body is on a war footing, or possibly on a "leg-it" footing, – the "fight or flight" reaction to fear. Mind you, Shakespeare refers, in the "Rape of Lucretia" to "extreme fear which can neither fight nor fly" – I know the feeling.

The first thing to get straight is that fear is a perfectly normal and indeed desirable, if sometimes irrational, reaction to certain events. If an apparently life-threatening situation is in fact not life-threatening, the old mind will eventually come to grips with and overcome the problem – this is assuming, of course, that one has not left the scene in undignified haste before the mind has had a chance to get into gear! The second is that I doubt if anyone not entirely devoid of reason and imagination is fearless. Fear is an essential part of the preservation mechanism of the species. I do not propose to define it, as I am sure we all know the overwhelming desire to leg it from certain situations or being rendered virtually legless by an event (not connected with alcohol). And, I don't want to be accused of "swinging the lamp", but I thought I might recount some of my moments of fear, followed by my ideas of how and why I was able to deal with them. Please allow that fear is a subjective matter and that I am only speaking from personal experience. Having been scared pretty often, pretty badly over the years I feel qualified to pontificate, so here goes.

I want to make clear, by the way, that the sort of fear I am talking about here is not that brought about by phobias or psychological panic attacks and the like, which are out of my province, but the fear brought on by immediate, sudden danger either real or perceived. Indeed, the word fear is derived from the old English "fær", meaning "sudden danger", the kind that causes our bodies to react with sensations we probably all know only too well.

Here we might consider what Lord Moran had to say in his book "Anatomy of Courage". He formed the theory that courage was finite and that a series of events demanding courage would diminish the "well of courage" so that in the end there would be none left. Moran spent a lot of time studying bomber crews in WW2 and stated that

"The first and last cause of a pilot's collapse is a persistent state of fear." (p109). I think that diminished courage is brought about by fatigue. Exhaustion saps willpower. In my view, courage and willpower are inextricably linked, the greater the fear, the greater the willpower needed to overcome it and the weaker the willpower, the greater will seem the fear.

As soldiers, the problem we have with fear is to overcome it in order to get on with the job. I grant that some seem to resist fear or overcome it better than others, some just do not appear to experience fear in the same way as others do and some are just braver. The real issue is how can the average chap, who does experience fear, be helped to overcome it? I doubt there is a "well of courage" which too frequent use can drain. Of course too frequent exposure to fear over a very limited time will undoubtedly physically exhaust one but I have no doubt that courage can be developed by reasonable, controlled, exposure to frightening situations. I also have no doubt that discipline helps overcome fear and that "knowledge dispels fear" to quote (correctly I hope) the motto of No 1 Parachute Training School, RAF.

My basic parachute course was bedevilled by bad weather so that we were required to jump three times on the last day of the course. I was not alone in being almost unable to get to the door through having legs made of jelly. Some 30 years and scores of jumps later I carried out my last jump and I doubt if my pulse rate went up by more than a couple of beats per minute.

At the top of Tryfan in North Wales, there is a smallish jump which, if cocked up, can have pretty damaging consequences. After a day of strenuous climbing I funked the jump but the next morning went up and jumped it without a moment's hesitation. No one knew I'd funked it but me, but it was enough to get me back up there before breakfast to sort myself out.

Now, what caused the problem on my parachute course and on Tryfan was not fear but fatigue. Not for nothing do we use harassing fire to keep the baddies awake. It lowers the bravery level by increasing the fatigue level. Obviously the first thing to do to help your soldiers overcome fear is to get them extremely fit and provide adequate rest and relaxation – pretty obvious but it needs mentioning.

It has become clear to me that one cannot go without sleep indefinitely. I know I can go for two nights and still make some sort of sense – not too much my friends might say – but after three nights I make no sense at all and am too mentally numbed to realize it. Obviously one has to be very firm and arrange matters to allow periods of proper sleep and relaxation. Physical fitness certainly helps stave off the symptoms of tiredness, but relaxation is also vital – music often helps (or whatever), use a Walkman if necessary but ensure you clear your mind and relax for a few minutes at some time during hectic periods. I am sure all of us have faced situations which at night seemed desperate only to find that, with the dawn, the situation was not half as bad. (The morning after dinner nights are something else again however!)

Of course, what got me out of the door on my eighth and qualifying jump that miserable January day was applied-discipline mainly, but also a certain amount of self-discipline. It was certainly self-discipline that got me over the gap at the top of Tryfan. It is a lot easier for an officer to overcome the effects of fear than for a soldier (easier to resist falling out on an endurance run too) he has a lot to lose which is an aid to self-discipline. By good training, we RMAS cadets had been conditioned to jump from the 'plane when the green light came on – not to mention a certain sense of urgency imparted by the tone of the instructor bellowing "Go!"

Other aspects of my differing attitude to my first and last parachute jumps lends some credence to my contention that continued, controlled, exposure to fear reduces its adverse aspects. Even when well rested I have no doubt that jumps prior to, let's say, jumps number 30 onwards were "nervous but controlled" in the words of the RAF instructors. From then on the nervousness became less intense until my attitude was almost one of indifference.

We might consider the "knowledge dispels fear" theory when, for instance, disarming and lifting mines. It's the unknown mine that causes serious alarm. From personal experience, however, I can assure you that knowledge is one thing, overconfidence is something else again and can cause some pretty frightening experiences.

Twice in my young life I nearly killed myself by being overconfident and breaking rules I had learned. Once I failed to wait the requisite time before going out to blow a misfired grenade which then exploded within six feet of me, and earlier I had done a similarly stupid thing with a Mark V antitank mine in Egypt. Knowing how the mines and grenades worked had reduced my

fear of tackling them. Luckily I frightened myself enough to discontinue disobeying the safety rules. I was most impressed with the approach of many young men involved with mine-clearing in Cambodia, where knowledge and repeated exposure to mine-lifting situations allowed them to tackle the mines confidently but sensibly.

I am quite sure that being exposed to the most realistic battle situation conditions in training reduces the fear when the real thing is encountered. It seems to me that training these days is pretty tame compared to what we enjoyed. Having live ammunition fired over one's head used to be quite normal at one time but I remember having a terrible time as a CO trying to get permission to fire live rounds over the heads of my soldiers prior to a tour in Northern Ireland in the early 70s. (I wonder if I ever did get permission – I know I did it.) Until then I doubt if anyone in my regiment except for the squadron commanders, the quartermaster and myself, had ever had a round from a baddy pass anywhere near him. My experience had been that it took me a while to wake up to the fact that I was being shot at, so it seemed prudent to advise my Sappers what to expect. Single shots from a variety of weapons were fired over their heads.

As the opportunities for getting shot at recede I believe we have to create opportunities to expose ourselves and our soldiers to fear. I have a certain sympathy with one old general who was of the opinion that "young officers should have a bloody good fright once a day – preferably on a horse!" There's no doubt that a good gallop across unknown country can get the old adrenaline moving and the saying, when jumping on horseback, of "get your heart across first and the rest will follow" holds good even when faced with the most terrifying leap.

The foregoing brings me to the subject of "adventurous training" – which to me, frankly, is a thoroughly sound way of getting one's sports subsidized and little else. In any other walk of life, good money is paid to indulge in riding, skiing, canoeing, rock climbing, sailing, or any of the other moderately stimulating sports. These are good for overcoming the "nervous" part of "nervous but controlled" but do not really expose one to real fear for long, and the activity becomes fun.

In Cyprus, during the EOKA (Ethniki Organosis Kyprion Agoniston) campaign, when some Greek Cypriots wanted union with Greece and were using terror tactics to get their way, my troop was required to search an area for baddies. We came upon a disused mine shaft about a metre square and dropping vertically to unknown depths. There were recent footprints at the top and a rickety ladder down. It had to be searched. I asked for a volunteer to accompany me down and a section commander came forward. He had a Sten gun, I had a pistol and a torch, and down we went. At the bottom there was a gallery, again with footprints. Any baddy could have had adequate warning to depart the scene from the noise of my heartbeats it seemed to me. I led with the torch and pistol with the corporal with his Sten gun at the ready behind me. Thank God he kept his head when some bats flew over our heads! I nearly died of fright anyway and a few 9mm rounds would probably have passed through me unnoticed I was so scared. Eventually we surfaced – no baddies – "thanks very much for your help" etc etc. Years later, the same corporal was a staff sergeant in my squadron and the chat over a beer went thus "Staff, do you remember that mine shaft in Cyprus?" "Never forget it sir." "Really?" said I. "I was scared stiff, but you didn't seem a bit worried." "God, I was terrified but you seemed to be enjoying it all so I had to go along with it."

The lesson here is that having trained together, we had reasonable confidence in each other and gained mutual comfort from this – a fear shared is a fear halved would you say?

I think I must have been a troop commander before I realized that some people could not swim. Everyone I knew could swim. I was somewhat taken aback by the stark terror of one non-swimming soldier I fished out of the deep end of a pool. I was even more surprised during a parachute jump into the sea off Guernsey, to discover that one TA sapper had blithely jumped from the 'plane into the sea, putting his trust in his parachute and life jacket as he could not swim either. He was certainly relieved to be in a boat at the end of what must have been a fairly testing episode in his young life, but he had, by courage (or was it training or just sheer stupidity?) carried out a pretty sporting manoeuvre. Obviously the lesson here is that potentially frightening areas can be removed from a soldier's life by sensible training.

What it boils down to is that fear can be very much reduced, or conversely, one's ability to conquer fear can be increased by sensible, progressive training and discipline. There will always be areas where no amount of rationalizing will stop the old knees trembling, what does one do then?

My salvation was along the lines of "So you're frightened, so what! You've been here before. This is nothing new so get on with it." But although that has, so far anyway, always allowed me to complete the task in hand, it may not always work.

I think the most frightening situations I have experienced have been while diving in thoroughly unpleasant conditions of cold, high currents and/or low visibility. More than one mouthpiece has been severely savaged as the old teeth clamped hard to prevent total panic taking over. Diving in conditions of cold and low visibility seems to be able to get me worked up for a while and the gritting teeth routine has been quite useful in other spots of bother. Had I never been frightened, I would not have had this handy solution available when it really mattered.

Of course I have been less frightened in some far more dangerous situations. Fear, being irrational, as I have said, does not bear any real relationship to the degree of physical danger involved. The other odd thing about dangerous situations is that the post-event reaction seems unrelated to the real degree of danger. I had a fragmentation grenade explode some eight to ten feet away from my prone and vulnerable little body at one time and a few minutes later could hardly get a cigarette into my mouth let alone light it for trembling hands. (I smoked in those days). Some years later I narrowly missed getting splattered by phosphorus from an exploding grenade thrown by a trooper. The entrance to the cave in the cliff in Oman was big enough to receive an armoured car but somehow he missed it and the grenade hit the cliff face and fell near me. I commented on his lack of accuracy but felt no emotion other than irritation!

On my back, under a ship in Portsmouth harbour in nil visibility, with the keel of the ship at almost arms length, on a rising tide which I well knew was rising, I once had the utmost difficulty in resisting an impulse to shed all gear and head for the surface, because my air bottles touched the bottom of the harbour; totally irrational and requiring some serious mouthpiece biting! At other times, having become totally absorbed in an underwater job, I have had to wriggle out of far more dangerous situations and felt nothing more than a mild concern for my predicament.

The first time I overturned a Land Rover, I covered my two passengers but not myself in petrol. All I can remember about the whole affair was laughing myself silly over the Lifeguard officer's desperate concern that no one should light a cigarette near him. However, he continued the journey with me but the Special Air Service trooper decided to ride in a following lorry! I also remember that the whole split-second episode seemed to last for ages and I was able to think "Oh dear, I'd better turn the ignition off," and indeed did so. The next time I overturned I don't remember anything except dusting myself off. The third time my driver was responsible, on an icy road on exercise in BAOR. My only memory of that was "Oh no, not again." At no time was there any adverse reaction in the shape of post-event trembling, acute need of a double, or anything of that nature. However, in another car accident resulting in 24 stitches over my eye, I can well recall thinking in the ambulance "If the Russians thump me on my other eye, I'll tell them everything."

An interesting feature of being frightened is the differing reactions one has to real or imagined danger. Lesley Garner, writing in a newspaper on "Fear and the Invisible Factor", stated that "Fear is the companion of incapacity. It is not the hungry lion, the menacing intruder or the falling 'plane that is frightening in itself, but our powerlessness in relation to it." I believe that she is near the truth but that it is not the whole answer.

I can remember shaking like a leaf after the grenade went off near me through my own stupidity, but when the phosphorous grenade exploded near me in Oman, I was too angry with the clown who had missed the cave to be frightened. During an incident in Cyprus, where I was involved in a serious fire-fight at night, I was too busy trying to work out what on earth was going on to be frightened. I am sure it was my own soldiers shooting at life-threatening bushes which were advancing on them in a menacing manner, but I never did find out who had started firing.

So it seems to me that one can learn to cope with fear by realistic training of individuals and teams, to develop mutual confidence; by keeping fit, and taking the opportunity to rest properly to reduce the fatigue factor, and by exposing people to frightening experiences under controlled conditions.

I think the old general had it right with his "a fright a day (on a horse) keeps fear at bay". As a very young chap, presented with a daunting jump on the hunting field, I was told the usual "get your heart over ..." and it really did seem to work, but there were times when my heart got over splendidly and so did the rest of me, but the horse had other ideas.

# A Category "A" Bomb

LIEUTENANT COLONEL E E WAKELING ERD MBIM

*This article gives an account of the disposal of an "A1" category bomb which the personnel concerned dealt with in the full knowledge that throughout the period taken to make it safe, it was ticking! It follows an article written by the author and published in the December 1993* Journal, *entitled* A 500kg Unexploded Bomb in Cleethorpes.

DURING World War Two, unexploded bombs were dealt with according to certain rules, and allocated "categories" or "priorities" as follows:

| | |
|---|---|
| A1 | Immediate disposal essential. Detonation of bomb in situ cannot be accepted on any terms. |
| A2 | Immediate disposal essential. Bomb may, if situation demands it, be detonated *in situ*. |
| B | Rapid disposal urgent, but less urgent than "A". |
| C | Not necessarily calling for immediate attention. |
| D | May be dealt with as convenient. *(Bombs falling in open country usually came into this category).* |

Because it was known that Germans had a long delay fuze which could be set to explode any time up to around 90 hours after a bomb had been dropped, rules were laid down that work would not commence on any bomb found until four days had elapsed unless circumstance dictated otherwise, for instance when a delay or an explosion would damage the War effort. These were category "A", meaning that work must commence immediately, regardless of the danger of loss of life to bomb disposal personnel.

One morning in 1941 at about 3am I was woken by the Guard Commander, to be told that a call had just come through from Company HQ. As a result of that night's raid there was a category "A1" bomb in a factory. I jumped out of bed, telling the corporal to wake my Section Sergeant, who should be in the office in ten minutes. Also to wake Maggs – my driver/batman – and tell him to have the PU (pick-up) outside the front door in 15 minutes.

When I met my sergeant in the office, I gave him all the information I had, and told him that I would go ahead to recce the bomb. He would organize shifts and bring the first one to the site. We would work round the clock – nonstop. Three of the four squads of the section would take shifts, working six hours on, twelve hours off, no rest and no meals during the working shift, but with tea available at all times. Each shift must have at least eight hours sleep whilst off duty. The fourth squad would continue to work on the most important category "B" bomb. Work on all other bombs would stop for the time being.

If the bomb penetrated to a considerable depth, it would be necessary to split the four squads into two eight-hour shifts. (The deeper a bomb went, the more men were required to get it out!)

The first shift would leave as soon as it was ready, taking just the equipment necessary. Being a factory, we would probably have to go through a concrete floor, so the compressor, with all it's tools loaded should be brought along. Pumps, hopefully, wouldn't be needed at once so could be left until later. The second shift would bring up the timber for the shaft. Once I was there I could decide what size shaft.

By this time Maggs came into the office to announce that the PU was kitted out with all necessary equipment. Telling him to organize a flask of tea, I finalized details with my sergeant, then was out of the building yelling for Maggs on the way.

We had a fast but uneventful drive to the bomb site, Maggs was a very good driver. It was unfortunate that his scruffy appearance caused many people to conclude that he was "thick" – that he was not, as I had discovered over many months of close contact. It was his deliberate deception because he didn't want responsibility. He was quite happy to be "just a driver"! He looked after me extremely well, so I had no complaints.

When we arrived at the barrier across the road which lead to the entrance of the factory, I was surprised to see a civilian standing with the policeman on duty. The man introduced himself as "a man from the Ministry." He said that the factory was producing tanks which were vitally needed for the war in the desert. It was imperative that it was out of action for the minimum amount of time and in NO WAY was the bomb to be exploded in situ because of a special machine, close to the hole of entry, which was one of just three in the UK, and only available from the United States.

Leaving the PU at the barrier, I walked into the factory, having been briefed by the constable as to

the location of the bomb. I returned grim-faced – it was worse than I had expected. In addition to the concrete floor, which I had anticipated, the area was crammed with heavy machinery, limiting the positioning of the shaft and its size.

The hole of entry indicated that it was probably a 500kg with the possibility of two fuzes.

Maggs did not need to be told to get the probe out and assemble it, and I went back to the hole of entry with him. Taking the probe I pushed it into the hole in the concrete floor, hoping the "trace" of the bomb would give me some idea of the angle of entry. It certainly wouldn't help me assess the depth because the concrete would have slowed the bomb's progress. At 4ft, I felt something hard – "the tail fin," I thought. I managed to get the probe past it, but at 10ft was unable to feel anything else. Still, at least I had some idea as to where the bomb might be.

By this time the first shift had arrived and the sergeant reported to me. I pointed out the limitations put upon us by the positions of the various bits of machinery. "We'll break up the concrete here", I said, marking out an area 6ft by 8ft. "Heaven help us if it's got a 50 fuze."

The Germans had two sizes of bomb which could be fitted with two fuzes. The SC 250kg and SC 500kg. Both general purpose bombs. Their "favourite" combination of fuzing was a 17, which was a long delay fuze, based on a clock mechanism which, in those days, we stopped with a powerful electromagnet. But, to stop us from doing just that, the Germans put in a 50 fuze as a booby trap, or anti-handling fuze. It was armed in the normal way on leaving the aircraft, but did not become active until after it had come to rest. From then on, any slight movement or vibration would set it off. The clock of the 17 usually started soon after the bomb had come to rest, so the pair were a strong combination, which the Germans thought would prevent the bomb being made safe.

To make it even more difficult, some German genius thought up the idea of putting an anti-withdrawal device (Zus 40) in the fuze pocket under the 17 fuze, so that if it was extracted – it was possible, even if it was ticking – then, again, the bomb would explode – perm any two from three!!

Soon the whole place reverberated with the sound of pneumatic drills as we broke up the concrete floor. Fortunately, it was only about 10 to 12ins thick and not reinforced.

We had the job done in about 3hrs. Removing the lumps of concrete and hard core underneath was difficult to say the least, but by the time the second shift arrived 6hrs later, we were down a couple of feet and the men were very tired. I sent the sergeant and the first shift back to the section billet, with instructions to have a meal and then rest – preferably sleep.

The second shift really got cracking on the sub soil. Having been able to sleep to their normal time they were fit and ready to have a go. In cases like this it was always a matter of pride to be the squad which actually uncovered the bomb. I thought it was more likely to be the third, or even the fourth shift which would be the lucky (?) one.

Having sent the sergeant back with the first shift, I told him to return with the third, when I would take a rest in the back of my PU.

After 6 solid hours of digging, the second shift had made substantial progress to 8ft. The tail fin had been removed at 4ft, confirming my original suspicion that it was an SC 500 – a standard German general purpose bomb which could have two fuze pockets.

Before I let the third shift start, I went down and probed again, this time touching something at 13ft. So, if shift three worked as hard as shift two, then they could be the ones to uncover the bomb. Returning to the safe point, I ate some food; it was now just after 4pm in the afternoon and I had not eaten that day. Telling the sergeant to take control, I climbed into the back of my PU curled up under a couple of blankets and went to sleep.

Whilst I slept, the sergeant made one careful use of the probe, making a good contact with the bomb. Placing the magnetic microphone on the probe, and the headphones on his head, he switched the stethoscope on only to hear the very sound he most dreaded, one fuze in the bomb was ticking! He withdrew the probe, switched off the stethoscope and decided not to tell the men – or me, until I woke up.

The men, hoping to be the ones to uncover the bomb, dug quickly and well. The sergeant made sure they timbered the shaft correctly – he didn't want heavy machinery falling in on top of them!

I woke from a deep exhausted sleep and took some time to realize where I was and why. Then it dawned upon me, I was sleeping on the job! I had slept for two hours. Throwing off the blankets, I jumped out of the PU and made my way to the shaft. Before reaching it, I met my sergeant on his way out. In a quiet voice he said:

"It's ticking, Sir."

That stopped me dead in my tracks.

"My God!" – I was very prone (at that time) to use that expression when under stress or on receipt of bad news.

"Do the men know?"

"No Sir, I thought it wise not to tell them."

I complimented him on his decision.

"How much further down is it?" I asked.

"About 3ft!"

"Let's hope we get to it before it goes off!"

We walked back to the shaft and, standing at the top, I watched the men digging away, fast but not without care. They knew that they were close to the bomb and that an accidental knock with a spade could explode it.

"Start rabbiting," I said, "but be bloody careful. We need to get down to the first fuze as fast as possible." "Rabbiting" meant that they would dig a small hole straight down to the bomb, and by nine o'clock we'd reached it.

"Right, everybody out. I'll uncover the fuze nearest the tail." It took me but a few minutes to gently clear the final earth around the bomb.

It was the 17! (Later in the war we had the "Stephens Stopper", which enabled us to stop the clock of a 17 fuze without disturbing the 50).

We would have to reach the other fuze first, if one existed, in case it was a 50 – *(with??)* an anti-handling device. We had to resume digging.

I climbed up the ladder and went back to the safe point, where the men were gathered. I told them, as if they hadn't guessed, that the fuze was a 17 and that it was ticking. We would have to dig down to check on the other fuze, just in case it was a 50.

"I can't tell you to hurry, but you all realize that it might explode at any time. An even greater danger is that one of you could knock the bomb with your spade which could have the same affect. We will only have two men in the shaft at a time and you will only be in there for ten minutes, OK? You will be detailed for each stint and the sergeant will keep the time."

The sergeant quickly named two men who literally shot down the ladder, wishing away the next ten minutes. The remainder retired to the safe point to be called up by the sergeant as their time approached.

Eventually, one of the sappers called up to say that he had reached the fuze.

Whilst the digging had been going on, I had gone back to my PU and set up the piece of equipment which I would require to render the fuze safe – a Bomb Disposal Discharger. It had been designed by "Boffins" to insinuate a fluid into a fuze to discharge the electricity in its condensers. It had to be done in such a way that the two plungers, depressed when the fuze was charged as it left the plane, were not depressed again as the fluid went in – THAT would also set the bomb off!!

Carrying the discharger, I climbed down the ladder knowing that I could be blown to Kingdom Come at any minute, by that damned ticking 17 fuze or if I was "heavy handed" and accidentally knocked the bomb whilst I was immunizing the fuze. With trembling hands I placed the collet of the discharger on the boss of the fuze head and slowly turned the screw to ensure a fluid-tight joint. Having got that right, I started pumping up the pressure. Satisfying myself that I had got it right, not too high, I turned the cock on the collet head and watched the fluid level drop as it filled the pipeline and collet. Noting the drop of the fluid (I would have to check later that sufficient fluid had gone into the fuze to immunize it) and checking that the pressure was still correct, I left the shaft. It would require at least 20 minutes for it to have it's effect. By now the microphone of the stethoscope was on the bomb itself, and the listening watch was back at the safe point.

During the wait I organized the men. When the time was up and I had removed the discharger, I wouldn't be removing the fuze!! Two men would immediately start digging to make room for the "Clockstopper" to be placed on the ticking 17. The clockstopper equipment was prepared. We set up the batteries and control box, ran the cable out to the shaft and brought up the clockstopper to the top of the shaft.

After the time had elapsed, I returned, removed the discharger, climbed out of the way and watched the two men digging around the bomb. Care was not the important factor now, as the 50 fuze had been immunized, but time was of the essence and speed the byword. I had a thought that my luck was just about to run out and that the bomb would explode, just as we were putting the clockstopper on the bomb.

Once the men had cleared sufficient room I went down the ladder whilst my sergeant organized the team at the top. The clockstopper was eventually lowered with some difficulty. It was a cumbersome piece of equipment, about 14ins in diameter, 10ins deep, with two large handles. It always appeared to weigh a ton, (actually it was about 112lb). However, with my sergeant's help, we manoeuvred the weighty lump of the magnet onto the fuze cap. As soon as it was in position I

yelled "clockstopper on." I heard the response from the safe point, "Clockstopper on!" No sooner did I hear the voice, than I heard the "thump" of the powerful electromagnet as it adhered itself to the bomb.

A faint voice called "It's stopped ticking!"

My sergeant and I looked at one another and we laughed out loud with relief.

"Not bad, eh, Sir? Less than 18hrs to kill the Bugger. Mind you, it's not over, but at least we know that it won't blow up the factory."

This had been my lucky day. With the limited amount of space in which to site the shaft, we had been fortunate enough to find the bomb within it's confines. There had been no need to tunnel.

The next stage would be the removal of the bomb. I decided that Number 3 shift had worked hard and long enough and told them so. Their shift was almost up and I told them that they could knock off and go back and have a bloody good, and well deserved, sleep. Number 4 shift would dig down to uncover the bomb and remove it – with the clockstopper still attached. I phoned Section HQ, and spoke to the lance sergeant to ensure the next shift had all the equipment they might need to carry out their work, before they left for the site. Maggs and my sergeant went to the local hostelry, whilst I used the phone to tell the OC that the danger was over and that by the morning the bomb would have been removed and the factory could resume work. I then repaired to the pub, asking the constable on duty at the edge of the evacuation area to tell the corporal in charge where I could be found.

Under my direction the men got down to removing the earth which still held the bomb in position, whilst others brought up the gyn and set it up over the shaft, securing each of the three legs to machinery close by. Lifting a bomb out of a shaft is difficult at any time, but trying to raise one with a clockstopper on it is doubly difficult. It had to be lashed to the bomb, so that it would not move; if it fell off, then the clock would start ticking again, and the bomb could explode.

Having lashed the clockstopper to the bomb, another set of ropes was required to lift the bomb out of the shaft. The gradual lifting of the bomb to ground level began. Half a ton dead weight of bomb, plus another hundredweight of clockstopper which altered its centre of gravity, is not an easy load to handle, but we made it. As soon as the bomb was above ground level, timbers were slid across the opening of the shaft.

So far, so good!

Whilst this was going on, Maggs was looking around the factory to find something suitable to remove the bomb from the factory. He found a four-wheeled trolley, not unlike the luggage trolleys to be found on railway station platforms at that time. I was a little doubtful as to whether the trolley would take the weight, but decided to risk it. We lifted the bomb higher, slid the trolley onto the timbers, which I had decided to double in thickness – just in case. The bomb was then lowered gently until it rested on the trolley. Satisfied that both the timbers and the trolley would take the weight, a few sandbags were laid either side of the bomb to stop it rolling whilst in transit. The ropes were undone and the bomb was wheeled slowly through and out of the factory, one man holding the clockstopper cables to ensure they did not get caught up in the wheels of the trolley.

The next job was to carry the gyn out, to be used to lift the bomb onto the back of the truck.

The clockstopper batteries were put onto the truck – we still couldn't disconnect or switch it off yet. In next to no time the gyn arrived and the bomb was lifted high enough for the truck to back underneath it.

I then phoned the Civil Defence HQ to advise them that the site was clear and production could recommence, told the constable on duty that the barriers could be taken down, and followed the truck to the bomb cemetery.

At the bomb cemetery, I told the corporal to get the bomb off the truck carefully, with the clockstopper intact, and to await the arrival of Number 2 shift, who would come out with the steam sterilizer to empty the bomb of its explosive. He was told to "have a go" at removing the baseplate, which would make the steaming out somewhat easier.

My sergeant and I returned to Section HQ. The lance sergeant was told to get on with steaming out, and cautioned to leave the clockstopper on all the time. I would be out to supervise the removal of the clockstopper and the two fuzes, which might be followed by a small explosion if the 17 fuze had a Zus 40 under it.

Having decided that we had both done as much as was possible, we both fell into our respective beds, thoroughly exhausted. I expect that Maggs did as well, but you never knew with him. He probably had had more sleep than anyone. Who misses a driver when there isn't any driving to be done??

# When The Lights Came On – 8 May 1945

## Postal and Courier Memories

*The following are accounts by postal officers of what they were doing on Victory in Europe (VE) Day – 8 May 1945.*

**Lieutenant W Barlow RNVR (Royal Naval Voluntary Reserve) (later Chairman General Post Office Board Sir William Barlow), Electrical Officer, Levant Coast, based in Beirut.**

I REMEMBER being called to Divisions, when the Base Captain announced the end of the war in Europe. This was followed by a church service. After a party in the Wardroom, we went out into the streets of Beirut which were already *en fête*. We soon heard shooting. At first, we thought it was in connection with the celebrations but then realized it was something more serious. On return to Base, we found that the French forces had combined with the Syrians and were attempting a *coup d'état* in Lebanon. The British took swift action which resulted in our former colleagues in the Free French Navy at the base being put under house arrest.

**Major W F Barnes DADAPS (Defence Advisor Director of Army Postal Services) 8 Corps.**

I REMEMBER that as the war ended we approached Celle, where all our Corps specialists were withdrawn to deal with the crisis at Belsen. From the frightening tales they told, I am glad a postal specialist was not needed. The rest of us carried on over Luneburg Heath to Hamburg, Lubeck and Kiel. I was somewhere in this area on 8 May, but cannot remember exactly where.

**Flying Officer J W Bridge (later Brigadier J W Bridge CBE, Director PCS (Postal and Courier Service)), RAF Liaison Officer, HQ Czech Brigade.**

I REMEMBER having just completed a tour of operation. I was posted to my "rest" job with the Czech Brigade, which had the Germans bottled up in Dunkirk. The RAF used this area as a training ground for newly qualified Typhoon pilots. They were "blooded" on targets in Dunkirk before being sent to join operational squadrons. My job had been to sit with a radio set at a vantage point on the perimeter, to control the attack – a very interesting four to five weeks.

Two points of interest. Although the European war finished on 8 May, the one exception was at Dunkirk where the General Officer Commanding had not received his orders and refused to capitulate. Our war finished on 9 May.

Secondly, it only struck me on the way down to Mill Hill for the VE-day luncheon last week. I'm sure I can lay claim to being the first British serviceman to enter Dunkirk after our withdrawal in 1940 – unless someone knows otherwise ...!

**WO1 A V Burge BEM Regimental Sergeant Major 1st (British) Armoured Division Provost Company Police, 5 Corps 8th Army, (later Colonel A V Burge MBE BEM Commandant Postal and Courier Depot 1972-79).**

I REMEMBER having arrived at the Semmering Pass in Austria to meet the Soviet Forces, I had to return to Klagenfurt to try and police a great shoot-out taking place between King Peter's Imperial Guards and Mihajlovic *četniks* with Tito's partisans. What a first day of peace, when I should have been on my way to form the first International Police Force in Vienna.

**Yeoman of Signals N A Bush RNVR (later Major N A Bush TD), Naval Officer in Charge Antwerp (Naval Party 1501).**

I REMEMBER that day in the Signals Office, it began busier than usual but, as lunchtime came and went, traffic died down; obviously originators of messages had better things to do with their writing arms.

Meanwhile the local population, which had been very subdued during the V1 and V2 attacks and even more subdued when the Germans broke out in the Ardennes, began to whoop it up on the main boulevards. (I never knew, until then, how many Belgians had been in the White Army!) Some of us joined them but as the evening wore on, a number of "Brown jobs"

began blasting off with Stens and Verey pistols and were not too fussy about firing into the air. Not wishing to become casualties at that stage, we adjourned to the C&POs' (Chief and Petty Officers') Mess, where the beverages were stronger than the local brew. Proceedings there soon degenerated into what is known in Naval parlance as a "Sods' Opera".

### Captain J F A Day, Royal Signals (later Major J F A Day ERD JP), in transit ex Python, Royal Signals Base Depot, Cairo, Egypt.

I remember after nearly five years continuous service in MEF (Middle East Force), I was passing through the Depot and found myself detailed as Orderly Officer. The guard had been mounted earlier that day by another officer and 7pm found me approaching the guard tent to inspect the guard. I saw no sentry about to challenge me, and heard singing coming from inside. Looking inside I saw, to my horror, that a boozy party was taking place and all the guard appeared to be celebrating. I grabbed the NCO in charge and pulled him outside. Asked to explain, he said they were all Post Office high-speed morse operators who had spent the past five years in remote stations on specialized duties – which did NOT include military duties. I ordered him to post the most sober soldier at the front gate immediately and gave him one hour to sober up his guard and instruct them on their duties. I added that failure to do so would mean immediate arrest and a court martial would follow.

Fortunately 90 minutes later he was able to turn out a reasonably competent guard, and as a precaution, I inspected them every hour throughout the night. Next morning I prepared a non-committal report and left with the guard for Alexandria and home. We were all very relieved to get out of such a nasty situation. The soldiers thanked me on the journey home. What would you have done?

### Lieutenant W Smart (later Lieut Colonel W Smart MBE), General Factotum, 8 Base APO. General HQ and Line of Communication (LoC) Troops.

I remember that I was summoned to attend DDAPS, HQ 21 Army Group, to be told that I was to report immediately, if not before, to 3 (British) Infantry Division at Lustringen on the eastern outskirts of Osnabrück. The Postal Officer had fallen by the wayside and the Divisional Commander had demanded an immediate replacement. I packed my bags and left first light next morning 9 May 1945 on the floor of a Dakota. I saw no flags or celebrations in the streets and after seeing some of the scenes shown on television I am left confused and wondering whether it was the same war in which I was engaged.

### Lieutenant J Turver (later Lieut Colonel J Turver OBE), Postal Officer, HQ Guards Armoured Division, Starde (near Hamburg).

I remember that the Guards Division had been making fairly easy progress across the northern plains of Germany when they turned north to clear up the Bremen-Hamburg peninsula. They were faced then by the SS *(shutzstaffel)* Marine Division which slowed down the advance.

On the morning of 4 May, it was widely known at Guards HQ that the end was near. Orders were received later that day for the Artillery to fire a final five-minute barrage at 0800hrs on the 5th, thereafter there was to be no activity on the Guards front.

As 4 May happened to be my birthday, the occasion called for a double celebration.

### Sapper J G Long (later Major J G Long), 2IC Railhead Detachment REPS (Royal Engineers Postal Section), 2nd Army.

I remember I was at Bedberg, a small village just inside Germany from the Dutch border, west of the River Rhine. It boasted a railway station and that was where the British 2nd Army Postal Railhead was sited for surface mails to/from formations etc of 2nd Amy, then storming their way into the heartland of Germany. At that time all the rail bridges across the Rhine were unusable having been either demolished by the retreating German forces, bombed out of existence by the Allied air forces or had fallen into the river from the close attention of both factors. In consequence, surface mails were being transported to/from Calais and Bedberg by rail, off-loaded by a small REPS detachment, sorted by bags into the various roadhead piles then loaded onto three-ton vehicles that ferried mail between those roadheads and the Bedberg railhead.

The railhead had very little other traffic. One noticeable exception was that of a small party of persons liberated from the notorious Buchenwald Concentration Camp, who presented me with a pictorial sight of horror that I will never forget. Those poor unfortunates had been medically vetted and passed being well enough to be evacuated back to their respective homelands. If they were "fit to travel" then goodness only knows what a sight those declared as "unfit" must have presented – but their liberators etc would have known ... gruesome in the extreme!

My other vivid memory of that day was nightfall when, seemingly, every single person who had a firearm/gun or whatever attempted to fire the "last shot of World War Two". The cascade of tracer shells from Bofors Guns outshone any firework display that I have ever witnessed; the scarlet-red ball-like orbs floating aimlessly up into and around the darkened sky and the racket of explosions must have rivalled the concentrated barrage of guns at El Alamein almost three years earlier.

### Major A Wolstencroft
### (later Major A Wolstencroft CB), In UK.

I remember I was on demob leave, attending a party near Lancaster, (my home town). The Post Office authorities had requested my early return to the Department, perjuring themselves (as I subsequently ascertained) by certifying that this was in the national interest, or some such phrase. I can understand it might have been considered in the national interest to get me out of the Army at the earliest possible moment, but not, as was alleged, to get me back into the Post Office! But I do look forward to reading about what my colleagues of those days were doing, still in the field.

### Major W J Edwards
### (later Major W J Edwards ERD), DADAPS, HQ No 1 District (Forli, Italy).

I only recall entering the District Mess in Forli finding only one officer therein and remarking to him "Where is everybody?" The officer in question was Major Bracewell-Smith, Catering Adviser, whose father owned the Café Royal and the Piccadilly Hotel in London and who became Lord Mayor of London. "Bracers" as he was known, was a likeable chap and we proceeded to celebrate despite the lack of others.

### Captain J J Schweiger
### Parachuted into Styria (Austria) approximately six to eight months previously. Unit: Special Operations Executive, No 1 Special Force.

I remember, about three or four weeks prior to 8 May 1945, we were contacted by the local German *abwehr* detachment (located south of Leoben) and were asked whether we could arrange surrender talks for the two German Army Corps, one retreating from Greece, and the other retreating from Hungary – a house on the Wörther See would be made ready for such talks. After communicating this request to our Bari HQ, we received strict orders from HQ to refrain from any further such talks, and to inform the Germans that the German Army Corps concerned would have to surrender to Tito and to the Russians respectively (I assume the Russians had become nervous about "separate" peace negotiations).

I think it must have been on 8 May that the German OC of this *abwehr* detachment agreed that he and his detachment would now have to be considered as our prisoners of war. He requested permission, however, for their immediate withdrawal to the west (Salzburg) and the American POW cages, so that he and his men would not fall into the hands of the Russians now approaching from Vienna. This was granted by us (we could not have stopped them anyway) and they left.

### WO1 V P Youdell RAF
### (later Major V P Youdell), Pilot Bomber Command, escaped prisoner of war, formerly 156 Squadron RAF Warboys, Cambridge.

I remember that day I had reached a village called Usti, in Czechoslovakia, after marching many miles from our POW camp in Germany, since January. It was just inside the border of the Protectorate and the German Sudetenland at the eastern end of Czechoslovakia. When I arrived the Germans were still occupying the village but in the afternoon, after a small battle, they withdrew and the Russian Army, which had battled its way from Stalingrad, came in.

There followed the most exciting time of my life, with me cautiously drinking vodka – the most potent drink I've ever had – with the Russian soldiers and having party after party with the Czechs to celebrate their release from German occupation – but I still had to get home which was the other side of Europe.

**Lieutenant A A Seaton**
**(later Brigadier A A Seaton CBE,**
**10th Cameronians,**
**Langholme, Dumfriesshire.**

I remember that the 10th Cameronians were part of the Scottish Training Brigade in ten companies of some 1800 Jocks.

The announcement of VE raised the unholy question of what to do with the 1800, so it was passed to the sucker of an Orderly Officer of Day – one Seaton. The NAAFI (Navy, Army and Air Force Institutes) absorbed some, many walked out to the local village pubs (two). The rest were trucked into Carlisle.

The drafts for North West Europe whoopheed it up – those for the Far East had a different view of their future but still got drunk.

They eventually all returned; there were some minor incidents – the RSM (one Percy the Bastard) was found knocked unconscious in a ditch – but still it was VE Day.

The last "passion wagon" returned and I was surprised to see all the Jocks jump out and vanish. On inspection I could see two ladies of the town in the rear of the three-tonner – starkers. They had been in there with 30 Jocks on the 20-mile return trip to camp – my thoughts boggled! What does the Orderly Officer do now ...?

A couple of army blankets were obtained and in due course the local police van picked them up for a night in their cells and rekitting by the local Women's Institute.

**Pilot Officer L P Bennett**
**(later Brigadier L P Bennett CBE),**
**34 Squadron South African Air Force,**
**Foggia, Italy.**

My log book shows that on 8 May we were ferrying petrol supplies to Aviano in northern Italy. These supplies were to support Tito's forces who were moving into the area around Trieste. I vividly recall that on the way back to base we picked up a Mayday call concerning a Baltimore which had gone into the drink in the Adriatic. Although we carried out an extensive search we found no trace of the aircraft and eventually returned to base.

I should explain that we shared a 'drome with an American Fortress Squadron (we had Liberators) and they apparently thought it would be fun to celebrate the end of the war by shooting up our tented camp. Deciding it was too dangerous to remain in camp a friend of mine (Bob Walters) and I went out on the town. The local vino was reputed to be mainly aviation spirit and I must confess my recollections of the latter part of the 8th are somewhat hazy. However, I do remember getting a lift back to camp sitting astride a water bowser. How I didn't fall off I'll never know – Lester Pigott would have been proud of me!

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# The Man Lifting Kite – a Forgotten Invention?

COLONEL J E NOWERS BSc(Econ) FIMgt

Correction to article printed in December 1994 *Journal.*

The author wishes to correct errors on page 324, right hand column under section headed "Cody's Experiments". In paragraph four, the measurement on line three should read 1300ft, instead of 13,000ft, and on line five, 1000ft, instead of 10,000. In the next paragraph, line three, 26,000ft should read 2600ft.

# Memoirs

## BRIGADIER R W DOWDALL

*Born 21 October 1929, died 30 August 1994, aged 64.*

Dick attended Bangor Grammar School and his brother Walter recalls that he was successful there, leaving with both the junior and senior certificates of education. He did not go to university, choosing to go direct to the RMA. However he did not neglect further education being always well and widely read, reading law for a few years and completing the examinations of the Chartered Institute of Secretaries, of which he later became a Fellow. His career choice was not unexpected because of the times in which he lived and because both his grandfather and great uncle were in the army.

His love of sport and games was well founded at Bangor, playing rugby football and tennis, the latter improving and developing throughout his career to the extent that he represented the Corps regularly and the army occasionally at tennis. He was latterly chairman of the Army Lawn Tennis Association. His other long abiding love and interest was sailing but this came later in his army service.

Dick was given a very wide spread of both regimental and staff appointments. As a troop commander he was in Hong Kong, Korea, Egypt and Maidstone and during this spell came under fire for the first time; his then OC recalls an excited Dick, face flushed, saying "I have just been shelled." Dick had brought it upon himself by going to an area of the lines where he had been expressly forbidden to go. For this he earned a right royal dressing down. He was not known during later life for always following the party line.

In 1956 he was posted to the UK Ministry of Supply Support Staff for the forthcoming atomic bomb trials at Maralinga. He witnessed the first explosion at the desert site. Earlier during his R and R leave from Korea he had visited Hiroshima and seen the devastation of it before the city was rebuilt. These two events obviously weighed heavily upon him for in 1992, at an address he was asked to give at the Remembrance Day service at Chetnole Parish Church, he recalled both. It was a very moving occasion remembered by the local parishioners and his address survives him on tape. He spoke of the dead of Hiroshima and in particular seeing the shadow of a Japanese woman etched forever on some stone steps where she had been sitting at the time of the atomic blast. Similarly the effect of blast at the Maralinga trials on the soldier dummies placed near the target area remained imprinted on his mind. He argued in his address of the futility of conflict and the consequent massive cost in loss of life. In a world then largely at peace he concluded that all "should embrace the christian message of love and peace which came loud and clear from the Gospels."

On a lighter note, it was whilst in Australia that his love of the ballet and ballet music was kindled. As far as one can tell the catalyst was a ballerina he was keen to marry; however she rejected him.

On his return to UK he became ADC to the Commandant of the RMA and spent two happy years at Sandhurst. He met Caroline whilst there and they became engaged and married in 1961 in Wimbledon. Over the years they gathered pets and animals about the family, but he was always passionate about his dogs and Caroline said he loved them most of all.



Brig R W Dowdall

By then he was a squadron 2IC in the strategic reserve, working for Staff College and trying to fit in his new-found love of sailing. When the squadron was sent on a short unaccompanied tour to Kenya, his first daughter, Jane, was by then expected but had not yet arrived.

His posting after Staff College was as BM of 12 Engineer Group at Woolwich (later moved to Wilton). The family by this time had grown with the addition of Susie, and it was with some relief and pleasure that they heard that his squadron command was to be with the Malaysian Engineers. A move to Malaya in 1966 was a welcome one for them all and for Dick, in particular, a time of challenge which he fulfilled with considerable success. It included a period in Borneo on operations. Dick clearly enjoyed this phase of his regimental soldiering and recorded a short history of the Malaysian engineers in an article for the *Journal*. Later, he and Caroline were the honoured guests of the Federation during the Silver Jubilee celebrations of the Malaysian Engineers when gifts were exchanged by the two Corps.

By now the family was complete. Hugh was born in Malaysia and the family returned to UK and the first of Dick's MOD jobs. He is quoted as saying that he had three tours on the 5th floor of MOD "all happily relatively short." The first of them was in MO where his work covered the rundown in the Far East and the operation in Anguilla. He was meticulous in his staff work; he set himself good old fashioned standards and demanded the same from others.

In 1970 he became CO of 37 Engineer Regiment in Longmoor. The regiment was one of five in 12 Engineer Brigade, part of the strategic reserve and with a worldwide "cold war" role to fulfil. Much of the activity in the brigade was, of course, directed to support for Northern Ireland and operational tours there. In addition to the operational demands, squadrons were deployed on project work worldwide and, in UK, on MACC tasks many of which were in Scotland. One such fell to 37 Regiment. It involved the development of an airfield on the Isle of Skye. The weather overshadowed every plan and consideration as can be imagined. The airfield was duly completed in 1972 and formally opened by George Younger the then secretary of state for Scotland. The CO's hard head for genuine, and generous, Scottish hospitality was revealed during the following celebrations when much goodwill was shown to the Corps and to 37 Regiment in particular.

Those who knew him well will remember his irascible short temper; his apparent love of a good argument, sometimes adopting the opposing view for the sake of it; and his somewhat brusque manner which, added to his stature, presented a somewhat daunting figure to the young or unsuspecting. He did not suffer fools gladly. But all will remember better his kind heartedness and thoughtfulness for others and the considerable lengths he would go to help them. He had the quality of being able to listen and listen very carefully and only then to give his views. He balanced his serious side with a wry and lovely sense of humour. His courteous and thoughtful approach indicated a sensitive and caring nature and these qualities made him always a very good friend. There is a lovely story from his bursaring days about a heated argument he had with a groundsman. Voices rose to fever pitch and the bursar was informed that he was an abomination of a bursar – "even your dog is nicer than you." There was a pause and a quiet rejoinder from Dick "Now, there you are absolutely right."

A spell in Germany as CRE of a division was followed by his promotion to brigadier and command of 11 Engineer Group at Minley. As such he was at the centre of shaping the Corps' basic training requirements for recruits, apprentices and junior leaders. He oversaw too the affairs of the Central Volunteer HQ and the specialist engineer pools. He was closely involved in the major building programme for the new Gibraltar Barracks which was to house the two training regiments. He was, as ever, leading a full and very busy life.

An officer present at the time remembers the day when Dick was presenting awards to a cadre class. He asked the top student his trade and classification. The reply was "Surveyor Engineer A3, Sir." Whereupon Dick wanted to know why he was not A2. The student said that he was to attend the next course. Dick then asked what was the student's weak subject. When the reply came "Maths, Sir", Dick not unnaturally asked what he was doing about it and quite unthinkingly the reply came "nothing." The result was explosive and the poor sapper not only received his award but nearly ended up in the guardroom too.

His final service in the army was spent as ACOS Intelligence at AFCENT in Holland and a moving testimonial of his time there was written after he died by a German colleague who worked for him. He said how lucky he was to have worked for Dick "he was among the best generals he had ever

met. He was honest, straightforward – what some of his countrymen disliked – and just, which was sometimes painful. God's ways are unknown and so are the time and place, when he wants us to come home."

During these latter years in the army, Dick became an active and enthusiastic sailor who raced offshore in the REYC yachts and was elected a member of the RORC in 1972. He encouraged sailing amongst all ranks during his command appointments and he skippered the Corps' yacht *Contessa Catherine* in the Fastnet in 1977 and 1979. The 1979 race encountered very severe weather which caused much damage to the fleet, and some loss of life, but Dick's seamanship brought *Contessa Catherine* safely into Newlyn with only minimal damage. As a skipper he was a hard taskmaster but extremely competent, professional and inspired a great deal of confidence in his crew in hard conditions.

After the army he was appointed bursar of Cranleigh School where he stayed for six hard-working but happy years. He is remembered there for the many changes he wrought in the bursary in dragging it unwillingly into the 20th century, the efficient management of the finances of the school and the imaginative way he was able to transform many of the essential facilities in the school by sensible modernization and refurbishment. On his second retirement it was felt, by the school, that he had been a great bursar.

By this time he and Caroline had found the perfect house for their retirement, deep in the countryside of west Dorset and were setting about the planning and work necessary to turn it into their dream home that it eventually became. Dick was nonetheless anxious not to retire finally and was appointed to the panel of Independent Planning Inspectors of the Department of the Environment. He might in the circumstances have taken on the more minor cases and settled for a quiet life but this would not have been Dick's style. So after his initial period of indoctrination understudying an experienced inspector he heard a number of important cases culminating in his last which was an inquiry in Cheshire into the siting of the Davenham bypass, 4.2km of new highway which attracted much local interest and thus many vociferous objectors to it. He handled this with great tact and firmness under very taxing circumstances.

And so Dick learned of his illness. Those who were privileged to see him in those last months were greatly impressed by his determination to make the most of what was left to him of life, and of his courage and his unfailing interest and pleasure in meeting and talking to old friends. He turned more to his Christianity, became increasingly loyal to his homeland and read widely about it. He and Caroline were able to make one final journey to Ireland and during it he had one final sail. How he loved that short holiday. The whole burden of these last months fell on Caroline and this trip could not have been made without her determination, strength of will and love.

He will be sorely missed. He is buried behind the tiny Batcombe Church which he came to love and served so well, still within sight and sound of his home and in a plot of his own choosing. At his funeral the church was full to the rafters and many had to remain outside; every square foot of space was occupied, even the sanctuary. This itself lent a family kind of atmosphere to a most moving service, much of the content of which was chosen by Dick himself. The address by Brother Samuel of the Society of St Francis expressed far better than the foregoing how much Dick meant to his many friends there to say farewell.

The service was concluded by his two sailing companions singing to the guitar the Simon and Garfunkel number, "The Boxer", one that they had all sung together on earlier happy occasions aboard their yacht. A Service of Thanksgiving was held in the Chapel of Cranleigh School on Monday 10 October 1994 at which the address was given by Mr Jonathan Leigh, headmaster of Blundells and former second master of Cranleigh.

## MAJOR GENERAL W M BROOMHALL CB DSO OBE

*Born 16 July 1897, died 13 January 1995, aged 97 years.*

WIDELY known as "Tubby" since his school days, William Maurice Broomhall was the son of A E Broomhall; fiercely determined from an early age to be a Sapper, quiet support by his parents and excellent schooling at Colet Court and St Paul's encouraged the development of values he maintained for the rest of his life. Straight from school to become a cadet at the Royal Military Academy, Woolwich, he passed out with Keane's Batch, and was granted a commission in the Royal Engineers on 27 October 1915.

He was soon in France with 201 Field Company, but his first taste of action was on the fateful 1 July 1916, when he "went over the top" as the Battle of the Somme erupted with such fury, and he never could expunge from his memory the futile loss of life in the first few hours there, which his clear military mind considered to have been exacerbated by faulty strategy. Still only 18, he immediately established a reputation for personal bravery, going on to be wounded at Guillemont a month later.

Returning to the front in 1917, he was again wounded, this time more seriously, in what has been described as a suicide attack on fortified machine-gun emplacements known as "the Twins". Before the war ended, he returned for a third time, now to 225 Field Company on the Belgian frontier, where he was already respected as an able tactician, though he himself still believed that he had not yet done full justice to himself or to the Sappers! This impulse, always to do even more, was characteristic of him for the rest of his military and business career, and continued into his many years of retirement.

What a contrast Broomhall must have found in 1919 on his next appointment: as a junior staff officer in MI3 Branch of the War Office, where his duties took him to the peace conferences in Paris; he was particularly involved with the Treaty of Sevres concerning Turkey, followed by his posting to Constantinople itself in 1920, for a year on the British staff there.

He returned to Chatham in 1921 to be given formal instruction in the art and science of military engineering. For part of this time, like most of his contemporary brother officers, he went up to Cambridge University for an abbreviated course in mechanical sciences, in his case at Christ's College. He soon made his name as somewhat of a "character", becoming well known to a much wider circle than most officers of his age.

It was then that one of the earliest stories about him originated: having a keen interest in motorcars, as well as having private means of his own, he visited the Rolls Royce showrooms in Mayfair to examine the vehicles on display there. Business was quiet and the only salesman on duty listened deferentially to the young gentleman's statements for 20 minutes or so, until his mind was suddenly concentrated by Broomhall's bald question, "What price and date of delivery?" Having failed to note all the detailed points made, the salesman was flabbergasted and reacted so poorly, that Tubby stormed out, subsequently persuading the Derby Rolls Royce Works to sell him a car with his own modifications.

Soon after completing his studies at Cambridge and Chatham, Broomhall was rewarded with a posting to India, the prize sought by most young officers in those days. Initially he was sent to Waziristan as a garrison engineer, working on the mountain road to Razmak. Two years later he joined the Bengal Sappers and Miners in Roorkee.

Always interested in the mechanical side of life, it was in India that some of the earliest items of American earthmoving plant came to his notice, as

Maj Gen W M Broomhall CB DSO OBE

well as cars and trucks of the same provenance. His service in Waziristan gained him an MBE, and this led to his being given command of 4 Field Company in the Peshawar campaign of 1929-31, when Tubby took part in many successful operations, one of which, the occupation of the Kajuri and Aka Khel plains, proved to be almost entirely an engineering undertaking. There was very little resistance, as the cavalry, artillery and infantry held the ring for several companies of Sappers and Miners, with their accompanying Pioneers. The plains lie a few miles southwest of Peshawar and are separated by the deep and precipitous chasm of the Bara River. In November 1930, the Nowshera Brigade was in position along the frontier road running southwards from Jamrud as it covered the operations of the company, which included the construction of a water supply pipeline for some 15 miles across a waterless plain to enable a major perimeter camp to be established for the pacification of the tribesmen.

Owing to spates in the Bara River, a bridge was needed urgently for the frontier road to cross the gorge, and this presented a peculiar problem; while the bridge had to be designed to carry a 10-ton steamroller over a span of 144ft, the Inglis Mk 1 bridging equipment available was limited to a span of 120ft under such loading. However, Captain Broomhall and his Sappers surmounted the difficulty by prolonging the bridge over its supports, so that the projecting ends remained as cantilevers. Each end consisted of three bays (36ft) and the last bay at each end was loaded with six tons of concrete to reduce the stress in the centre of the bridge. This provided an ingenious solution and received suitable acknowledgment, as did the work of the pioneer and infantry parties, who cut the deep approaches in the hard conglomerate soil.

What with this success and the fortification of the Nowshera post, as well as many other demonstrations of excellence by his company, Tubby was granted the Brevet rank of major, being also nominated to attend the Staff College, Camberley, for the 1932 course. But that was not all; in May of that year, Broomhall was advanced to OBE, in recognition of his part in the North-West Frontier operations.

His service with 4 Field Company on the North-West Frontier is illustrated in the well-known picture painted by Johnny Jonas in 1990, which was commissioned by the Corps to mark our long association with all the Engineers of India and now hangs in the Royal Engineers HQ Mess. Based on a photograph taken at that time, the painting includes Tubby, standing by his car.

On leaving Camberley, his outstanding ability was recognized by his next posting as Brigade Major to 145 (Argyll and Sutherland) Infantry Brigade. This was followed by a spell at the War Office, again in a branch of military intelligence, first as GSO 3, then being promoted to GSO 2; in this role, Broomhall's personal enthusiasm for cars and mechanical equipment was recognized by including in his assignment the task of monitoring the mechanization of the German Army.

Meanwhile the British "Mobile Division" of the thirties was renamed the "1st Armoured Division" in 1939; soon after mobilization, it was dispersed north of London as a mobile reserve. Its few Sappers were limited to 1 Field Squadron, including its field park troop, and there was no CRE, until Tubby was posted to that appointment at the end of the year. He immediately had his few Sappers concentrated at Pangbourne for a bridging camp, so that he could get to know them, and soon made his mark, both on the Sappers and on the divisional commander, who transferred him from CRE to become his principal staff officer (GSO 1) in time for the sudden move to France in May 1940.

Having been kept as a mobile reserve in England for all those months, the division never fought as one in France, but was frittered away, piecemeal, in the fighting on the Somme when the Germans blitzed through to the sea by Abbeville. When France collapsed, Broomhall was captured by a pushy enemy patrol in the chaos of the withdrawal towards Cherbourg.

He had some knowledge of the German language and recently recalled his memories as a very unwilling POW at Kassel, being marched by an escort of three German soldiers, not as he had suspected to an unmarked grave, but to the railway, where the guard of the train, a youngish German woman, chided his escort, as they travelled southwards, and was rewarded by Tubby giving her a bit of his Red Cross chocolate, an unknown luxury for ordinary people in wartime Germany. This led to Broomhall dispelling the escort's belief that their U-boats had closed the Atlantic to all shipping and, when his beady eye watching the stations through which the train passed had spotted a newspaper headline, he was able to browbeat them with the news just breaking that day, 3 February 1943, of the German Army's surrender at Stalingrad.

Their destination turned out to be Oflag 7B at Eichstätt in Bavaria; there his reception and

interview gave him another opportunity to upset the authorities, who placed him for a while in solitary confinement, but later relented enabling him to organize a mass escape by some 40 young officers, some in German uniforms, and to "vet" the plans for others

After each of these, camp security was tightened, and the POW felt that any further effort should involve the impersonation of more senior Germans. Tubby had the age and the air of authority to impersonate a German general, somewhat aided perhaps by his figure. With some of his friends, one of whom was really fluent in the German language, Lieutenant Colonel Broomhall decided to take advantage of the fact that German and international commissions visited the camp from time to time.

Quite by chance his Savile Row tailor was in the same prison camp, and they decided to improvise exact copies of German uniforms, so that Tubby could dress as Major General von Pappenheim, accompanied by an adjutant and an orderly; two others were dressed as attendant civilians. Intense efforts were made to collect suitable materials for every item of this clothing, even utilizing Red Cross blankets carefully shaved to simulate the cloth worn by German servicemen.

When all was ready, the ruse took place at lunchtime, when few of the guards were at their posts. The party of five walked round part of the camp, pretending to inspect the buildings, while other prisoners meticulously saluted the "general" resplendent with his red tabs, Iron Cross and jackboots. As they approached the back gate of the camp, the sentry saluted, and the "adjutant" used the correct password, showing the fake papers, which authorized the visit. Broomhall was not a credible German speaker, but he had carefully practised one sentence, which he barked out in an authoritative voice "Hurry up and get that gate open." Instant obedience, and out they marched – but not for long! The sentry's NCO telephoned the main gate to offer some comment on the visit, and a hue and cry was raised.

Before the escape party had reached the woods, where they had hoped to change and to lie up until dark, they were apprehended and escorted back to camp; there the commandant told them that wearing enemy uniform was an offence punishable by death. Tubby retorted that they were wearing "fancy dress" made up for them by their friends; after weeks of solitary confinement, they were transferred under heavy guard to the rigours of a fortress in Saxony, the formidable *sonderlager* Oflag IV/C, Colditz Castle, where the tougher officers of all three British Services were being concentrated under strict security; Tubby used to refer to it as the "Strafe College".

This was the prison, to which Lieutenant Colonel Broomhall arrived on 14 July 1943 and he remained there as the senior British officer for the rest of the war, imposing his forceful personality upon the German commandant. He was held in much respect by the German camp staff, as well as by the British POW, and was awarded the DSO in November 1945 for his outstanding leadership there and throughout the years of his imprisonment. Latterly, he often conjectured on the large numbers of German troops tied up for so long in the task of guarding the POW, spread, as they were, over many camps and frequently involved in escaping.

Like others, who had been in the enemy's hands for such a long time, Tubby returned to find that his contemporaries had been promoted and some of them, by several ranks. His brilliant pre-war prospects for advancement in command and staff appointments had now dwindled and he was destined to spend the rest of his service in engineer postings, for which he was well qualified but which would have been much more welcome, if they had been interspersed by spells in more operational fields.

As it turned out, he was posted in 1946 to be Chief Engineer (brigadier) of the Allied Armies in Italy, and moved the next year to be Chief Engineer of the British Army of the Rhine, where his energies were devoted largely to the task of providing accommodation and amenities for the British troops, restoring German communications and services, as well as assisting the Dutch and Belgians in the rehabilitation of their countries. At the same time, it was necessary to keep up the efficiency of the Royal Engineer units, rendered all the more important by the absorption of large numbers of new entries in replacement of men discharged and demobilized on the cessation of hostilities.

His promotion to major general (this time for real) came in 1948, when he took over as Chief Engineer Middle East Land Forces, based at Fayid in the Canal Zone. With a powerful engineer hierarchy under him in Egypt, his duties took him far and wide around the Levant, and to Greece, where an important British military mission was doing its best to rebuild the Greek Army after the civil war waged there by the Communists.

After the British withdrawal from Palestine that year, the nascent State of Israel took over much of

that country, but leaving in Arab hands both Gaza and the Judean Hills; the latter continued to be defended by the Jordan Army popularly known as "the Arab League", and commanded by Jack Glubb, a Sapper contemporary of Broomhall's always known as "the Pasha". Somewhat surprisingly this force did not then include an engineer regiment, until, at the instigation of General Sir Brian Robertson, C-in-C Middle East Land Forces, the Jordan authorities accepted Broomhall's advice to Glubb and agreed to raise such a body of Arab engineers, to which some British officers and WOs were seconded.

An interesting insight into Tubby's mind can be gauged by a small incident, which occurred during his tenure at GHQ Fayid. His near neighbour was the resident Admiral, whose newly arrived flag lieutenant sought to have a leaking tap repaired; unused to the military telephone directory, he dialled the Broomhall residence and, perhaps somewhat peremptorily, demanded early action. Broomhall took the call, and, rather than passing the sailor onto a more appropriate office, he took up a bag of tools and walked round to the nearby Admiral's house to do the repair himself. Instead of having a siesta, the latter was holding a tennis party, and saw his neighbour, General Tubby, successfully completing the repair, much to their mutual amusement.

Broomhall had been honoured with a CB in 1950, before retiring from the Army in 1951 to become Chairman and Managing Director of the Cellulose Development Corporation in London. There he travelled far and wide on its behalf until 1972, in which year he served as Chairman of the British Paper Machinery Makers' Association; he was also a member of the Institution of Chemical Engineers for many years.

Even in his years of maturity, he continued to derive great satisfaction from driving fast cars, and it was only the onset of eye trouble which finally persuaded him to give up driving his beloved E-type Jaguar.

Throughout his life, Tubby's support for the Corps remained strong and he celebrated his 95th birthday by hosting a delicious lunch in a well-known West End restaurant, to which he had invited the (then) Chief Royal Engineer and a couple of fortunate fellow officers and their wives.

A past Chairman of the Blythe Sappers, he rarely missed any of their meetings, and he was meticulous in his attendance at London reunions of the Bengal Sappers and Miners, as well as those of the Colditz Association. Well into his eighties, he made a stirring Chairman's speech at the Colditz "Forty years on" gathering, at which he read out a message from the Queen Mother; the occasion included a visit to the Imperial War Museum and a cruise on the Thames, before the Memorial Service, at which a message from the prime minister, then Margaret Thatcher, was received.

On 1 June 1991, accompanied by a party of contemporaries, Tubby celebrated the 75th anniversary of his "blooding" on the Somme, by visiting that battlefield, before proceeding to Paris and gathering there for a banquet with a dozen *anciens combattants*. Even in his nineties, Broomhall impressed his friends by his spirit and thirst for much of the "good life", especially fast cars, delicious food, fine wines and stimulating company. Blessed with a phenomenal memory and still able to challenge anyone to a debate on almost any issue of the day (and usually win!) his stubborn denial of the ravages of time was remarkable. During his last months, a friendly neighbour started research for a biography, and Tubby was stimulated by the prospect, now sadly unfinished.

In an interview, shortly before his death, he said "I have devoted the whole of my life, from birth to the age of 97, to a deep affection and almost reverence for the Corps of Royal Engineers. I have had a very happy life with them, and some very sad moments when I have lost brave comrades – but I really owe my life to the Royal Engineers." A fitting epitaph for a great Sapper.

Finally, it was his practical ability that proved fatal, when Maurice Broomhall fell from a stepladder at his home, while trying to perform a household chore, as was his wont. The cuts he received were relatively superficial, but the shock must have been too great – he fought on for nearly a week before the end came. Although always most courteous towards the ladies, he had remained a bachelor throughout his life.

JC GLCC IHLG GBS

# Memoirs in Brief

*Brief memoirs are published below of distinguished men who served the Royal Engineers.*

**Lieutenant Kenneth Ryden MC* DL FRICS FRCP(E),** died in Edinburgh on 7 October 1994. Born in Lancashire in 1917, he joined the Corps at the outbreak of war, serving in India and Burma. Edited *Gazette* details of his MC awards are as follows:

- On 21 April 1945, Lieut Ryden was commanding the detachment of Sappers and Miners in the armoured column, which entered Yenanyaung that morning. The sapper detachment went to the head of the column to investigate a blown bridge. At this moment the enemy opened heavy fire with light machine guns and rifles from all sides at a range of less than a hundred yards.

  Seven infantry were wounded on the very open ground. Without the slightest hesitation and completely disregarding his own safety Lieut Ryden went to recover the wounded. Three times he went out and brought back wounded to safety, where they were covered by tanks.

  This officer's courage, determination and complete disregard for his own safety was an inspiration to all who saw it and is typical of this gallant officer's actions throughout this campaign.
- Lieut Ryden, has been in all the actions fought from the advance from the Chindwin to the capture of Kyaukse on 8 Feb 45. During the advance to Shwebo, he was responsible for seeing that the road was clear of enemy mines. His recce and clearing of mines have always been carried out under enemy observation and usually under heavy and accurate small arms and mortar fire.

  At the crossing over the moat in Shwebo, the advance was held up as the bridge was mined. Lieut Ryden, with utter disregard for his own safety, went forward under heavy fire to clear the bridge. As a result the tanks and infantry were able to advance and the greater part of Shwebo was captured that evening. His personal courage, leadership and determination have at all times been of the highest order and have been an inspiration not only to his own troop but to the squadron with which he was working.

After the war he rejoined the civil service and was attached to the UK High Commission in India and Pakistan, returning home in 1947. In 1959 he set up Kenneth Ryden & Partners in Edinburgh, retiring in 1974 but remaining a consultant until 1980. A meticulous and polite man, the firm still benefits from the tradition he inspired.

He was the first person from outwith Edinburgh to become Master of the Company of Merchants of the City of Edinburgh in 1972. He was also chairman of the Scottish Chartered Auctioneers and Estate Agents' Institute, 1960-61; a member of the Edinburgh Valuation Appeal Committee, 1965-75; a member of the Scottish Solicitors' Disciplinary Tribunal, and Liveryman of the Honourable Company of Chartered Surveyors.

He was DL of the City of Edinburgh in 1978.

He will be greatly missed by his wife, Cathy, and their two sons, Nick and Peter.

**Colonel Jim S Oakes MA CEng FIMechE FIEE,** who died on 10 October 1994, came from a military family but did his national service of two and half years in the Fleet Air Arm from 1945 to 1948. His very successful career as a consulting engineer, qualified him to be invited to accept a commission in the rank of major in the then Railway & Engineering Staff Corps, in 1972. He was delighted to accept and his pride in being able to wear the Corps tie was exemplified in his membership of the Blythe Sappers, whose Corps-inspired lunches he seldom failed to attend.

Jim went to Wellington and Trinity, Oxford, before joining Kennedy & Donkin. His field of expertise was in power generation, transmission, distribution and desalinization. He was responsible for all the firm's thermal generation work in Northern Ireland.

In no way was Jim an extrovert, but somehow he managed to convince those around him, in the nicest possible way, that he was totally in charge (which he was!) and he generated a feeling in them that not to carry out his instructions or to let him down in any way would be unthinkable. Such is the stuff of leadership. His many friends and beloved family, Gillian, Christopher, Victoria and Caroline, miss him greatly.

**Emeritus Professor Rolf Arthur Jensen, BArch BE FRIBA LFRAIA FRTPI LFRAPI JP,** Emeritus Professor of Architecture and Town Planning at Adelaide University, South Australia, died on 20 November 1994.

As Foundation Professor, he began the School of Architecture in March 1957 and a few years later the Planning School which subsequently ran a post-graduate course in urban and regional planning.

He served during the war in the Royal Engineers as a garrison engineer and in Singapore his exploits gained him a commendation for duties under Japanese air attack. He returned with the army to oust the Japanese shortly before the conclusion of hostilities.

On returning to the UK in 1946 he was appointed Director of Housing for the Borough of Paddington from 1947-56, now incorporated in the City of Westminster, where he remained until his appointment to Adelaide University from 1956-75.

In retirement, his activities as a Consultant Town Planner were enlivened by the establishment of a small farm in the Hunter Valley, and he maintained a continuing and active interest in planning issues (such as urban consolidation and public transport access to Pittwater in Sydney) until shortly before his death.

# Correspondence

## A SHORT HISTORY – THE ROYAL ENGINEERS

*From Captain S Simmons*

Sir, – On a visit to the RE Museum last year, I bought the fascinating "History" compiled by Major Aston, and was delighted to find a reference to the efforts of my own unit, Excavator Company, in Gibraltar.

On being commissioned, I went to 4 MTTD RE at Haydock Park, and from there to Halifax, where in the dark in a snowstorm, I took over a group to go to Gorouk. On a luxurious Polish liner we met the rest of a unit which became Excavator Company Gibraltar, under War Office control.

On arrival at Gib, we were told that the few heaps of rockfill (from the tunnels) which were being tipped into the bay by a single dumper on weekdays, was to be an airfield runway. Our major, whose name I am surprised to say escapes me, was a tough rugged practical character. He found Gib to be a cosy establishment running on a comfortable easy peacetime basis. It was difficult to gain access to higher command to get decisions made so he picked up a chair and placed it outside the brigadier's door. Planting himself on it he announced that was where he would stay until there was action – he stayed there most of the day. The brigadier was splendid, however, and action we had. We worked in shifts every day except Christmas Day. For plant we had 37 RB's, D7s and D8s, and to start with, Ford Thames tippers (later American 3-tonners and then Macs – in all 200 vehicles.)

The rock for the runway did not come from the tunnels, but from the North Front scree. It was won by several methods. We had a Canadian Section of diamond drillers and the Penmaenmawr Quarry Company from north Wales. (The CO was the manager, the 2IC or Adjutant was the company secretary, the NCOs were the foremen or gangers and the sappers were all quarrymen). They climbed the scree with the agility of mountain goats and naturally spoke and shouted in their mother tongue.

We had an ingenious ship's engineer who borrowed six Rolls Royce Merlin engines from the RAF and linked them in series to pump water from the basin between the north front road and the rock face where our camp was wedged. The water jetted through the nozzle of the fire-fighters' monitor with tremendous force dislodging the rocks the quarrymen had failed to move and bringing down others on their way down. Eventually the pipeline was extended to the top of the scree.

Some rocks were loaded directly onto lorries and some were blasted to a size the diggers could manage. Unfortunately, although a heavily loaded lorry could manage to get the loads to the seaward end of the tipping face without a half-shaft shearing, when attempting to tip the load, the cross brace supporting the end of the hydraulic ram folded up and the body remained on the distorted chassis. We also lost the cab of a lorry when it was whipped away by a Wellington taking off – with skill and bravery the pilot brought it in safely, helped by our prayers.

The plant did not escape damage. Rocks bounding down the scree and across the floor were dangerous. A 37 RB was made unusable when the counter weight rear was knocked off by a rock. The Dockyard gave us a steel sheet which was heated and rolled to shape with a road roller and welded on.

The water pumped from the brackish basin was replaced by sea water. The basin was full of eels which came to the surface as a writhing mass and were collected by the bucket-full by Spanish workers returning home from work.

Eventually when much of the loose scree had been removed a routine of drilling, blasting and clearing was established. A successful blast just shook the face in an effective shudder which loosened a great deal of spoil, but if an undiscovered hole was not plugged, boulders of a ton or more would sail through the air in slow motion to crash to ground or through the roof of my workshop already punctured by hundreds of smaller stones. The RAF have many splendid photos of the scene.

Within the scree were many silent sealed caves, veiled and floored by sheets of calcite and sometimes covered with delicate snowflake-like flowers of the same material deposited by evaporation in the still air over many thousands of years. They glistened and sparkled in the light of our lamps like a fairyland for the first and last time.

We witnessed many aircraft crashes – the most distressing was the loss of many nurses and children when a rescue plane from Malta went through the east end of the runway into the sea. Fighter planes were delivered in crates (which made comfortable apartments for some of us); we saw them being assembled and passing down our runway as the RAF went to support the North African landings.

Several times we thought we were going home, but then a larger plane was introduced and we had to stay a little longer to lengthen the runway. However, we regarded ourselves as lucky – life on the Rock was tedious for most troops but we were too busy and too tired to be bored. Yours sincerely – S Simmons.

## RECOLLECTIONS OF AN AMATEUR SAPPER/SINKERS

*From: Mr B S Baxter, REME Museum*

Sir, – I was interested to read in the December issue of the *Journal* the article on Anzio and the mention of the recovery of the BIV demolition vehicle. The BIV was a larger and more sophisticated device than Goliath, being driven to an operational site and then used under radio control. Goliath, much smaller, was carried on a trailer and was wire controlled being in some ways a less adaptable ancestor of "wheelbarrow".

A night infantry patrol discovered the BIV which was new to them and reported it lying disabled in no-mans-land beyond the "flyover". After the sappers removed the charge a REME recovery team investigated the vehicle and devised a means of winching it back to, and under, the bridge so that it could be examined behind cover. The operation involved positioning a Scammell behind the flyover and out of sight. The team had first to drag out a length of cable to be attached to the Scammell's winch rope which was itself too short. Further complications arose due to mortaring and avoiding enemy patrols. Then the BIV was found to be locked solid because of damage to its sprocket and road wheels, some of which had to be removed in situ. Eventually after two nights of furtive preparation an artillery and machine-gun "stonk" was organized to keep enemy heads down while the Scammell began to winch in.

Throughout these nocturnal operations there was careful planning and cooperation between the RE and REME.

Once safely back under the bridge the BIV was loaded onto a light recovery trailer, as shown in the photo in the December *Journal*. It was taken away for "intelligence assessment" and is believed to be the one in the US Army's Aberdeen Proving Ground collection. The REME Museum meanwhile makes do with a smaller Goliath kindly donated many years ago by the RE. The importance at the time of this first recovery of a new weapon was reflected in gallantry awards to some of the REME personnel involved.

On a separate subject the letter about "Sinkers" in the Normandy landings is most interesting. I have studied the equipment used for the invasion in some detail particularly last year in preparation for our own D-Day exhibition. The only equipment generally meeting this description was the "Rhino" ferry and certainly some of these made the channel crossing (and some failed to in the rough weather). The Rhinos were an ancestor of the present day pontoon ferries having ramp sections fore and aft and large diesel engined power units. Certainly the Rhinos grounded to unload and if the tide went out remained totally grounded but I do not know if they were intended for use as piers nor if they had any arrangement for flooding the pontoon. Presumably the "Sinkers" as described would have been drained by gravity before refloating as no mention is made of pumps. I am intrigued! Yours sincerely – Brain S Baxter, Deputy Curator.

## SINKERS

*From: Col J E Nowers BSc(Econ) FIMgt*

Sir, – I refer to the letter from Jim Holden in the December 1994 edition on this subject. "Sinkers" did indeed exist, together with their close relatives "Floaters".

Sinkers and Floaters were built up from an American equipment, the Naval Lighterage Pontoon, NL Pontoon for short. It was a steel tank 5ft long, 7ft wide and 5ft deep. Pontoons could be connected side by side and end to end to form a pier (floaters) or causeway (sinkers) of virtually any width and length.

In Normandy, six were built as causeways in the British sector and landed over 100,000 men dry-shod and almost 14,000 vehicles. They were built by 15 (Kent) GHQ Troop Engineers. The CRE, Brigadier L R E Fayle, published a detailed account in the *Journal* for June 1954 and the Corps Library has two albums of personal photographs – taken illegally perhaps – covering the Channel crossing, construction and operation of the causeways.

The story is not well-known and for this reason was given some prominence in the Museum's D-Day Exhibition, and special booklet which is still available at a price of £2 plus p&p. – J E Nowers, Colonel, Director, RE Museum.

## CHEH INCH AGEH

*From: Lieutenant G P Webb PEng*

Sir, – I can supplement Colonel Perceval's tale of "Cheh Inch Ageh" (6 Inches Forward) in the December *Journal*, with the classic instruction (in the reverse direction) given to an eager 30cwt driver *Jawan* in Roorkee, circa 1943 – "Aur pichee!" "Aur pichee!" "Thora aur pichee!" – CRASH! ... "Bas!". Yours sincerely – Geoff Webb.

## ITALIAN POST BLOWN UP CAPPUZZO CIRCA 1941

*From Colonel G W A Napier MA*

Sir, – Recently I came across the following cutting from, I think, the *Daily Telegraph* circa 1941.

It occurred to me you might reproduce it – someone might recollect the incident and come forward with further details. Yours – Gerald (Col G W A Napier).

### ITALIAN POST BLOWN UP

SAPPER DESTROYS "DUCE'S STATUE"

From Arthur Merton

Daily Telegraph Special Correspondent with the British Striking Force, Libya, Friday.

THAT tanks and armoured cars, whose remarkable achievements have been described in recent local despatches, have no monopoly in dash and daring has just been brilliantly demonstrated by a young sapper, whose repeated prowess and skill the Higher Command has warmly commended.

For a long time our observers have been annoyed by the enemy's "spotting" from a curious edifice some distance in front of the Customs House at Cappuzzo. The edifice is called "The Duce's Post" by the Italians, and "Musso's statue" by our troops.

It resembles a gigantic cat sitting on its haunches with its front paws joined and outstretched downward, facing towards our lines. In place of a head is a platform whence an observer, climbing by a stairway running up the cat's back, can see an extensive area of flat desert.

Fifty feet high, with a 20ft deep base, it was erected to permit the Duce to survey the country on his memorable visit to Libya, when he proclaimed himself Islam's protector. Standing on the platform, he looked for long over Egypt, much as Napoleon gazed towards England's white cliffs from the heights of Boulogne.

The British commander tired of the interference from "spotters" in the edifice, asked the young sapper officer, in private life a civil engineer, who had already done excellent mining work, to try to remove it. A few nights ago, with four sappers carrying a considerable quantity of guncotton, he sallied forth on his operation so near the Italian lines.

#### COVERED BY BARRAGE

BEFORE he crossed the barbed wire entanglements the adjacent Italian trenches were subjected to a heavy barrage which compelled occupants to seek shelter underground. When the barrage was lifted the officer crawled ahead carrying the guncotton charges.

An examination of the edifice showed it to be much more solid than was expected, but undaunted by this he cut the necessary holes in the base and inserted the charges so skilfully that the attention of the enemy troops nearby was not attracted.

Lighting the fuse he crawled away under cover of another barrage. A few minutes later there was a terrific explosion and the edifice went up.

The previous night the same officer, without being detected, had boldly blown up a portion of the Cappuzzo-Bardia road, mining it in all possible directions with high-explosive shells he had rescued from lorries left derelict after the Gerba battle.

## EINC

*From: Major D A Good*

Sir, – In your profile of the new Engineer in Chief (Vol 108, No 3) you mentioned that he was moved to Germany in the early 1970s to support the Harrier force.

This reminds me of an incident involving General Drewienkiewicz which no doubt he will recall. At that time 2nd Tactical Airforce had arranged a field

(off base) exercise for the Harrier squadron. The RAF had selected the site and instructed the troop of 38 Regiment to undertake the necessary engineering work to prepare the site. Captain DZ (as he was then) pointed out the unsuitability of the site to the force commander and stressed that it would not be possible to secure the take off/landing pad in the selected ground. His objections were overruled and he was told to get on with the job.

Needless to say the inevitable happened. One of the Harriers, on take off, lifted the pad which wrapped itself around the fuselage of the plane, causing considerable damage.

In very short time the Group Captain Operations in RAF Germany stormed down the corridors of power in Rheindahlen to the office of the Colonel E where he stressed in considerable detail that the Sappers had jeopardized the whole defence plan for NATO and western Europe by writing off one of the very few available Harriers.

The Colonel E, Colonel, later Brigadier, John Notley, who was never short of a sense of humour, listened patiently. Then he said "Group Captain – you should be grateful. It is not every day that we gift wrap your planes in aluminium foil for you ...".

Exit one slightly deflated RAF officer. Yours sincerely – Donald Good.

## BRIGADIER E V DALDY

*From: Major General P J M Pellereau MA FIMechE FIMgt*

Sir, – Brigadier E V Daldy, whose excellent memoir was in the December *RE Journal*, was one of my earliest military idols. In 1943 he came to the 45th (Drake's Drum) Division as CRE when we were training in Northern Ireland and quickly gained the admiration, respect and friendship of all ranks. Not surprisingly, his stay was quite short as he was moved on to planning for *Overlord*. But by then he had taught us much about the practicalities of war time operations and staff work.

But my fondest recollection of him comes many years later at an enormous conference on "mobilization" held at HQ Aldershot District where he had taken post as a retired officer. Those attending were (like me) COs or 2ICs of the multifarious training and depot units located in that area. It was a tediously long afternoon and many had despaired of visualizing how the planned mobilization could possibly work out. "Who could there be to drive the truck to the railway station to pick up the drivers to draw the trucks to be driven to the station etc etc?"!

We were almost packing up to depart dispiritedly when Brig (retd) Daldy (ROIII) asked the GOC presiding if he could say a few words which might raise our morale a little. The general nodded and we all expected some intellectual contribution because Daldy was probably the brightest brain at the meeting. This, however was the tale, which he told us:

> In 1938 he had been Adjutant RE of one of our front line divisions in Aldershot which had just been proudly mechanized. It was peace time soldiering at its best with plenty of sport and only the adjutant expected to work in the afternoon – for which he got paid extra. Gradually it became apparent that war could break out at any time. So he decided he had better look at the thick file kept in his office safe marked MOBILIZATION. Opening it he found that, after the expected item of officers having to hand in their swords to be sharpened, an early order was that the field companies had to draw extra fodder for their horses! He realized that this instruction had to be changed and set about trying to get some higher level staff to alter it. But try as he could he made no impression. So eventually he decided that he must tell his CRE, which with some trepidation he did. "Don't worry my boy" was the response. "It will be alright on the day". So Daldy continued to enjoy the warm summer of 1939 until of course late in August came the dreaded order to mobilize. But the very next item in his in-tray was his posting order effective immediately. So for him "It was alright on the day"! And indeed the division managed to get to France in their vehicles and in time for hostilities.

Like him, everyone in the room hoped that he would be well clear of Aldershot if ever mobilization was ordered. And we were. That is my last and happiest memory of E V Daldy – as splendid an officer as the Corps has ever contained. Yours – P J M Pellereau.

## GIANT VIPER

*From: Brigadier R A Blakeway OBE*

Sir, – I was amused to read Colonel Payne's letter to you about the Giant Viper in the December 1994 *Journal*. The fact that the equipment is still having development problems does not surprise me, but I am amazed to hear that it is still in service.

From 1953 to 1957 I was in charge of the explosives group at MEXE, and the Giant Viper was one of my responsibilities. It was the brainchild of the late Major Ronnie Maling, and, potentially, was a splendid toy to show off to senior officers, the press, etc on open days.

Unfortunately, however, in those days it was somewhat unpredictable in action. I think I can

remember the large rocket becoming detached from the hose, and circling overhead on more than one occasion. My memory may be at fault here, but I can remember dreading the idea of explaining to my director, the late Brigadier David Fayle, that the rocket had last been seen circling over Bournemouth, approaching the square.

I wonder what its problems are today – 40 years on. *Eheu fugaces*! Yours sincerely – Richard Blakeway.

### AN AIRFIELD TOO FAR, WORK OF NO 16 AIRFIELD CONSTRUCTION GROUP IN HOLLAND – SEPTEMBER 1944

*From: Colonel M H Cobb*

Sir, – In the *RE Journal* for December 1994 I was interested to read Colonel Mitchell's remark, when writing about his Airfield Construction Group's work in Holland in 1944, that his "task was to get men and equipment on to Arnhem airfield as soon as possible and do whatever was necessary to enable the second wave of I AB Div ...to land aircraft and gliders".

I was SO II to the Chief Engineer of Airborne Corps (Ken MacKay) at the time and was given the job of getting some two dozen American WACO gliders, each of which held a D2 angle-dozer, to Arnhem as soon as Deelan Airfield could take us. In fact I sat on an airfield in Essex with the gliders for five days, not knowing what was happening, until a signal arrived telling me to get out to Nijmegen soonest, by air to Brussels and by road thereafter. Only then did I begin to learn the truth.

I am most relieved to know, even 50 years later, that I would have been so safely received. Yours faithfully – Michael Cobb.

# Reviews

### STEAM TRACTION IN THE ROYAL ENGINEERS

COLONEL J E NOWERS

*Published by North Kent Books, 162 Borstal Road, Rochester, Kent – Price £4.50*
*ISBN 0 948305 07 X*
*Copies available from Corps Enterprises £4.50 + 50p p&p*

THIS little book covers the period 1845-1906 and includes not only the history of Sapper involvement with the steam engine but also a comprehensive commentary on the Balloon Corps. The book is written by a knowledgeable enthusiast as a result of extensive research, and chronicles the use of the steam engine by the sappers from 1868. He describes the fortunes of the first Steam Sappers (the names given to steam traction engines) on operations during the Boer War and the slow realization of the enormous savings in manpower to be gained by using steam power. The story of Sapper ingenuity and involvement in the earliest "state of the art" mechanical engineering techniques, underlines the extent to which the Corps was in the forefront of mechanical engineering throughout the Victorian era, and how civilian developments fed on military progress and vice versa. It also again demonstrates the ability of the Corps to change the direction of the army. As so often happened the new capability was rebrigaded after development. Thus in 1903/4 our expertise and the equipment was transferred to the Army Service Corps (ASC) when 77 and 78 Companies ASC were formed. This specialist book provides a fascinating insight into an area of the Corps unknown to most Sappers who knew only that 45 Field Support Squadron sported a steam tractor as their "corporate logo". KJD

### CIVIL ENGINEERING HERITAGE – SOUTHERN ENGLAND

EDITED BY R A OTTER BSC CENG MICE

*Published for the Institution of Civil Engineers by Thomas Telford Ltd, Thomas Telford House, 1 Heron Quay, London E14 4JD – Price £12.50*
*ISBN 07277 1971 8*

THIS volume is one of a series drawing on the archive compiled by the ICE's Panel for Historical Engineering works. The series seeks to make information from the archive available to a wider public. Although the ICE was founded in 1818 the archive includes many older works with a few, like Stonehenge, of great antiquity.

Also available in the series are "Northern England", "Wales and Western England", and

"Eastern and Central England". Future titles include "Scotland", "Ireland" and "London".

"Southern England" covers the Scilly Isles and the southern counties from Cornwall to Kent including Somerset, south Wiltshire and Surrey.

The book is divided into a number of sections, each covering a defined geographical area based mainly on county boundaries. Each section begins with a map, a list of the sites described and a brief introduction. Each site is then described. It's archive reference number and ordnance survey grid reference is given with suggestions for further reading. A bibliography covering the history of civil engineering is also included.

For Kent, 30 sites are listed including bridges, canals, railways, tunnels, dockyards and harbours, lighthouses. The Corps is mentioned in connection with the demolition of the medieval bridge at Rochester. In the discussion on Chatham Dockyard the work of Colonel G T Greene RE of the admiralty staff is mentioned but the extension of the dockyard to include St Mary's Island is not. Two surviving buildings in the dockyard were originally erected in the Woolwich Dockyard. The boat store at Sheerness Dockyard, also the work of Colonel Greene, is described.

Beaumont is mentioned in connection with the Channel Tunnel works but that he was a Royal Engineer is not. The Royal Military Canal is mentioned but without reference to the Military Staff Corps.

It seems odd to include prehistoric and Roman sites but to omit mention of any of the cathedrals and castles in the region. Some might also argue that Kent has little to do with southern England.

However, the books are well illustrated and present a useful survey of their region. JEN

## NOR ORDINARY MEN
### The Story of the Battle of Kohima
JOHN COLVIN

*Published by Pen & Sword Books Limited, 47 Church Street, Barnsley, South Yorkshire S70 2AS – Price £18.85*
*ISBN 0 85052 373 7*

MANY people under the age of 65 will have heard of Kohima and perhaps even be aware that it was a battle of some significance in South East Asia during the Second World War. Few are probably aware of the scale of this victory by Allied forces against great odds, in the siege of Kohima, where incredible feats of heroism were displayed. The siege shared the fate of Slim's "Forgotten Army" due to the neglect of those in the UK to give proper recognition to the achievements of that magnificent army.

In early 1943 the war in South East Asia had reached a critical stage; Slims 14th Army was sensing that victory was becoming a real possibility. In Ronald Lewin's book Slim[1] we read:

> Instead of retreating in panic, 4 Corps (of the 14th Army) and its reinforcements were either standing fast or bitterly contesting any ground surrendered – and nowhere more so than around the District Commissioner's bungalow at Kohima. Round this historic little demesne Slim's 14th and Mutaguchis 15th Armies interlocked. The defence of Kohima ridge by Colonel Richards, 4th Royal West Kents and the rest of the meagre miscellaneous garrison was epic – Sato, of 31 Division, had strict instructions to take and hold Kohima – no more!
>
> This book describes how "4th Royal Kents and the rest of the meagre miscellaneous garrison" withstood the might of a whole Japanese division"
>
> The author John Colvin, does not have an army background. He was educated at Dartmouth and served in the Royal Navy throughout the Second World War, mainly in cruisers and battle cruisers in the Far East. Nevertheless, he writes with great understanding, insight and sympathy for fighting soldiers involved in a desperate hand to hand battle in fearsome terrain and under appaling conditions. The details of the battle are enthralling. But how did an ill assorted battalion group withstand the might of a whole division? Colvin is in no doubt. It was due to the incredible bravery, devotion to duty and loyalty to comrades of small groups of soldiers from various regiments and corps, with the 4th Royal West Kents providing the backbone. He provides fascinating pen pictures of many of those officers and soldiers. Of Lieutenant John Wright RE he concludes "Wright deserved a VC, his *Naik* was awarded the Indian DSM.

Don't be put off by some rather wordy introductory chapters to this book. The description of the siege of Kohima is well worth waiting for.

FRB

[1] *Slim: The Standard-bearer* by Ronald Lewin published by Leo Cooper 1976.

# Journal Awards

The Publications Committee announces the following awards for articles of special merit published in the December 1994 *Journal*.

MINEFIELD CLEARANCE IN CENTRAL BOSNIA
by Captain P A Buttery – **£75**

REMINISCENCES OF A CORPS SOREII IN THE BRITISH LIBERATION ARMY – 1944
by Brigadier H G W Hamilton – **£75**

T W J CONNOLLY – THE MAN
by Major J T Hancock – **£50**

THE BOAT STORE, SHEERNESS DOCK
by Major F J Green – **£50**

UN HQ BOSNIA-HERCEGOVENA COMMAND ENGINEERS
by Lieutenant Colonel M D Reynolds – **£25**

A further special award of **£100** was made to Lieutenant Colonel T H E Foulkes, for the second set of three articles on famous 19th century military/civil engineers.

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# Annual Awards

Awards for articles of special merit published in 1994, were made as follows:

**Montgomerie prize**
DISASTER RELIEF IN CENTRAL NEPAL
by Major R White – **£75 or a set of Corps History**

**Arthur Ffolliott Garrett Prize**
EXCAVATION OF A 2200 TONNE GOLD DREDGE FROM FROZEN GROUND
by Major G B O R Jones – **£100**

**Best article of the year**
THE TUNNEL – A FEASIBILITY STUDY 1967
by Brigadier J Constant – **£100**

**Best junior officer article of the year**
MINEFIELD CLEARANCE IN CENTRAL BOSNIA
by Captain P A Buttery – **£50**

# Centurion AVRE Centrepiece

A NEW centrepiece has been commissioned by the Corps to mark the withdrawal of the Centurion AVRE Mark 5 in 1994, after 31 years' service.

A ¼th scale silver model has been made by the Corps' silversmiths, Jonathan Beeby and James Powell, of Rochester, to complement the model of the Churchill AVRE which was made in 1964.

The main silver plate on the plinth describes the model, and on the remaining three faces are silver plates with views of the No 8 Bridgelayer, Ark and fascine, and Giant Viper variants, engraved by hand by David Beaumont, of Rainham.

The model was displayed at the Corps' guest night on 9 February 1995, and at the annual Goldsmiths Company's Exhibition during March. It is destined to go to 32 Engineer Regiment at Hohne, to join the Churchill AVRE, on permanent loan.

# Abbreviations used in this Journal

| | | | |
|---|---|---|---|
| CO | Commanding Officer | mm | millimetre/s |
| cm | centimetre/s | mph | miles per hour |
| CRE | Commander, RE | mpg | miles per gallon |
| CSgt | Colour Sergeant | NCO | Non Commissioned Officer |
| CSM | Company Sergeant Major | OC | Officer Commanding |
| DUKW | D=1942/U=Utility/K=All wheel drive/W=twin wheeled vehicle | POW | Prisoner/s of War |
| | | RAF | Royal Air Force |
| etc | et cetera | RE | Royal Engineers |
| ft | foot or feet | RN | Royal Navy |
| GHQ | Garrison/General Headquarters | RSM | Regimental Sergeant Major |
| HM | Her/His Majesty | SNCO | Senior NCO |
| HMS | Her/His Majesty's Ship | TA | Territorial Army |
| hr/s | hour/s | UK | United Kingdom |
| HQ | Headquarter/s | UN | United Nations |
| in/s | inch/s | USA | United States of America |
| JNCO | Junior NCO | VIP | Very Important Person |
| km/s | kilometre/s | VJ | Victory in Japan |
| LSgt | Lance Sergeant | WO | Warrant Officer |
| M | Million/s | WW1/2 | World War One/Two |
| m | metre/s | yd/s | yard/s |



Centurion AVRE Centrepiece p112.